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Editor's Note

I am pleased to announce that the Ferdowsi University of Mashhad is publishing Iranian Journal of Accounting, Auditing & Finance (IJAAF). On behalf of the board of the IJAAF and my co-editors, I am glad to present the Volume 1, Issue 1 of the journal in December 2017; the journal will publish four issues in a year. The board includes experts in the fields of accounting, finance and auditing, all of whom have proven track records of achievement in their respective disciplines. Covering various fields of accounting, *IJAAF* publishes research papers, review papers and practitioner oriented articles that address significant issues as well as those that focus on Asia in particular. Coverage includes but is not limited to:

- Financial accounting
- Managerial accounting
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- Taxation
- Accounting information systems
- Accounting education

Perspectives or viewpoints arising from regional, national or international focus, a private or public sector information need, or a market-perspective are greatly welcomed. Manuscripts that present viewpoints should address issues of wide interest among accounting scholars internationally and those in Asia in particular.

Yours faithfully,
Mahdi Moradi
Editor in Chief

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RESEARCH ARTICLE

The Relationship between Social Crises and Quality of Managers' Financial Decision-Making: The Mediating Role of Financial Crisis

Mohtaram Bizhanizadeh, Mohammad Ali Bagherpour Velashani*, Reza Hesarzadeh

Department of Accounting, Faculty of Administrative and Economic Sciences, Ferdowsi University of Mashhad, Mashhad, Iran

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Abstract

Managers may be more inclined to adopt conservative financial policies in response to social crises and unstable conditions. Such an approach can reduce corporate investments, growth opportunities, and available financial resources, ultimately exerting a negative impact on firms' financial performance through management's financial decisions. The primary objective of this paper is, therefore, to examine the mediating role of financial crises in the relationship between social crises and the quality of managers' financial decision-making. The study population comprises companies listed on the Tehran Stock Exchange (TSE) from 2018 to 2023. A systematic elimination method was employed to select the research sample. For data analysis, EViews 10 software and multiple regression models were utilized. The empirical results reveal a significant negative association between social crises and the quality of managers' financial decision-making. In contrast, a significant positive association is observed between social crises and financial crises. However, as the financial crisis variable was not statistically significant in the regression analysis involving both the independent and mediating variables, the mediating role of financial crises in the association between social crises and the quality of financial decision-making by managers is rejected. This study contributes to managerial and policy perspectives by providing deeper insights into the challenges associated with decision-making and by helping to bridge the existing information gap in this domain. The findings underscore the importance of managers adopting more effective strategies during unstable and crisis conditions to ensure operational continuity and enhance organizational resilience. In practical terms, developing flexible financial programs that enable firms to adjust rapidly to sudden changes is essential. Additional measures include strengthening risk management systems, establishing financial reserves, reducing unnecessary costs, and prioritizing investment projects with faster payback periods. The novelty of this research lies in being the first to investigate the impact of social crises on the quality of managers' financial decision-making (financial performance), while simultaneously examining the mediating role of financial crises—an issue previously unexplored in either domestic or international studies.

Keywords:
Decision-making, Financial Crisis, Quality of Financial Decision-making, Social Crises

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*Corresponding Author:
Mohammad Ali Bagherpour Velashani
Email: bagherpour@um.ac.ir
Tel: 09132279622
ORCID: 0000-0002-0255-0810

1. Introduction

The emergence of crises and challenges, both within and outside organizations, is inevitable and occurs over time. No private or public organization—regardless of its size—remains unaffected by such crises, particularly social crises. The undeniable interconnections between organizations and their social environments imply that organizational performance and profitability are heavily dependent on external environmental factors (Yousefnezhad & Heidarpour, 2023). The term "crisis" literally denotes the onset of chaos and disorder, and in a broader sense, refers to circumstances in which the normal order and balance of life are disrupted, creating a misalignment between needs and available resources (Raeisi et al., 2020). A crisis represents conditions in which the core objectives of the organization are threatened (Hills, 2000) and the regular functioning of systems is challenged (Conges et al., 2023; Ghorbani Marghmaleki et al., 2022). Such circumstances pose considerable difficulties for organizations, requiring prompt and efficient responses (Bénaben et al., 2016). Crises exert substantial pressure on organizational resources—both human and financial—potentially disrupting decision-making processes, lowering performance (Valizadeh et al., 2021), and even threatening organizational survival (Rabiei & Sarafrazi, 2015).

Difficulties and disruptions in decision-making may arise, on the one hand, from threats to the personal interests of decision-makers (Bagherifard & Tokli, 2023) and, on the other, from the reduced effectiveness of conventional managerial decision-making patterns under abnormal conditions (Raeisi et al., 2020). In crises, managers are often faced with incomplete information, limited time, and both internal and external pressures, all of which can compromise the quality of decision-making (Kamari et al., 2018). Moreover, the occurrence of social and financial crises can result in reduced productivity, heightened employee anxiety, and the loss of key personnel (Rabiei & Sarafrazi, 2015; Bekefi & Epstein, 2006). These crises may also diminish financial resources and opportunities for growth and investment (Rezaei, 2023), harm corporate reputation, decrease customer bases, and increase expenses for advertising, sales, administration, and public relations (Patatoukas, 2012), among other adverse consequences.

Therefore, understanding crises and their consequences, as well as implementing effective measures to address or mitigate their potential and actual impacts (Hosseini & Damnabi, 2012; Rabiei & Sarafrazi, 2015; Spillan & Hough, 2003), can reduce the level of surprise among individuals and organizational leaders (Kamari et al., 2018) and enhance alignment with an ever-changing environment (Burnett, 1998; Maitland & Sammartino, 2015). In addition, strengthening an organization's ability to cope with crises, developing creative solutions for their management (Bekefi & Epstein, 2006), and allocating sufficient time and resources in advance can increase organizational capacity to generate diverse solutions and minimize the risk of unexpected disruptions. Ultimately, these measures contribute to more efficient and effective decision-making, greater profitability, the prevention of failures, sustained success, and the long-term continuity of operations.

In light of these considerations, this study seeks to address the following four fundamental research questions, with a focus on the crises that occurred in Iran in 2018, 2020, and 2023:

1. Do social crises influence the occurrence of financial crises?
2. Do social crises impact the quality of managers' financial decision-making?
3. Does a financial crisis affect the quality of managers' financial decision-making?
4. Does a financial crisis mediate the relationship between social crises and the quality of managers' financial decision-making?

It is worth noting that while several studies have separately examined social crises (e.g., Raeisi et al., 2021), financial decision-making (e.g., Rai & Lin, 2019), and financial crises (e.g., Eriotis & Vasiliou, 2024), no prior research has investigated these constructs in an integrated manner. This

study, by focusing on the social crises mentioned above, seeks to assess their specific impact on the quality of managers' financial decision-making (financial performance). Furthermore, it explores the mediating role of financial crises—an aspect that, to the best of our knowledge, has not been addressed in either domestic or international research. Accordingly, this study contributes a novel perspective to the literature.

The remainder of this paper is structured as follows. The next section outlines the theoretical foundations and develops the research hypotheses. This is followed by the research methodology and the presentation of findings. Finally, the paper concludes with a discussion of the results and their implications.

2. Literature review and hypotheses development

This section introduces the main research variables, including the quality of managers' financial decision-making, and identifies the key factors influencing this process. It also examines social and financial crises, explores the relationships among the research variables, and presents the research hypotheses grounded in theoretical foundations and prior literature.

2.1. Quality of managers' financial decision-making

Quality is a complex concept that has been extensively debated across management theories (Fred, 2000). Organizations that value quality strive to cultivate a culture that generates value by promoting behaviours and activities that meet the needs and expectations of customers and other stakeholders, thereby fulfilling their requirements (INSO, 2017). In this sense, quality can be defined as the extent to which a company meets customer requirements (Kurt & Zehir, 2016), primarily through optimal and effective decision-making. Decision-making is both a skill (Ahmed & Omotunde, 2012) and an integral component of organizational management. It is reflected in various managerial functions, including policy formulation, goal setting, organizational design, and the evaluation and selection of alternatives under different circumstances. Essentially, decision-making entails choosing one course of action from among several available options (Karami et al., 2020). As such, it constitutes the central element of planning. Within this framework, managers make a wide range of financial decisions with the ultimate aim of maximizing the economic welfare or income of the firm's owners. These financial decisions are typically classified into three main categories, as follows:

Investment Decisions: Investment decisions determine how organizational resources and funds are allocated. Examples include establishing a new production line, constructing a warehouse, investing company funds in financial institutions, or making decisions regarding the acquisition, retention, or disposal of corporate assets. Such decisions require rigorous analysis and long-term planning, as they have a direct impact on the organization's financial stability and operational trajectory.

Financing Decisions: Financing decisions concern the methods by which a company secures the funds necessary to implement income-generating projects and support its organizational growth and development. Such decisions include whether managers should rely on internal sources, such as retained earnings, or external sources, such as bank loans or the issuance of common and preferred stock (Shabahang, 2012; Fabozzi & Peterson, 2003). These decisions are particularly critical because each financing method entails distinct implications for the company's financial structure and strategic direction.

Combined Decisions: Some organizational decisions encompass both investment and financing dimensions. For instance, when a company plans to establish a new production line (an investment decision), the success of the project largely depends on the chosen financing method. In such cases, managers must simultaneously consider both investment and financing aspects to ensure that the

project is implemented effectively and generates the expected return (Fabozzi and Peterson, 2003).

It is essential to note that two key factors—risk and return—play a crucial role in the financial decision-making process (Shariat Panahi et al., 2019). Expected return reflects the difference between potential profits and costs arising from decisions, while risk represents the degree of uncertainty associated with those returns (Fabozzi & Peterson, 2003). For managerial financial decisions to create value for the firm and its stakeholders, the anticipated benefits must outweigh the associated costs. The relationship between risk and return is therefore central to the quality of financial decision-making, as managers must strike an appropriate balance between these two elements. High-quality financial decisions are characterized by maximizing expected returns while effectively managing the related risks. In other words, managers must ensure that decisions generate reasonable returns while accounting for potential uncertainties. This balance between risk and return not only determines the quality of financial decision-making but also facilitates the achievement of strategic objectives. Accordingly, a sound understanding of this relationship and its implications for both investment and financing decisions enables managers to make more optimal financial choices. Such decisions enhance corporate financial performance and lay the foundation for creating sustainable value for stakeholders.

2.2 Factors affecting the quality of managers' financial decision-making

In the business environment, the quality of various decisions, including financial decisions, is shaped by multiple factors. Drawing on theoretical foundations, this study investigates the impact of several key determinants, namely managerial oversight, value-based management, financial leverage, gender, and firm size.

Power of Management Oversight: Competent managers can enhance firm performance through high-quality decisions only when they are subject to rigorous oversight (Khademalhosseini & Amirhosseini, 2018). Oversight functions as a critical deterrent to managerial behaviors that prioritize personal interests over organizational objectives (Cheung et al., 2017). In essence, monitoring managerial actions and decisions promotes ethical conduct and improves the quality and effectiveness of managerial activities, including financial decision-making (Nejatbakhsh Esfahani & Motahari, 2013; Nikpour et al., 2015). Agency theory (Jensen & Meckling, 1976) explicitly highlights the conflicts of interest between managers and shareholders. According to this theory, managers may utilize organizational resources for personal benefit, thereby reducing firm value and increasing agency costs. Within this framework, managerial oversight is considered a key mechanism to mitigate conflicts of interest and achieve an optimal capital structure. Effective oversight ensures that decisions are aligned with the best interests of the organization and its shareholders while minimizing agency costs.

Value-Based Management: This approach emphasizes value-enhancing decision-making at all organizational levels (Kordestani & Khansari, 2016). Beyond restating organizational goals and plans or defining control mechanisms, value-based management identifies both financial and non-financial drivers that contribute to organizational value creation (Koller, 1994). When managers are aware of these drivers, they are more likely to achieve organizational objectives with greater focus and fewer errors through informed decision-making. As a result, value-based management fosters conditions that enhance firm value (Rahnamae Rudposhti et al., 2020; Stancic et al., 2012) and strengthen competitive advantage. In this regard, value-based management and stakeholder theory serve as complementary approaches to management. Value-based management provides a framework for effective decision-making by emphasizing value-creating factors, while stakeholder theory broadens the scope of attention to include diverse stakeholder groups. This integration ensures that decisions generate not only financial but also social value. The alignment of these two perspectives thus enables

organizations to achieve sustainable competitive advantage in today's dynamic and competitive environment.

Financial Leverage: As debt levels rise, organizational managers and decision-makers often become less inclined to invest in projects with a positive net present value (NPV), since they believe the benefits of such projects will accrue primarily to creditors rather than shareholders (Myers, 1977). This reluctance may hinder future growth (Nouravesh & Yazdani, 2019) and limit the capital generated from value-enhancing projects. Reduced capital and funds within a company's limits managers' capacity for innovation and value creation through high-quality decisions. Additionally, managers may attempt to boost company value through the implementation of weak projects. In such circumstances, reliance on debt financing may lead to lower-quality decisions and ultimately diminish firm value (Nouravesh & Yazdani, 2019). According to the traditional theory of capital structure, using debt up to an optimal level can increase firm value, whereas excessive debt raises financial risk and adversely affects performance. Nonetheless, financial leverage can also provide notable benefits, including higher returns on equity, lower cost of capital, preservation of shareholder control, and tax advantages (Hashemi & Akhlaghi, 2012). In line with this view, the modified Modigliani–Miller theory (1963) emphasizes the tax benefits of debt, noting that interest payments are tax-deductible and thereby reduce the overall cost of capital, which can enhance firm value.

Gender: The presence of women on boards of directors can enhance oversight and control of organizational activities, foster innovation, and stimulate creative ideas (Huse et al., 2009). Women are also more likely to prioritize qualitative issues, such as corporate social responsibility (Hafsi & Turgut, 2013), and demonstrate stronger adherence to professional ethics (McCabe et al., 2006), thereby enhancing the quality of managerial decision-making. However, Adams and Ferreira (2009) argue that while female representation on boards enhances effectiveness in U.S. firms, gender diversity may, in some cases, complicate decision-making processes, reduce board efficiency, and negatively affect firm value due to increased complexity of oversight. From a theoretical perspective, stakeholder theory (Freeman, 1984) extends organizational responsibility beyond shareholders to all stakeholder groups—internal, external, and marginal. Within this framework, gender diversity on boards can serve as a mechanism for the more effective implementation of stakeholder theory. Women's stronger ethical and social orientations can encourage more balanced and responsible decision-making, benefiting a wide range of stakeholders. Accordingly, integrating gender diversity and stakeholder theory can help organizations enhance their financial performance while simultaneously fulfilling social responsibilities, ultimately achieving long-term, sustainable success.

Company Size: Firm Size. Larger firms, with broader market reach and stronger external support, typically possess greater expertise and experience (Rahmanian Kushkaki & Badyab, 2023). This increased expertise reduces managerial errors and improves decision quality, which in turn enhances organizational efficiency and financial performance (Rahmanian Kushkaki & Badyab, 2023; Ramli et al., 2019). Moreover, large firms often have access to more financial and physical resources and benefit from economies of scale. Such access enables them to develop unique capabilities, according to the resource-based view (RBV), which provides a foundation for a sustainable competitive advantage (Wartini et al., 2024). The RBV is one of the central approaches in strategic management, emphasizing the role of internal resources in achieving long-term competitive advantage. While large firms rely on extensive tangible resources, smaller firms can also gain a competitive advantage by leveraging intangible resources and organizational flexibility. In both cases, the RBV highlights that distinctive resources and capabilities are the primary drivers of sustainable competitive advantage (Wartini et al., 2024). Ultimately, competitive advantage not only improves financial performance but also fosters creativity and innovation in managerial decision-making.

In addition to the factors discussed above, several other elements can also influence the quality of

managerial decision-making. These include board independence (Petra, 2007), managers' financial education (Ghadamyari & Naghshbandi, 2020), training and development policies (Lepak & Gowan, 2010), awareness of laws and regulations (Khorshidi & Zarinkia, 2017), the integration of software and information systems (Hutahayan, 2020), and macroeconomic conditions such as inflation (Fan et al., 2012).

2.3. Explanation of social crises

Social Crises. Social crises refer to adverse conditions marked by deviations from the normal social order, resulting in distress and disorder (Ogundele & Olarewaju, 2014; Yarahmadi Khorasani, 2007). Such crises can impact all sectors of society (Ogundele & Olarewaju, 2014) and yield a wide range of detrimental outcomes, including economic costs, currency devaluation, intensified sanctions, and erosion of national independence (Gholami, 2021). They may also undermine public trust, foster social divisions, incite unrest and riots, and disrupt routine societal activities (Obateru, 1994).

Beyond their societal implications, social crises have a profound impact on organizations. These impacts can be analyzed in three dimensions: economic, social, and operational–organizational.

2.3.1 Social crises, economic impacts

Social crises can exert substantial economic pressures on both organizations and national economies. These impacts include increased costs for repairing and reconstructing damaged infrastructure, compensating for losses caused by crises, and restructuring organizations to adapt to new conditions. For instance, in the aftermath of widespread protests or acts of sabotage, firms may incur additional expenses to secure facilities and equipment. Furthermore, reduced profitability stemming from disruptions in production and service delivery represents another key economic consequence. Such conditions place financial strain on organizations and may ultimately expose them to financial crises.

2.3.2 Social crises and social impacts

Social crises have a significant impact on an organization's reputation and social relations. One of the most critical consequences is the loss of credibility and public trust resulting from poor crisis management (Burnett, 1998). For instance, when organizations fail to respond effectively, they risk losing the confidence of customers, investors, and the broader community. This erosion of trust can lead to declining sales, customer attrition, and reduced investment. Moreover, social crises may intensify tensions within organizations and strain relationships among employees.

2.3.3 Social crises operational-organizational impacts

Social crises can significantly disrupt an organization's internal functioning. Such impacts include strained employee relationships, reduced motivation, heightened anxiety, and the endangerment of organizational objectives (Rabiei, 2007). For example, during crises, employees may lose focus and experience performance declines due to concerns about the future. Additionally, social crises can hinder organizational responsiveness to environmental changes, reduce production, and disrupt service delivery. Collectively, these constraints significantly undermine an organization's ability to achieve its objectives.

Although social crises primarily generate negative consequences, they may also create opportunities for organizations. For instance, crises can help identify capable and effective personnel, reassign individuals to more suitable positions, and uncover hidden organizational problems. They may also catalyze the completion of new plans and programs, the development of early warning mechanisms, and the fostering of new sources of competitive advantage (Burnett, 1998).

2.4. Explanation of financial crisis

A financial crisis is typically characterized by a rapid decline in asset values (Percic et al., 2013) and arises when a firm is unable to meet its debt obligations or fulfill other financial commitments (Yosefnezhad et al., 2023). Financial crises are not a new phenomenon (Reinhart & Rogoff, 2009; Kannan et al., 2014) and have occurred across societies, regardless of their size or level of wealth. Such crises pose significant challenges for firms, profoundly influencing managerial decision-making, corporate performance, and organizational structures. Managers recognize that implementing most programs and activities requires adequate financial resources; when these are lacking, decision-making is severely constrained, operational capacity is weakened, and financial burdens increase. A shortage of resources may also prevent firms from investing in new projects (Rezaei, 2023) or meeting creditor obligations, potentially leading to market exit (Musso & Schiavo, 2008) and threatening business continuity (Isayas & McLean, 2021). Consequently, firms experiencing financial crises often resort to extraordinary measures to restore financial performance.

In other words, managers recognize that the execution of most programs and activities depends on the availability of sufficient financial resources. A shortage of these resources can severely constrain decision-making, weaken operational capacity, and impose substantial financial burdens. Moreover, insufficient funding may prevent firms from investing in new projects (Rezaei, 2023) or meeting their obligations to creditors, potentially leading to market exit (Musso & Schiavo, 2008) and threatening business continuity (Isayas & McLean, 2021).

2.5. Hypotheses development

2.5.1. Social crises and quality of managers' financial decision-making

One of the key objectives of financial decision-making is achieving financial flexibility (Sabouri, 2021), which is considered a vital component of capital structure (Gregory, 2020). Firms with greater financial flexibility are better equipped to withstand adverse external shocks, such as social crises, compared to less flexible firms (Sabouri, 2021). During crises, the time available for making critical decisions—including financial ones—shrinks, limiting the ability to gather adequate data and information. These constraints, in turn, heighten psychological pressure, anxiety, and stress among decision-makers (Arab Salehi et al., 2017; Rabiei & Sarafrazi, 2016; Hosseini, 2006). As emotional reactivity increases (Mostafavi et al., 2022), cognitive capacity declines, detachment from environmental realities emerges, and managers often fail to consider the long-term consequences of their decisions. This shift in focus toward short-term issues raises the likelihood of analytical errors and poor decision-making outcomes. Ultimately, the interplay of these factors diminishes the quality of managerial decision-making, particularly in financial domains. Social crises—such as widespread protests—destabilize the economic and commercial environment, making future conditions difficult to predict and rendering financial planning based on historical data less effective. Under such uncertainty, managers become more prone to errors in evaluation, which further reduces decision quality. Social crises influence multiple aspects of financial decision-making, including liquidity management, investment, and financing. For instance, liquidity management becomes challenging when declining sales or unexpected expenses disrupt cash flows. Investment decisions are also affected, as heightened uncertainty discourages managers from undertaking long-term projects. Moreover, financing constraints intensify during crises, since access to financial resources becomes more restricted and costly. As a result, social crises influence not only the psychological state of decision-makers but also the overall quality of financial decision-making by generating instability in the economic environment. Accordingly, the first research hypothesis is formulated as follows:

H1: There is a significant and negative relationship between social crises and the quality of

managers' financial decision-making.

2.5.2 Social crises and financial crises

When a crisis engulfs a society, both internal and external forces may exert pressure on the target country, attempting to weaken its stability and drive it toward collapse. Such pressures are often manifested through the character assassination of officials and the erosion of public trust, diverting attention from vital issues to less significant ones. Under these conditions, sabotage and terrorist activities may intensify, producing destructive consequences for businesses, individuals, and communities (Bekefi & Epstein, 2006). These activities not only undermine societal security but also generate instability that affects stock markets and corporate financial decision-making (Tosun & Eshraghi, 2022). This instability may encourage capital flight, as investors seek safer markets abroad. Consequently, declining social security and heightened instability exert direct negative effects on firms' financial performance. Specifically, reduced social security and increased instability can trigger capital withdrawal from production sectors, depress consumption in developing economies (Dutt & Padmalabhan, 2011), and decrease corporate profitability, ultimately leading to losses. These outcomes reflect the elevated risks associated with conducting economic activities under unsafe conditions. In addition, declining public trust in government and economic institutions can reduce participation in economic activities, which has a direct and negative impact on firms' revenues. As a result, companies may experience reduced income alongside rising costs, increasing their vulnerability to financial crises and even bankruptcy. Moreover, the spread of social crises around corporate facilities can impose substantial additional costs, such as: 1) the cost of employing someone to negotiate or talk with protesters, 2) paying an additional fee to protect the building and prevent various damages to it, 3) death or serious injury to company employees (if these people are skilled and trained employees of the organization, the amount of costs increases), 4) work stoppage, 5) damage to the company's reputation, 6) waste of time and resourses (Bekefi and Epstein, 2006). All of these factors diminish the financial resources required and available to organizations, constrain creative decision-making, and may ultimately push firms into financial crises, resulting in performance decline and potential bankruptcy. Accordingly, social crises—by reducing security, eroding public trust, and increasing operating costs—directly and indirectly affect firms' financial resources and may trigger financial crises. Thus, the second research hypothesis is formulated as follows:

H2: There is a significant and direct relationship between social crises and financial crises.

2.5.3 Financial crisis and the quality of managers' financial decision-making

A financial crisis reduces the availability of essential financial resources needed to implement corporate activities and programs. Under such conditions, two scenarios may arise: a) Managers may allocate resources only to projects with reasonable assurance of profitability (Espinosa, 2015; Hadian et al., 2017). To conserve resources and sustain operations, they may strengthen processes and decision-making structures, which can lead to innovative and higher-quality decisions. b) Conversely, declining financial resources and the onset of a financial crisis may erode investor confidence and negatively affect the firm's stock value. Financial crises increase economic uncertainty, create liquidity problems, reduce profits (Karshenasan et al., 2018), and lower dividend payments to shareholders. These outcomes diminish stock attractiveness, hinder growth, and weaken overall firm performance, including financial performance, which is the result of managerial decision-making (Yosefnezhad et al., 2023; Chen et al., 2014). Accordingly, the third research hypothesis is formulated as follows:

H3: There is a significant relationship between financial crises and the quality of managers'

financial decision-making.

2.5.4 Social crises and quality of managers' financial decision-making: the mediating role of financial crisis

Decision-making, including financial decisions, is one of the most fundamental processes in any organization. Enhancing the quality of this process requires the collection and analysis of financial data and information (Zabihzadeh & Molaei, 2023). However, as noted earlier, crises such as social crises reduce the time available for decision-making and limit the information accessible to managers (Yosefnezhad et al., 2023), thereby impairing their ability to make high-quality decisions. Moreover, social crises may restrict organizational access to financial resources and, by imposing additional costs, trigger financial crises. Under such circumstances, companies may attempt to offset costs by reducing the quantity and quality of their products (Sikwila, 2011). This strategy undermines competitiveness in both domestic and international markets, leading to lower profits and, ultimately, a decline in firm value and performance—the direct outcome of managerial decisions, including financial ones. Accordingly, the fourth research hypothesis is formulated as follows:

H4: There is a significant relationship between social crises and the quality of managers' financial decision-making, with a mediating effect of financial crises.

3. Research methodology

This research is applied in terms of purpose and descriptive-ex post facto in terms of methodology, as it relies on historical and analytical data. The statistical population comprises all firms listed on the Tehran Stock Exchange (TSE) from 2018 to 2023. The research sample was selected using a systematic elimination method. Accordingly, only firms meeting the following criteria were included, while the remaining companies were excluded.

1. Firms must have been listed on the Tehran Stock Exchange before 2018 and remained listed until the end of 2023.
2. Firms operating in the leasing, insurance, investment, pension fund, or banking sectors were excluded.
3. Firms must have maintained continuous operations throughout the research period without altering their fiscal year.
4. Annual and interim financial statements must be publicly available for the entire study period.

In this study, the values related to the dependent variable are calculated using the model proposed by Pastor et al. (1999), applied separately to each industry. To enhance the credibility of the results, the number of firms within each industry must be sufficiently large. Roychowdhury (2006) recommends a minimum of 15 firms per industry. However, Persian studies often use fewer firms due to sample size limitations; for instance, Hedayat Mazhari et al. (2021) considered five firms per industry sufficient for analysis. Accordingly, to balance methodological rigor with data availability and to prevent excessive sample reduction, this study requires a minimum of seven firms in each industry.

Ultimately, 137 firms that satisfied the above criteria were selected as the final statistical sample for this study. Table 1 presents the detailed process of sample selection.

Table 1. Final sample selection steps

Explanation	The number of companies
Total number of firms listed on the Tehran Stock Exchange during the research period.	585
Exclusion of firms operating in the leasing, insurance, investment, pension fund, or banking sectors.	(269)
Exclusion of firms whose fiscal year does not end on March 19 (29 Esfand).	(67)
Exclusion of firms that suspended operations, changed their fiscal year, or had incomplete data.	(87)
Exclusion of industries with fewer than seven firms.	(25)
Accessible Population	137

To develop the research background and clarify the required concepts, library resources and articles published in reputable journals were reviewed. The data needed for measuring the variables were obtained from the databases of the Securities and Exchange Organization, the annual financial statements of firms, and the Rahavard Novin 3 software. For data analysis, EViews 10 software was employed, and multiple regression tests were conducted.

3.1 Specification of models and definition of variables

In this research, the following models are used to test the first to fourth hypotheses, respectively;

$$RE = a_0 + a_1SC + a_2SG + a_3S + a_4POMS + a_5MA + a_6LEV + a_7G + a_8FSIZE + a_9FIN + a_{10}BS + a_{11}BI + a_{12}AGE + a_{13}ROA + a_{14}ROE \quad (1)$$

$$FC = a_0 + a_1SC + a_2SG + a_3S + a_4POMS + a_5MA + a_6LEV + a_7G + a_8FSIZE + a_9FIN + a_{10}BS + a_{11}BI + a_{12}AGE + a_{13}ROA + a_{14}ROE \quad (2)$$

$$RE = a_0 + a_1FC + a_2SG + a_3S + a_4POMS + a_5MA + a_6LEV + a_7G + a_8FSIZE + a_9FIN + a_{10}BS + a_{11}BI + a_{12}AGE + a_{13}ROA + a_{14}ROE \quad (3)$$

$$RE = a_0 + a_1FC + a_2SC + a_3SG + a_4S + a_5POMS + a_6MA + a_7LEV + a_8G + a_9FSIZE + a_{10}FIN + a_{11}BS + a_{12}BI + a_{13}AGE + a_{14}ROA + a_{15}ROE \quad (4)$$

3.2 Research variables and their measurement methods

3.2.1 Independent variable

This variable is defined as binary, taking the value of 1 in the presence of a social crisis and zero otherwise. The 2022 crisis lasted for approximately three months, while the 2019 and 2017 crises each lasted less than ten days. All three crises occurred during the second half of their respective years. In line with Howell and Zhao (2019), and given the limited availability of reliable information as well as the lagged impact of such events on financial markets, the end of each crisis is considered with a slight delay. Accordingly, for the years 2022, 2019, and 2017, the pre-crisis and crisis periods correspond to the first and second halves of the year, respectively.

3.2.2 Dependent variable

In this study, the quality of managers' financial decision-making (RE) is estimated using the model proposed by Pastor et al. (1999). The model is specified as follows:

$$\min \quad \mathrm{Re}(X_0, Y_0) = \frac{1 - \frac{1}{m}\sum_{i=1}^{m} \frac{s_{i0}^-}{x_{i0}}}{1 + \frac{1}{s}\sum_{r=1}^{s} \frac{s_{r0}^+}{y_{r0}}} \qquad (5)$$

$$s.t. \quad \sum_{j=1}^{n} \lambda_j x_{ij} = x_{i0} - s_{i0}^-, \qquad i = 1,\ldots..,m,$$

$$\sum_{j=1}^{n} \lambda_j y_{rj} = y_{r0} + s_{r0}^+, \qquad r = 1,\ldots..,s,$$

$$s_{i0}^-, s_{r0}^+ \geq 0 \qquad \forall i, r,$$

$$\lambda_j \geq 0, \qquad j = 1,\ldots..,n,$$

For computational convenience, the above non-linear programming problem is transformed into the following linear programming formulation.

$$\min \quad \mathrm{Re}(X_0, Y_0) = Z - \frac{1}{m}\sum_{i=1}^{m}\left(\frac{S_{i0}^-}{X_{i0}}\right) \qquad (6)$$

$$s.t. \quad \sum_{j=1}^{n} \lambda_j X_{ij} - ZX_{i0} + S_{i0}^- = 0 \qquad i = 1,\ldots..,m$$

$$\sum_{j=1}^{n} \lambda_j Y_{rj} - Y_{r0} - S_{r0}^+ = 0 \qquad r = 1,\ldots...,s$$

$$Z + \frac{1}{S}\sum_{r=1}^{s}\left(\frac{S_{r0}^+}{Y_{r0}}\right) = 1 \qquad Z \geq 0$$

$$S_{i0}^-, S_{r0}^+ \geq 0 \qquad \forall i, r,$$

$$\lambda_j \geq 0 \qquad j = 1,\ldots..,n$$

M= the number of inputs, S= the number of outputs, X_{i0}= the input value *i* in the evaluated unit, Y_{r0}= the output value of r in the evaluated unit, X_{ij}= the input value of i in unit j, Y_{rj}= the output value of r in unit j, S_{i0} and S_{r0}= these are slacks.

In this study, the input variables include operating costs (Pastor et al., 1999; Bowlin, 1999), board size (Lin et al., 2009; Pastor et al., 1999), and the current ratio (Anthony et al., 2019), while the output variables are operating cash flows (Ansari et al., 2023; Bowlin, 1999) and sales (Bowlin, 1999). Specifically, operating expenses and sales are obtained from the income statement, operating cash flows from the statement of cash flows, and board size (measured as the number of board members) from the board activity report. The current ratio is calculated using balance sheet data, which is the ratio of current assets to current liabilities.

3.2.3 *Mediating variable*

Financial Crisis (FC): A company is deemed to be in a financial crisis (FC=1) if it meets any of the following criteria; otherwise, FC=0:

1. Financial losses (operating, net, or accumulated) for three consecutive years.
2. A decrease of more than 40% in annual dividends compared to the previous year **(**Jantadej, 2006**).**
3. Subject to Article 141 of the Commercial Code, indicating that at least half of the company's capital has been lost due to accumulated losses.

3.2.4 Definition of other variables

Sales Growth (SG): Calculated as the difference between sales in the current period and sales in the previous period, divided by sales in the last period (Dastgir and Mehrjoo, 2012).

Graduate Education-Science (S): The ratio of board members holding Master's and Doctoral degrees to the total number of board members (Vasilaki and O'Regan, 2008).

Power of Management Oversight (POMS): This is a binary variable that takes the value of 1 if at least one board member simultaneously serves as a member of the company's audit committee or as the head of the internal audit unit, and zero otherwise (Cheung et al., 2017; Faleye et al., 2011; Adams & Ferreira, 2009).

Managerial Ability (MA): This variable is measured as the average difference between a firm's ROA and the industry average over the last three periods. For instance, when analyzing the 2022 crisis period, the average is calculated using that period and the two preceding periods. To mitigate the limitations associated with using the book value of total assets, the market value of assets is employed, defined as: [(Number of shares at the end of the target date × Share price at the end of the target date) + Book value of total liabilities at the target date]. Accordingly, ROA is computed as the ratio of operating profit to the total market value of assets (Chaharmahali et al., 2019).

Financial Leverage (LEV): The ratio of total debt to total assets (Cronqvist et al., 2009).

Board Gender Diversity (G): This is a binary variable. G=1 if there are female members on the organization's board of directors; otherwise, G=0 (Adams and Ferreira, 2009).

Firm Size (FSIZE): The natural logarithm of sales (Rahmanian Kushkaki and Badiyab, 2024**)**.

Financial Education (FIN): The ratio of board members with financial education to the total number of board members **(**Hosseini, 2017**).**

Board Size (BS): The number of board members in the period under review (Pastor et al., 1999).

Board Independence (BI): The ratio of non-committal board members to the total number of board members (Fathi and Abutalebi, 2022).

Firm Age (AGE): The natural logarithm of the company's age plus one (Van den Bogaerd and Aerts, 2014).

Return on Assets (ROA): The ratio of operating profit to the market value of total assets (Chaharmahali et al., 2019).

Return on Equity (ROE): The ratio of net income to the market value of equity (Chaharmahali et al., 2019).

To examine the mediating role of financial crises in the relationship between social crises and the quality of managers' financial decision-making, multiple regression analysis is employed within the framework of Sobel's test and the approach of Baron and Kenny (1986). The mediating effect is confirmed if the following conditions are satisfied:

1. The independent variable (social crisis) has a significant effect on the dependent variable (quality of financial decision-making).
2. The independent variable (social crisis) has a significant effect on the mediating variable (financial crisis).
3. When both the independent and mediating variables are included in the regression model, the mediating variable (financial crisis) has a significant effect on the dependent variable (quality of financial decision-making).

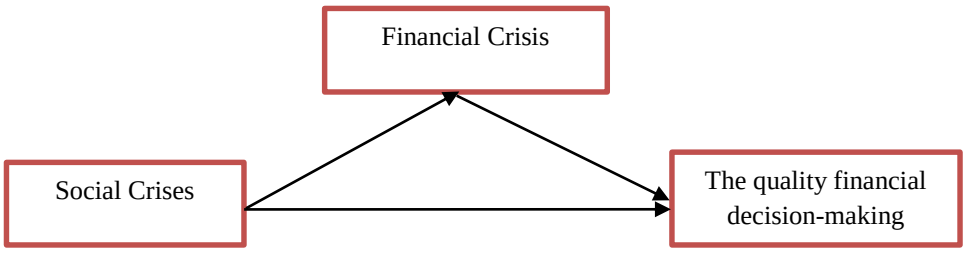

Figure 1. Examining the mediating association of the financial crisis variable

4. Findings

4.1. Descriptive statistics

Descriptive statistics provide a general overview of the data. Table 2 presents a concise summary of the research variables. The average level of financial education among managers is 0.453, indicating that 45.3% of managers possess some level of financial expertise. In addition, 64.5% of observations reveal the presence of non-executive directors on the board; specifically, 530 out of 821 firm-year observations confirm such presence during the review period. This finding reflects a relatively high level of board independence, which can strengthen corporate governance, improve transparency in decision-making, and safeguard shareholder interests. Moreover, these results suggest that many firms in the sample exceed common standards of board independence by maintaining a balanced mix of independent and executive directors. Finally, the similarity between the calculated means and medians of the variables indicates that the data are well distributed, providing a reliable basis for subsequent analyses. Another important descriptive statistic is the standard deviation, which measures the degree of dispersion of variable values around the mean. A higher standard deviation indicates greater variability in the data. For example, the standard deviation of firm size is higher than that of other variables, suggesting that firm size exhibits greater dispersion from the mean. Table 2 also reports the maximum and minimum values for each variable. For instance, the financial leverage variable ranges from 0.008 to 0.987, reflecting substantial variation in firms' financing strategies. Companies with leverage close to 0.987 are highly dependent on debt and therefore face greater financial risk, whereas firms with leverage closer to 0.008 adopt a more conservative approach. Such differences can significantly influence firms' financial performance, risk exposure, and growth opportunities.

Table 2. The descriptive statistics of research variables

Variable	Abbreviation	Mean	Median	Max	Min	Standard Deviation	Sample
Quality of financial decision-making	RE	0.742	0.846	1.000	0.101	0.281	821
Social crises	SC	0.502	1.000	1.000	0.000	0.500	821
Financial crisis	FC	0.393	0.000	1.000	0.000	0.489	821
Sales growth	SG	0.532	0.390	8.517	-3.633	0.893	821
Graduate education (science)	S	0.672	0.750	1.000	0.000	0.368	821
Power of management knowledge	POMS	0.797	1.000	1.000	0.000	0.403	821

Variable	Abbreviation	Mean	Median	Max	Min	Standard Deviation	Sample
Management Ability	MA	0.010	0.001	0.856	-0.837	0.148	821
Financial Leverage	LEV	0.521	0.540	0.987	0.008	0.216	821
Gender	G	0.058	0.000	1.000	0.000	0.235	821
Firm Size	FSIZE	28.673	28.387	35.113	22.782	2.035	821
Financial Education	FIN	0.453	0.400	1.000	0.000	0.238	821
Board Size	BS	4.848	5.000	5.000	3.000	0.466	821
Board Independence	BI	0.645	0.600	1.000	0.000	0.192	821
Firm Age	AGE	3.668	3.761	4.263	2.303	0.378	821
Return On Assets	ROA	0.045	0.036	0.291	0.039	0.039	821
Return On Equity	ROE	0.045	0.042	0.979	0.061	0.061	821

4.2 Hypothesis test results

The results of testing the first hypothesis, which examines the relationship between social crises and the quality of managers' financial decision-making, are presented in Table 3.

Before estimating the model, the necessary prerequisites were examined. Given the large number of observations, testing for the normality of errors was not required (Aflatooni, 2023). According to Table 3, the coefficient of determination (R-squared) is 0.281, indicating that the model's predictors explain 28.1% of the variation in financial crises (dependent variable). The Fisher statistic is 11.494 with a significance level close to zero, confirming both the reliability of the R-squared and the statistical significance of the estimated relationship. The diagnostic tests further support the robustness of the model. Variance inflation factor (VIF) values for all independent and control variables were below 10, suggesting the absence of multicollinearity. The Durbin–Watson statistic of 1.883, which lies between 1.5 and 2.5, indicates no autocorrelation in the residuals. To address potential heteroskedasticity or error dependence, standard errors were clustered at the firm level. In addition, the F-Limer statistic yielded a probability of 0.000, leading to the rejection of the null hypothesis and confirming that a panel data structure is appropriate. The Hausman test produced a probability value of 1.000 (greater than 5%), suggesting that the random effects model is preferable to the fixed effects model. Finally, the significance of the independent variable was assessed to test the first hypothesis. The p-value for social crises was 0.027 (less than 5%), confirming the first hypothesis. Thus, the first condition for establishing mediation—namely, a significant relationship between the independent variable and the mediating variable—is satisfied.

Table 3. The first hypothesis test result

Dependent Variable: Quality of financial decision making

$RE = a_0 + a_1SC + a_2SG + a_3S + a_4POMS + a_5MA + a_6LEV + a_7G + a_8FSIZE + a_9FIN + a_{10}BS + a_{11}BI + a_{12}AGE + a_{13}ROA + a_{14}ROE$

Variable	Coefficient	Standard Deviation	t-statistic	Significance level	VIF
SC	-0.185	0.083	-2.216	0.027	1.086
SG	0.001	0.009	0.076	0.939	1.033
S	0.041	0.039	1.042	0.298	1.089
POMS	-0.009	0.021	-0.430	0.668	1.081
MA	-0.011	0.042	-0.254	0.799	1.029
LEV	-0.051	0.059	-0.866	0.387	1.161
G	-0.014	0.038	-0.373	0.709	1.037
FSIZE	0.058	0.010	5.988	0.000	1.280

Variable	Coefficient	Standard Deviation	t-statistic	Significance level	VIF
FIN	-0.014	0.039	-0.365	0.715	1.074
BS	-0.028	0.017	-1.650	0.099	1.074
BI	-0.060	0.048	-1.254	0.210	1.055
AGE	0.023	0.041	0.573	0.567	1.051
ROA	0.111	0.413	0.268	0.789	3.215
ROE	-0.055	0.223	-0.248	0.804	2.972
C	-0.749	0.383	-1.954	0.051	NA
Year-Industry effects were controlled					
F-Statistic		11.494	R-Squared		0.281
Prob (F-Statistic)		0.000	Durbin-watson		1.883
Chow Test Statistic		2.174	Hasman Test Statistic		27.000
Prob (Chow Test Statistic)		0.000	Prob (Hasman Test Statistic)		1.000

The results of testing the second hypothesis, which examines the relationship between social crises and financial crises, are presented in Table 4.

Since the preliminary assumptions of the model were verified earlier, they are not repeated here. The p-value for the financial crisis variable is 0.004 (less than 5%), confirming the second hypothesis. Thus, the second mediation condition—requiring a significant relationship between the independent variable (social crises) and the mediating variable (financial crises)—is satisfied. Additional results also reveal a significant positive association between firm size and managers' graduate education in science-related fields, as well as the quality of financial decision-making. This indicates that larger firms and managers with advanced scientific education tend to make higher-quality financial decisions.

The results of testing the third hypothesis, which examines the relationship between financial crises and the quality of managers' financial decision-making, are presented in Table 5.

As the preliminary assumptions of the model were verified earlier, they are not repeated here. The p-value for the financial crisis variable is 0.869 (greater than 5%), leading to the rejection of the third hypothesis. However, additional results indicate a significant positive relationship between firm size and the quality of financial decision-making, suggesting that larger firms are associated with higher-quality financial decisions made by managers.

Table 4. The second hypothesis test result

Dependent Variable: Financial Crisis

$FC = a_0 + a_1SC + a_2SG + a_3S + a_4POMS + a_5MA + a_6LEV + a_7G + a_8FSIZE + a_9FIN + a_{10}BS + a_{11}BI + a_{12}AGE + a_{13}ROA + a_{14}ROE$

Variable	Coefficient	Standard Deviation	t-statistic	Significance level	VIF
SC	0.460	0.161	2.862	0.004	1.086
SG	-0.011	0.025	-0.437	0.663	1.033
S	0.162	0.062	2.586	0.010	1.089
POMS	0.001	0.039	0.032	0.974	1.081
MA	0.039	0.089	0.432	0.666	1.029
LEV	-0.168	0.090	-1.861	0.063	1.161
G	0.051	0.064	0.791	0.429	1.037
FSIZE	0.030	0.013	2.289	0.022	1.280
FIN	0.146	0.077	1.907	0.057	1.074
BS	0.034	0.030	1.140	0.225	1.074
BI	-0.060	0.075	-0.797	0.426	1.055
AGE	0.000	0.051	0.007	0.995	1.051
ROA	0.350	0.664	-0.527	0.599	3.215
ROE	0.380	0.332	-1.146	0.252	2.972
C	-0.601	0.538	-1.116	0.265	NA
Year-Industry effects were controlled					

F-Statistic	14.689	R-Squared	0.333
Prob (F-Statistic)	0.000	Durbin-watson	1.996
Chow Test Statistic	1.786	Hasman Test Statistic	27.000
Prob (Chow Test Statistic)	0.000	Prob (Hasman Test Statistic)	1.000

Table 5. The third hypothesis test result

Dependent Variable: Quality of financial decision making

$RE = a_0 + a_1FC + a_2SG + a_3S + a_4POMS + a_5MA + a_6LEV + a_7G + a_8FSIZE + a_9FIN + a_{10}BS + a_{11}BI + a_{12}AGE + a_{13}ROA + a_{14}ROE$

Variable	Coefficient	Standard Deviation	t-statistic	Significance level	VIF
FC	-0.003	0.019	-0.165	0.869	1.077
SG	0.001	0.009	0.100	0.920	1.026
S	0.038	0.039	0.962	0.337	1.104
POMS	-0.009	0.021	-0.419	0.675	1.081
MA	-0.013	0.042	-0.323	0.747	1.017
LEV	-0.048	0.060	-0.812	0.417	1.135
G	-0.014	0.038	-0.371	0.710	1.038
FSIZE	0.058	0.010	5.962	0.000	1.295
FIN	-0.012	0.039	-0.309	0.758	1.084
BS	-0.028	0.017	-1.683	0.093	1.075
BI	-0.062	0.047	-1.300	0.194	1.058
AGE	0.026	0.041	0.632	0.528	1.050
ROA	0.123	0.418	0.295	0.768	3.226
ROE	-0.060	0.224	-0.265	0.791	2.970
C	0.949	0.353	-2.685	0.007	NA
Year-Industry effects were controlled					
F-Statistic		11.355	R-Squared		0.279
Prob (F-Statistic)		0.000	Durbin-watson		1.870
Chow Test Statistic		2.204	Hasman Test Statistic		27.000
Prob (Chow Test Statistic)		0.000	Prob (Hasman Test Statistic)		1.000

Finally, the results of testing the fourth hypothesis, which investigates the mediating role of financial crises in the relationship between social crises and the quality of managers' financial decision-making, are presented in Table 6.

Table 6. The fourth hypothesis test result

Dependent Variable: Quality of financial decision making

$RE = a_0 + a_1FC + a_2SC + a_3SG + a_4S + a_5POMS + a_6MA + a_7LEV + a_8G + a_9FSIZE + a_{10}FIN + a_{11}BS + a_{12}BI + a_{13}AGE + a_{14}ROA + a_{15}ROE$

Variable	Coefficient	Standard Deviation	t-statistic	Significance level	VIF
SC	-0.185	0.085	-2.190	0.029	1.420
FC	-0.001	0.019	-0.027	0.979	1.408
SG	0.001	0.009	0.076	0.940	1.033
S	0.041	0.039	1.044	0.297	1.105
POMS	-0.009	0.021	-0.429	0.668	1.081
MA	-0.011	0.042	-0.254	0.799	1.030
LEV	-0.052	0.059	-0.872	0.384	1.163
G	-0.015	0.038	-0.381	0.703	1.038
FSIZE	0.058	0.010	5.981	0.000	1.299
FIN	-0.014	0.039	-0.358	0.720	1.084
BS	-0.028	0.017	-1.652	0.099	1.075
BI	-0.060	0.047	-1.264	0.207	1.059
AGE	0.023	0.041	0.573	0.567	1.051
ROA	0.112	0.414	0.270	0.787	3.227
ROE	-0.057	0.223	-0.255	0.799	2.972
C	-0.750	0.383	-1.958	0.051	NA
Year-Industry effects were controlled					
F-Statistic		11.095	R-Squared		0.282
Prob (F-Statistic)		0.000	Durbin-watson		1.880

Chow Test Statistic	2.171	Hasman Test Statistic	28.000
Prob (Chow Test Statistic)	0.000	Prob (Hasman Test Statistic)	1.000

The p-value for the financial crisis variable is 0.979 (greater than 5%), leading to the rejection of the fourth hypothesis. Thus, the third mediation condition—requiring a significant effect of the mediating variable on the dependent variable—is not satisfied. In addition, the Sobel test result (z = –0.149) confirms that the indirect effect of social crises through financial crises on the quality of financial decision-making is not significant at the 95% confidence level. However, further findings reveal a significant positive relationship between firm size and the quality of managers' financial decision-making, suggesting that larger firms are associated with higher-quality financial decisions.

5. Discussion and conclusion

This study investigates the impact of social crises on the quality of managers' financial decision-making, as well as the mediating role of financial crises in this relationship. The statistical population comprises all firms listed on the Tehran Stock Exchange from 2018 to 2023. Using a systematic elimination method, companies meeting specific criteria—such as continuity of operations, no changes in fiscal year, and at least seven firms per industry—were included. Ultimately, 137 firms were selected as the final sample. Data analysis was conducted using EViews 10 software and multiple regression techniques. The results reveal a significant negative relationship between social crises and the quality of managers' financial decision-making. This finding suggests that during social crises, the emergence of turmoil and insecurity heightens managerial anxiety and imposes considerable psychological stress (Arab-Salehi et al., 2017; Rabiei & Sarafrazi, 2015; Hosseini, 2006). As a result, managers may shift their focus from precise and comprehensive financial analyses to short-term, ineffective, and lower-quality decisions, thereby diverting attention from strategic objectives. Moreover, crises reduce the time available for decision-making, including financial decisions. Under such constraints, data-driven analyses that require accuracy and time may be neglected, while emotionally driven and irrational judgments may prevail. Consequently, the quality of financial decision-making declines. These results are consistent with the findings of Ghosi & Akbarpour (2019), Sheikhi & Hassanzadeh Diva (2021), and Bărbuță-Mișu et al. (2019).

Furthermore, the results reveal a significant positive relationship between social crises and financial crises. This relationship can be explained by the fact that social crises and widespread public dissatisfaction discourage both domestic and foreign investment. Investors tend to avoid unstable environments, which can lead to declining stock values and rising interest rates. At the same time, social hardship reduces consumption (Dutt & Padmalabhan, 2011), which lowers market demand and creates challenges for firms in producing and supplying goods and services (Sikwila, 2011). Such conditions may also weaken competitiveness in both domestic and international markets. In addition, social crises often impose substantial costs, including employee harm, work stoppages, reputational damage, and profit losses (Bekefi & Epstein, 2006). Collectively, these factors increase the likelihood of financial distress and may ultimately push firms toward bankruptcy. This finding is consistent with the results reported by Abbasi et al. (2024).

Moreover, the results indicate that financial crises negatively affect the quality of managers' financial decision-making and weaken the relationship between social crises and decision-making quality. However, the magnitude of this effect is not statistically significant. This finding is consistent with Rashidbeigi et al. (2015) but contrasts with studies such as Karshenasan et al. (2019) and Sufian & Shah Habibullah (2010). These inconsistencies may be attributed to differences in research methodology, time frames, sample industries, or managerial experience levels. The lack of significance may be explained by the fact that, during financial crises, managers and analysts often

rely on historical data and macroeconomic analyses, incorporating broader economic outlooks rather than focusing exclusively on firm-level financial distress. In such situations, managers face multiple challenges that affect decision quality; however, by drawing on historical experiences and identifying successful patterns under similar conditions, they may adopt more comprehensive and strategic approaches to crisis management. This reliance on past data can mitigate the negative effects of financial crises on the quality of financial decision-making. Macroeconomic analyses—such as assessments of economic growth rates, government monetary and fiscal policies, and market trends—enable managers to better understand the overall economic environment and make decisions consistent with broader trends. This becomes particularly important during crises, as data-driven decisions can mitigate negative impacts and prepare firms for improved future conditions. Consequently, the effect of financial crises on the quality of managers' financial decision-making is not statistically significant, and its mediating role in the relationship between social crises and decision-making quality is rendered irrelevant.

Overall, the findings of this study contribute to the existing literature by highlighting the factors influencing the quality of managerial financial decision-making, particularly the role of social crises. Focusing on the unrest of 2018, 2020, and 2023, the study clarifies how social crises affect the quality of decision-making and examines the role of financial crises within this relationship. To the best of our knowledge, this issue has not been explored in prior domestic or international studies, underscoring the novelty and originality of the present research.

In addition, this study contributes to a better understanding of the challenges and issues related to financial decision-making, while addressing existing informational gaps in the field. In doing so, it provides valuable insights for managers and policymakers, enabling them to adopt more effective approaches to strengthen organizational resilience and ensure continuity under unstable and crisis conditions. This dual contribution highlights both the scientific value and the practical relevance of the research.

Nevertheless, the study is subject to certain limitations. Notably, the lack of access to information regarding managers' personal characteristics—such as experience, confidence, and risk tolerance—restricted the scope of analysis. Furthermore, the limited availability of prior domestic and international studies on this topic constrained the extent of comparative discussion.

Finally, given the negative impact of social crises on the quality of managers' financial decision-making—and the critical role of preparedness in mitigating such effects—crisis planning emerges as an essential organizational practice. Proper planning not only reduces the scope of disruptions but also enhances control during crises. In this regard, the following internal organizational measures are recommended: 1. Achieving a comprehensive understanding of workflows from start to finish, 2. Identifying vulnerable points that require close monitoring and control, 3. Developing and strengthening crisis management and control programs, and 4. Preparing and securely maintaining backup copies of critical documents in locations separate from the workplace.

Furthermore, as the impacts of social crises extend beyond economic outcomes to include social and operational dimensions, future research should explore these aspects and their implications for financial decision-making. In addition, examining the relationship between social crises and the quality of financial decision-making, along with the mediating role of financial crises, within specific industries may yield different results, thereby expanding knowledge and addressing existing gaps in the literature.

References

1. Abbasi, E., Mohammadimoghadam, F. and Ghalibafasl, H. (2024). The relationship between financial leverage and financial performance: emphasizing financial distress and currency crisis

in the Tehran Stock Exchange. *Financial Research Journal*, 26(4), pp. 880-903. https://doi.org/10.22059/frj.2023.366503.1007521
2. Adams, R. B. and Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, 94(2), pp. 291-309. https://doi.org/10.1016/j.jfineco.2008.10.007
3. Aflatooni, A. (2023). Econometrics in financial and accounting research with EViews software. Tehran: Termeh Publications, Tehran, Iran (In Persian).
4. Ahmed, M. T. and Omotunde, H. (2012). Theories and strategies of good decision making. *International Journal of Scientific & Technology Research*, 1(10), pp. 51-54.
5. Ansari, Z., Hejazi, R., Zeraat Kish, Y. and Khani Masoomabad, Z. (2023). Predicting the life cycle and evaluating the financial performance of companies using the decision tree algorithm and multi-criteria decision-making techniques. *The Financial Accounting and Auditing Research*, 15(1), pp. 43–68 (In Persian). https://doi.org/10.30495/faar.2023.699784
6. Anthony, P., Behnoee, B., Hassanpour, M. and Pamucar, D. (2019). Financial performance evaluation of seven Indian chemical companies. *Decision Making: Applications in Management and Engineering*, 2(2), pp. 81-99. https://doi.org/10.31181/dmame1902021a
7. Arab Salehi, M., Bari, S. and Behshour, I. (2017). The global financial crisis and earnings management in companies listed on the Tehran Stock Exchange. *Financial Accounting and Auditing Research*, 9(36), pp. 73–87 (In Persian).
8. Bagherifard, M. H. and Tavakoli, A. (2023). Designing a descriptive model of decision-making in ethical challenges in management with an emphasis on applied ethics. *Journal of Religion, Spirituality, and Management*, 10(18), pp. 257-279. https://doi.org/10.30471/im.2021.7127.1222
9. Bărbuță-Mișu, N., Madaleno, M. and Ilie, V. (2019). Analysis of risk factors affecting firms' financial performance—Support for managerial decision-making. *Sustainability*, 11(18), A. 4838. https://doi.org/10.3390/su11184838
10. Baron, R. M. and Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), A. 1173. https://psycnet.apa.org/doi/10.1037/0022-3514.51.6.1173
11. Bekefi, T. and Epstein, M. J. (2006). Integrating social and political risk into management decision-making. The Society of Management Accountants of Canada and The American Institute of Certified Public Accountants, Canada, North America
12. Bénaben, F., Lauras, M., Truptil, S. and Salatgé, N. (2016). A metamodel for knowledge management in crisis management. *In 2016 49th Hawaii International Conference on System Sciences (HICSS)*, (pp. 126-135). IEEE. https://doi.org/10.1109/HICSS.2016.24
13. Bowlin, W. F. (1999). An analysis of the financial performance of defense business segments using data envelopment analysis. *Journal of Accounting and Public Policy*, 18(4-5), pp. 287-310. https://doi.org/10.1016/S0278-4254(99)00018-6
14. Burnett, J. J. (1998). A strategic approach to managing crises. *Public Relations Review*, 24(4), pp. 475-488. https://doi.org/10.1016/S0363-8111(99)80112-X
15. Chaharmahali, A., Zahedi, J. and Mohammadi, R. (2019). The role of market capitalization in the relationship between ROA, ROE and stock prices in Tehran Stock Exchange. *Journal of Asset Management and Financing*, 7(4), pp. 17-30. https://doi.org/10.22108/amf.2019.103686.1094
16. Chen, C., Li, L. and Ma, M. L. (2014). Product market competition and the cost of equity capital: evidence from China. *Asia-pacific Journal of Accounting & Economics*, 21(3), pp. 227-261.

https://doi.org/10.1080/16081625.2014.893197
17. Cheung, K. T. S., Naidu, D., Navissi, F. and Ranjeeni, K. (2017). Valuing talent: Do CEOs' ability and discretion unambiguously increase firm performance. *Journal of Corporate Finance*, 42, pp. 15-35. https://doi.org/10.1016/j.jcorpfin.2016.11.006
18. Conges, A., Breard, L., Patruno, W., Ouro-Sao, A., Salatge, N., Fertier, A., ... and Benaben, F. (2023). Situational awareness and decision-making in a crisis situation: a crisis management cell in virtual reality. *International Journal of Disaster Risk Reduction*, 97, A. 104002. https://doi.org/10.1016/j.ijdrr.2023.104002
19. Cronqvist, H., Heyman, F., Nilsson, M., Svaleryd, H. and Vlachos, J. (2009). Do entrenched managers pay their workers more?. *The Journal of Finance*, 64(1), pp. 309-339. https://doi.org/10.1111/j.1540-6261.2008.01435.x
20. Dastgir, M. and Mehrjoo, E. (2012). The implication of accrual component of earning on profitability of the Firms Listed in Tehran Stock exchange. *Accounting and Auditing Research*, 4(15), pp. 4-21 (In Persian).
21. Dutt, P. and Padmanabhan, V. (2011). Crisis and consumption smoothing. *Marketing Science*, 30(3), 491-512. http://dx.doi.org/10.1287/mksc.1100.0630
22. Eriotis, N. and Vasiliou, D. (2024). Economic and social views of neoliberalism in greece: insights from the financial crisis and recovery. *International Conference on Science, Innovations and Global Solutions*, 1(1), pp. 241-245. http://dx.doi.org/10.2139/ssrn.4908961
23. Espinosa, R. (2015). Financial constraints, corporate investment and future profitability. *University of California, Berkeley*. Berkeley, California
24. Fabozzi, F. J. and Peterson, P. P. (2003). *Financial management and analysis* (Vol. 132). *John Wiley & Sons*, Hoboken, New Jersey
25. Faleye, O., Hoitash, R. and Hoitash, U. (2011). The costs of intense board monitoring. *Journal of Financial Economics*, 101(1), pp.160-181. https://doi.org/10.1016/j.jfineco.2011.02.010
26. Fan, J. P., Titman, S. and Twite, G. (2012). An international comparison of capital structure and debt maturity choices. *Journal of Financial and Quantitative Analysis*, 47(1), pp. 23-56. https://doi.org/10.1017/S0022109011000597
27. Fathi, S. and Abutalebi, H. (2022). The impact of corporate governance on the financial performance of companies using meta-analysis. *Journal of Financial Accounting Research*, 14(2), pp. 151-176 (In Persian). https://doi.org/10.22108/far.2023.135066.1921
28. Fred, D. (2000). Strategic management (A. Parsaeian & M. Ebrahimi, Trans.). Tehran: Cultural Research Publications. (Original work published 1999). Tehran, Iran (In Persian).
29. Freeman, R. E. (1984). Strategic management: A stakeholder approach. Boston: Pitman. Massachusetts.
30. Ghadamyari, M. R. and Naghshbandi, N. (2020). Examining the impact of the CEO's and board members' experience and financial knowledge on disclosure quality and company performance. *Quarterly Journal of Contemporary Research in Management and Accounting Sciences*, 2(5), pp. 22–33 (In Persian).
31. Gholami, A. (2021). Exchange rate instability and its effect on car prices. *Economic Security*, 9(7), pp. 59–74 (In Persian).
32. Ghorbani Marghmalki, A. R., Hosnavi, R. and Eskandari, M. (2022). Qualitative analysis of the role of corruption in creating social crises: A case study of the December 2017 protests in Shahrekord. *Emergency Management*, 10, pp. 60-74 (In Persian).
33. Ghosi, Z. and Akbarpour, S. (2019). The impact of economic crises on financial performance and stock returns of companies. *Accounting and Management Perspective*, 2(10), pp. 26-38 (In Persian).

34. Gregory, R. P. (2020). Political risk and financial flexibility in BRICS countries. *The Quarterly Review of Economics and Finance*, 78, pp. 166-174. https://doi.org/10.1016/j.qref.2020.01.011
35. Hadian, R., Hashemi, S. A. and Samadi, S. (2017). Evaluating the impact of investment on future performance considering the level of financial constraints of the company. *Journal of Asset Management and Finance*, 5(3), pp. 117–132 (In Persian). https://doi.org/10.22108/amf.2017.21196
36. Hafsi, T. and Turgut, G. (2013). Boardroom diversity and its effect on social performance: Conceptualization and empirical evidence. *Journal of Business Ethics*, 112(3), pp. 463-479. https://doi.org/10.1007/s10551-012-1272-z
37. Hashemi, S. A. and Akhlaghi, H. A. (2011). The impact of financial leverage, dividend policy, and profitability on the future value of the company. *Financial Accounting*, 2(6), pp. 38-49 (In Persian).
38. Hedayat Mazhari, R., Khorramabadi, M. and Lashgarara, S. (2021). Efficiency analysis using data envelopment analysis and its relationship with financial ratios. *Journal of Financial Accounting Research*, 13(3), pp. 89-110 (In Persian). https://doi.org/10.22108/far.2022.129532.1785
39. Hills, A. (2000). Revisiting institutional resilience as a tool in crisis management. *Journal of Contingencies and Crisis Management*, 8(2), pp. 109-118. https://doi.org/10.1111/1468-5973.00130
40. Hosseini, H. (2006). What is a crisis and how is it defined? *Security Quarterly*, 5(1&2), pp. 51-77.
41. Hosseini, S. A. (2017). The relationship between the education level of the board of directors and the financial performance of companies. Imam Khomeini International University, Qazvin, Iran (In Persian).
42. Hosseini, S. Y. and Damnabi Asl, A. (2012). Investigating the impact of strategic management on the quality of crisis management operations: A case study of the country's rail transport industry. *Crisis Management*, 1(2), pp. 77–86 (In Persian).
43. Howell, A. and Zhao, L. (2019). Turning points in the chinese civil war: a financial market perspective. *Australian Economic History Review*, 59(3), pp. 263-288. https://doi.org/10.1111/aehr.12168
44. Huse, M., Nielsen, S. T. and Hagen, I. M. (2009). Women and employee-elected board members, and their contributions to board control tasks. *Journal of Business Ethics*, 89(4), pp. 581-597. https://dx.doi.org/10.1007/s10551-008-0018-4
45. Hutahayan, B. (2020). The mediating role of human capital and management accounting information system in the relationship between innovation strategy and internal process performance and the impact on corporate financial performance. *Benchmarking: An International Journal*, 27(4), pp. 1289-1318. https://doi.org/10.1108/BIJ-02-2018-0034
46. Iranian National Standards Organization. (INSO) (2017). ISO 90000 standard. https://irangovah.com/wp-content/uploads/2023/10/ISO-09000-2015.pdf
47. Isayas, Y, N. and McMillan, D. (2021). Financial distress and its determinants: Evidence from insurance companies in Ethiopia. *Cogent Business & Management*, 8(1), A. 1951110. https://doi.org/10.1080/23311975.2021.1951110
48. Jantadej, P. (2006). Using the combination of cash flow components to predict finance distress. Ph.D. Dessertation, The Graduate College at the University of Nebraska, Lincoln, United States
49. Jensen, M. C. and Meckling, W. H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), pp. 305-360. https://doi.org/10.1016/0304-405X(76)90026-X

50. Kamari, H., Nourian, M., Soleimani, N. and Masoodi Nodooshan, E. (2018). Research synthesis in studies of strategic thinking of managers. *Journal of Educational Sciences*, 25(1), pp. 43–64 (In Persian). https://doi.org/1022055/edu.2018,22146,2212
51. Kannan, P., Scott, A. and Terrones, M. E. (2014). From recession to recovery: how soon and how strong. *Financial Crises: Causes, Consequences, and Policy Responses*, pp. 239-488 (Acces on Aug 18, 2025).
52. Karami, S. H., Dehghan, A. and Khodadadi, A. (2020). The role of decision-making dimensions and risk-taking on the performance of financial managers (Case study: The banking industry). *Financial Knowledge of Securities Analysis*, 13(47), pp. 33–50 (In Persian).
53. Karshenaan, A. L. I., Bahraminasab, A. and Mamashli, R. (2019). The effect of financial crisis on the probability of fraudulent reporting and stocks value. *Financial Accounting Knowledge*, 5(4), pp. 145-168. https://doi.org/10.30479/jfak.2019.1573
54. Karshenas, A., Bahrami Nasab, A. and Mamsheli, R. (2018). The impact of internal financial crises on the performance of banks and non-operational activities. *Islamic Economic Research*, 15(30), 93-118 (In Persian). https://doi.org/10.30471/iee.2018.1556
55. Khademalhosseini, S. and Amirhosseini, Z. (2018). Independence, managerial decision-making authority, and financial performance. *Journal of Financial Management Strategy*, 6(23), pp. 177–200 (In Persian). https://doi.org/10.22051/jfm.2018,19068,1596
56. Khorshidi, G. and Zarrinkia, F. (2017). Positioning accounting in the process of managerial decision-making. *Accounting and Auditing Research*, 9(34), pp. 70–87 (In Persian).
57. Koller, T. (1994). What is value-based management? *McKinsey Quarterly*, 1(1), pp. 87-87.
58. Kordestani, G. and Khansari, N. (2016). Investigating the relationship between value-based management ranking and company financial performance. *Journal of Management Accounting and Auditing Knowledge*, 5(18), pp. 105–117 (In Persian).
59. Kurt, A. and Zehir, C. (2016). The relationship between cost leadership strategy, total quality management applications and financial performance. *Doğuş Üniversitesi Dergisi*, 17(1), pp. 97-110.
60. Lepak, D. and Gowan, M. (2010). Human Resource Management. Managing Employees for Competitive Advantage. New Jersey NJ: Pearson-Prentice Hall, Hoboken, NJ
61. Lin, T. T., Lee, C. C. and Chiu, T. F. (2009). Application of DEA in analyzing a bank's operating performance. Expert Systems with Applications, 36(5), pp. 8883-8891. https://doi.org/10.1016/j.eswa.2008.11.018
62. Maitland, E. and Sammartino, A. (2015). Decision making and uncertainty: The role of heuristics and experience in assessing a politically hazardous environment. *Strategic Management Journal*, 36(10), pp. 1554-1578. https://doi.org/10.1002/smj.2297
63. McCabe, A. C., Ingram, R. and Dato-On, M. C. (2006). The business of ethics and gender. *Journal of Business Ethics*, 64(2), pp. 101-116. https://doi.org/10.1007/s10551-005-3327-x
64. Modigliani, F. and Miller, M. H. (1963). Corporate income taxes and the cost of capital: a correction. *The American Economic Review*, 53(3), pp. 433-443.
65. Mostafavi, A., Shahabi, M. and Shalchi, S. (2022). Collective behavior or protest action: a study of the November 2019 social unrest using grounded theory. *Political and International Approaches*, 14(2), pp. 211–236 (In Persian). https://doi.org/10.29252/piaj.2022.225335.1183
66. Musso, P. and Schiavo, S. (2008). The impact of financial constraints on firm survival and growth. *Journal of Evolutionary Economics*, 18(2), pp. 135-149. https://doi.org/10.1007/s00191-007-0087-z
67. Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, 5(2), pp. 147-175. https://doi.org/10.1016/0304-405X(77)90015-0

68. Nejatbakhsh Esfahani, A. and Motaheri, A. (2013). Examining supervision with emphasis on self-control to improve administrative health in Islamic Iran. *Islam and Management Research*, 3(1), pp. 43–58 (In Persian).
69. Nikpour, A., ManzariTavakoli, A., Saljegheh, S., Pourkiani, M. and Arabpour, A. (2015). Presenting a conceptual model of supervision of government organizations' employees based on the proposed criteria of Muslim scientists towards the general policies of the administrative system. *Islam and Management Research*, 5(1), pp. 99–116 (In Persian).
70. Nouravesh, I. and Yazdani, S. (2019). Examining the effect of financial leverage on investment in companies listed on the Tehran Stock Exchange. *Journal of Financial Accounting Research*, 2(2), pp. 35–47 (In Persian).
71. Obateru, O. I. (1994). Planning the city to mitigate urban violence. *Urban Management and Urban Violence in Africa*, 1(1), pp. 29-40.
72. Ogundele, M. and Olarewaju, (2014). Baneful effects of social crises on adult education goals' achievement in Nigeria. *Journal of Education and e-Learning Research*, 1(1), pp. 1-4.
73. Pastor, J. T., Ruiz, J. L. and Sirvent, I. (1999). An enhanced DEA Russell graph efficiency measure. *European Journal of Operational Research*, 115(3), pp. 596-607. https://doi.org/10.1016/S0377-2217(98)00098-8
74. Patatoukas, P. N. (2012). Customer-base concentration: implications for firm performance and capital markets: 2011 American accounting association competitive manuscript award winner. *The Accounting Review*, 87(2), pp. 363-392. https://doi.org/10.2308/accr-10198
75. Percic, S., Apostoaie, C. M. and Cocris, V. (2013). arly Warning systems for financial crises- a critical approach. *Centre for European Studies (CES) Working Papers*, *5*(1), pp. 77-88.
76. Petra, S. T. (2007). The effects of corporate governance on the informativeness of earnings. *Economics of Governance*, 8(2), pp. 129-152. https://doi.org/10.1007/s10101-006-0018-8
77. Rabiei, A. (2007). Social crises in contemporary Iran. *Iranian Journal of Sociology*, 8(3), pp. 51–80 (In Persian).
78. Rabiei, A. and Sarafrazi, R. (2015). Organizational crisis management (concepts, theories, and decision-making models). Tehran: Negaristan Andishe, Tehran, Iran (In Persian).
79. Raeisi, M., Pishgua Hadian, H. and Javdani Moghadam, M. (2020). Optimal policies and strategies in preventing social crises (Case study: Tehran). *The Islamic Revolution Approach*, 14(51), pp. 93-112 (In Persian).
80. Rahmanian Koushkaki, A. and Badayb, A. (2023). The effect of corporate governance, profitability, and firm size on firm value with the mediating role of intellectual capital. *Studies of Ethics and Behavior in Accounting and Auditing*, 3(1), pp. 89–114 (In Persian).
81. Rahnamae Rudposhti, F., Nikomaram, H. and Shahvardiani, S.H. (2020). Strategic financial management (Value Creation). Tehran: Hakim Bashi Publications, Tehran, Iran (In Persian).
82. Rai, D. and Lin, C. W. W. (2019). The influence of implicit self-theories on consumer financial decision making. *Journal of Business Research*, 95, 316-325. https://doi.org/10.1016/j.jbusres.2018.08.016
83. Ramli, N. A., Latan, H. and Solovida, G. T. (2019). Determinants of capital structure and firm financial performance—A PLS-SEM approach: Evidence from Malaysia and Indonesia. *The Quarterly Review of Economics and Finance*, 71, pp. 148-160. https://doi.org/10.1016/j.qref.2018.07.001
84. Rashidbeigi, N., Omidi, N. and Rashidbeigi, J. (2015). The impact of financial crises on the performance of banks listed on the Tehran Stock Exchange. *Third International Conference on Modern Research in Management, Economics, and Accounting*, Istanbul, Turkey.
85. Reinhart, C. M. and Rogoff, K. S. (2009). *This Time is Different.* New Jersey: Princeton

University Press, New Jersey, United States
86. Rezaei, H. (2023). Investigating the effect of financial constraints and liquidity on investment opportunities. *Scientific Journal of Modern Research Approaches in Management and Accounting*, 7(88), pp. 877–888 (In Persian).
87. Roychowdhury, S. (2006). Earning management through real activities manipulation. *Journal of Accounting and Economics*, 42(3), pp. 335-370. https://doi.org/10.1016/j.jacceco.2006.01.002
88. Sabouri, N. (2021). Investigating the role of financial flexibility in sustainable development on company performance during the COVID-19 crisis with regard to tangible assets (Case study: Companies listed on the Tehran Stock Exchange). *Scientific Journal of Modern Research Approaches in Management and Accounting*, 5(17), pp. 48–66 (In Persian).
89. Shabahang, R. (2012). *Financial management (Volume 2)*. Tehran: Auditing Organization, Tehran, Iran (In Persian).
90. Shariat panahi, M., Sadeghi Sharif, J., Osoolian, M. and Bodaghi, A. (2019). The relationship between risk and expected return of Sukuk. *Islamic Financial Researches*, 9(1), pp. 367–398 (In Persian). https://doi.org/10.30497/ifr.2019.2597
91. Sheikhi, Z. and Hassanzadeh Divah, S. M. (2020). Investigating the relationship between state ownership, financing constraints, fraudulent financial reporting, and company performance. *Accounting and Management Perspective*, 3(29), pp. 71-89 (In Persian).
92. Sikwila, M. N. (2011). Inflation impact of an exchange rate adjustment: The case of Zimbabwe. Management, Informatics and Research Design, Chinhoyi University of Technology, Chinhoyi, Zimbabwe
93. Spillan, J. and Hough, M. (2003). Crisis planning in small businesses: importance, impetus and indifference. *European Management Journal*, 21(3), pp. 398-407. https://doi.org/10.1016/S0263-2373(03)00046-X
94. Stancic, P., Todorovic, M. M. and Cupic, M. (2012). Value-based management and corporate governance: a study of Serbian corporations. *Economic Annals*, 57(193), pp. 93-112.
95. Sufian, F. and Shah Habibullah, M. (2010), "Assessing the impact of financial crisis on bank performance: empirical evidence from Indonesia", *ASEAN Economic Bulletin*, 27 (3), pp. 245-262.
96. Tosun, O. K. and Eshraghi, A. (2022). Corporate decisions in times of war: Evidence from the Russia-Ukraine conflict. *Finance Research Letters*, 48, 102920. https://doi.org/10.1016/j.frl.2022.102920
97. Valizadeh, N., Ramezani, J. and Khalilpour, M. (2021). Optimal investor timing, debt financing, and investment scale based on prospect theory. *Financial Accounting and Auditing Research*, 13(51), pp. 87-104 (In Persian).
98. Van den Bogaerd, M. and Aerts, W. (2014). Media reputation of a firm and extent of trade credit supply. *Corporate Reputation Review*, 17(1), pp. 28-45. https://doi.org/10.1057/crr.2013.24
99. Vasilaki, A. and O'Regan, N. (2008). Enhancing post-acquisition organisational performance: the role of the top management team. *Team Performance Management: An International Journal*, 14(3/4), pp. 134-145. https://doi.org/10.1108/13527590810883415
100. Wartini, S., Prananta, W., Febriatmoko, B. and Putri, P. I. (2024). Theory of resource-based view (RBV): integrated framework of distinctive capability in university performance. *Media Ekonomi dan Manajemen*, 39(2), pp. 334-349. https://dx.doi.org/10.56444/mem.v39i2.4891
101. Yarahmadi Khorasani, M. (2007). Crisis, an inseparable reality from the internal nature of organizations. *Iranian Management Association*, 11(102), pp. 43-47 (In Persian). https://ensani.ir/fa/article/59222

102. Yosef Nezhad, S., Mohammadi Node, F. and Moshki Myavaghi, M. (2023). The impact of growth opportunities, profitability, and financial crisis on the value of companies listed on the Tehran Stock Exchange. *Journal of Accounting and Management Vision*, 6(83), pp. 301–313 (In Persian).
103. Yousefnezhad, S. and Heidarpour, F. (2023). Explaining the model of measuring environmental uncertainty of companies and its impact on the volatility of financial characteristics of companies. *Financial Accounting and Auditing Research*, 15(4), pp. 27-53 (In Persian).
104. Zabihzadeh, A. and Molaei, M. (2023). The impact of the quality of financial reporting on managers' decision-making in companies. *Scientific Journal of Modern Research Approaches in Management and Accounting*, 7(24), pp. 18–33 (In Persian).

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The Effects of Cost Efficiency and Investment Efficiency on Value Chain Performance and Cash Flow Growth

Behrooz Badpa*, Mohammad Amin Jamshidi

Department of Accounting, Faculty of Humanities, Ilam University, Ilam, Iran

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Abstract

Value creation is one of the primary strategic objectives of firms, as it plays a crucial role in ensuring their sustainability and success within competitive markets, often leading to increased cash flow growth. Achieving value creation requires the efficient and effective utilization of organizational resources. In this regard, cost control, prudent financial resource management, and investment in value-generating projects are key drivers of success in enhancing value chain performance and improving cash flow. The present study aims to examine the effects of cost efficiency and investment efficiency on value chain performance and cash flow growth among companies. The statistical population comprises all firms listed on the Tehran Stock Exchange (TSE) during the period 2017–2022, of which 115 firms were selected through purposive sampling. Data were analyzed using multivariate regression techniques. The findings indicate that both cost efficiency and investment efficiency have significant positive effects on value chain performance. Moreover, the results show that higher levels of cost and investment efficiency contribute to increased cash flows. In other words, controlling and managing costs effectively, as well as avoiding over- or under-investment, enhances firms' overall performance across the value chain and leads to greater cash flow growth. From a practical perspective, policymakers can promote value creation by developing supportive regulations, offering financial incentives, and encouraging firms to adopt cost efficiency as a strategic mindset. Analysts can also rank companies based on their cost and investment efficiency, assisting managers in making better-informed decisions. Likewise, investors can evaluate firms' efficiency levels alongside other performance indicators when constructing their investment portfolios according to their desired investment horizons. Finally, this study contributes to the existing literature by expanding the understanding of value creation, performance evaluation, and optimal resource allocation in capital markets.

Keywords:
Cost Efficiency, Investment Efficiency, Value Chain Performance, Cash Flow Growth, Stochastic Frontier Function

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*Corresponding Author: Behrooz Badpa
Email: b.badpa@ilam.ac.ir
Tel: 09111271577
ORCID: 0000-0003-4192-6582

1. Introduction

Value creation is among the most important strategic objectives of companies, as it often leads to increased cash flows. Investment plays a vital role in ensuring sustainable development in competitive markets and, consequently, in fostering corporate value creation. Because investment decisions have long-term implications, they must be made prudently to help firms secure a strong market position while ensuring their long-term survival. In other words, business enterprises must strive to enhance their investment efficiency (He et al., 2019). On the other hand, improving cost efficiency can be achieved by enhancing the quality of products and services, as well as minimizing waste throughout the production process. To achieve favorable financial outcomes, firms must optimize the allocation and utilization of their financial resources. According to Beladi et al. (2021), companies that successfully optimize their costs typically perform better across the value chain and achieve higher customer satisfaction by improving product and service quality. This, in turn, not only increases the company's market share but also strengthens its financial position.

Companies today face numerous financial and economic challenges. Under such circumstances, optimizing costs and investing efficiently in profitable projects have become increasingly important. Identifying and analyzing the effects of these two factors enables managers to make better decisions and allocate resources more effectively. As the variety and quality of products and services evolve at an accelerated pace, stakeholders' expectations of companies have also risen. In this complex and competitive environment, firms must enhance their performance across all stages of the value chain to ensure sustainable revenue generation and stakeholder satisfaction (Ju et al., 2006). Accordingly, it is essential to identify and evaluate the factors that influence improvements in value chain performance. The concept of the value chain encompasses all activities that contribute to creating value for a company's products or services. A strong value chain translates into a competitive advantage. Firms that maintain high competitiveness across various stages of the value chain are better positioned to create greater added value. In its most common application, value chain analysis serves as a strategic management and cost accounting tool used to identify and strengthen a firm's competitive advantage.

Investing in new and innovative projects, which often enhance investment efficiency, can lead to increased cash flow. Firms that allocate resources effectively to research and development (R&D) activities generally perform better across various stages of the value chain and experience lower cash flow volatility, thereby reducing financial risk (Xu et al., 2019). Such an investment orientation fosters the creation of new products, increases future revenues, and ultimately improves overall corporate performance. Furthermore, the optimal management of cash flows is essential. Strong cash flows not only enable firms to meet their debt obligations on time but also provide the flexibility to utilize financial resources during economic downturns and to seize new investment opportunities (Arianpoor & Mehrfard, 2023). Therefore, the direct relationship between cost efficiency, optimal investment, and cash flow management must be recognized for organizations to remain successful in today's competitive environment. A detailed examination of the effects of cost and investment efficiency on value chain performance and cash flow growth is essential for this purpose. This study aims to identify best practices in financial and human resource management and to propose strategies for enhancing efficiency and reducing costs. Considering the rapid pace of economic change and the necessity for firms to adapt to evolving market conditions, this issue holds considerable significance. Furthermore, based on the mechanistic hypothesis, improvements in performance indicators and increases in stock prices may stem from changes in accounting methods and earnings management practices. Therefore, examining the relationship between operational efficiency and cash flow performance can provide more substantial support for the research findings. One of the key innovations of this study lies in its examination of the role of cost efficiency and investment efficiency

in enhancing value chain performance among companies listed on the Tehran Stock Exchange. Additionally, it evaluates how these efficiencies contribute to improving corporate cash flows. The remainder of this paper is structured as follows: the next section presents the theoretical foundations and prior research, followed by a description of the research methodology. The final sections report the findings, conclusions, and practical as well as research recommendations.

2. Literature review and hypothesis development

Efficiency is a concept that evaluates the cost of resources utilized in the process of achieving specific objectives. In other words, efficiency is determined by comparing the outputs achieved with the inputs consumed. To measure efficiency, various factors, including human resource costs, equipment utilization costs, financing expenses, return on investment, and other relevant expenditures, are considered (Meeusen & Van Den Broeck, 1977). From an economic perspective, efficiency refers to producing the maximum possible output from a given set of inputs. It is also defined as the ratio of actual output to the standard or expected output—essentially, the proportion of work accomplished relative to the work that should have been completed (Ray, 2002). Therefore, efficiency serves as a key performance indicator that reflects how effectively a firm manages its available resources and evaluates the operational performance of a system in different dimensions. Overall, efficiency demonstrates the extent to which an organization utilizes its resources to achieve optimal production at a given point in time (Seth et al., 2021).

There are two methods for measuring efficiency: Data Envelopment Analysis (DEA) and the Stochastic Frontier Approach (SFA). In DEA, a linear programming method is employed in which model residuals are not decomposed into random shocks and inefficiency components; thus, all deviations from the efficient frontier are interpreted as inefficiency. In contrast, the stochastic frontier approach attributes the deviation between actual and potential (frontier) output to both random errors and inefficiency. Accordingly, when a firm's performance falls below the production frontier, part of the gap is attributed to technical inefficiency, while the remainder is due to random factors. Conversely, if a firm performs above the estimated production frontier, this deviation is entirely explained by random shocks (Sharif-Azadeh and Basirat, 2013).

2.1. Cost efficiency, value chain performance, and cash flows

The value chain serves as a managerial tool for coordinating and directing a company's activities across all departments. By analyzing the interactions and behaviors of these departments, firms can assess their performance in terms of both competitive and functional advantages, such as cost reduction and improved output quality. Applying the value chain concept fosters an integrated perspective of organizational activities and resources, thereby enabling firms to assess how effectively their resources contribute to achieving competitive advantage. Since the structure of the value chain varies depending on the nature of a company's operations, each department contributes differently to the firm's overall value creation and competitive strength (Ghaffari-Darab et al., 2015). Among the various models developed to evaluate departmental or operational activities, Porter's Value Chain Model is one of the most widely used. According to Porter (1985), a firm's activities are categorized into primary and support activities, and together, these activities form the company's value chain. The value generated through these interrelated processes collectively determines the overall value of the firm.

From the perspective of management accounting, the value chain serves as an analytical framework that enables firms to identify the key steps involved in delivering a product or service to

customers. This framework is typically divided into three broad stages: upstream activities, production or operational activities, and downstream activities. Upstream activities encompass research, design, product development, and interactions with suppliers of raw materials and other essential components. Operational activities include the manufacturing and production of goods or the provision of services, while downstream activities involve product delivery, customer service, and post-sale interactions. Accordingly, some scholars associate upstream activities with supply chain management and downstream activities with customer relationship management (Badpa & Mohamadvali, 2023). The central premise of value chain analysis is that each stage of a company's operations should be carefully examined to determine its contribution to profitability and competitive advantage. Cost efficiency, defined as the optimization of resources and reduction of expenses through effective cost management, plays a pivotal role in this process. Efficient cost management enhances value chain performance and increases cash flows, underscoring the importance of prudent financial resource management in establishing a competitive advantage (Blocher et al., 2009). Moreover, effective cost management is directly linked to value chain performance and, consequently, to corporate cash flows. Improved cash flow not only strengthens financial stability but also catalyzes further investment, thereby fostering corporate growth and long-term development (Alu, 2023).

Viverita et al. (2024) investigated the impact of cost efficiency on liquidity generation in Islamic and conventional banks across the ASEAN-4 countries. Using data from 117 banks (103 conventional and 14 Islamic) and applying a dynamic panel regression model, they found that banks with higher cost efficiency possess a greater ability to generate liquidity. However, increased market competition tends to weaken this ability. However, the negative impact of competition diminishes as banks become more cost-efficient, indicating that efficient banks are better positioned to maintain liquidity generation in competitive markets. The study also revealed that Islamic banks outperform conventional banks in liquidity creation. Similarly, Kinyugo (2014) examined the effect of cost efficiency on the financial performance of firms listed on the Nairobi Stock Exchange. Analyzing data from 47 companies, the study concluded that cost efficiency has a positive influence on firms' return on assets (ROA), confirming that efficient cost management contributes to improved financial performance. Kordestani and Mortazavi (2011) examined the moderating role of cost efficiency in the relationship between the operating expense ratio and firms' future performance. Their findings indicated that the selling, general, and administrative expenses ratio (SG&A ratio) has a significantly positive effect on future operating income only when SG&A efficiency exists and when there is sufficient potential to reduce the cost of goods sold. Under these conditions, SG&A expenditures represent strategic investments in enhancing manufacturing efficiency. Similarly, Lin (2005) analyzed the cost efficiency of Taiwanese commercial banks during periods of merger activity. The results revealed that mergers between heterogeneous banks improve cost efficiency, whereas mergers between homogeneous banks do not significantly affect cost control performance. The study further demonstrated that smaller banks in Taiwan outperform larger ones in terms of cost efficiency. Accordingly, it can be inferred that achieving optimal cost efficiency enables firms to streamline processes, reduce waste, and enhance value chain performance and customer satisfaction. These improvements contribute to higher cash flows, as reduced costs and increased revenues enhance profitability, liquidity, and overall financial stability. Based on this reasoning, the research hypotheses are formulated as follows:

H1: Cost efficiency has a significant positive effect on the company's value chain performance.
H2: Cost efficiency has a significant positive effect on the company's cash flow growth.

2.2. Investment efficiency, value chain performance, and cash flows

The business and economic environments in which companies operate have undergone profound changes worldwide. In developing countries, finding appropriate solutions to optimize the use of resources and wealth is essential for addressing economic challenges. One of the most effective approaches in this regard is the expansion and development of investment activities (Muñoz, 2013). Corporate investment in various sectors has long been regarded as a key driver of growth and a safeguard against stagnation and financial distress. However, due to resource constraints, firms must pursue investment development in tandem with improving investment efficiency (Hubbard, 1998). Investment efficiency refers to a firm's ability to invest solely in projects with a positive net present value (NPV), thereby avoiding unproductive or value-destroying investments (Biddle et al., 2009). Achieving optimal investment efficiency requires preventing the over-allocation of resources to over-optimized areas and redirecting them toward activities with greater investment potential (Madan, 2007). A company's investment efficiency policy typically dictates that all projects with a positive net present value (NPV) should be accepted, as they are expected to generate future cash inflows. Historical evidence from many developed and industrialized countries demonstrates that investment enhances production capacity and quality, which in turn leads to improved firm performance (Surya et al., 2021). Optimal investment contributes to superior performance in the value creation process, and the resulting increase in firm value enhances cash flow generation (Richardson, 2006). However, market imperfections—such as information asymmetry and agency costs—can lead to investment inefficiency, thereby negatively affecting value chain performance (Ascioglu et al., 2008). Overall, empirical evidence supports that greater investment efficiency promotes sustainable growth in firms' cash flows by ensuring that resources are allocated to projects with the highest potential for long-term value creation.

Badpa and Mohamadvali (2023) investigated the impact of entrepreneurial orientation on value chain efficiency among firms listed on the Tehran Stock Exchange. They measured innovation through investments in machinery, equipment, and software, and found that innovation, risk-taking, and business continuity—key dimensions of entrepreneurial orientation—have positive and significant effects on value chain efficiency. Similarly, Salehi et al. (2022), using data from 177 firms listed on the Tehran Stock Exchange from 2014 to 2021, demonstrated that investment efficiency has a positive influence on firm value. Moreover, institutional ownership and board independence were found to moderate this relationship. In another study, Abbas et al. (2018) examined the relationship between investment efficiency and the cost of equity using a sample of 235 firms listed on the Pakistan Stock Exchange (PSX) for the period 2005–2015. Their results indicated that investment efficiency has a significant negative effect on the cost of equity. Specifically, over-investment was positively associated with the cost of equity, whereas under-investment had no significant impact, suggesting that over-investment poses a more serious concern for investors. Additionally, Foroughnejad et al. (2016) demonstrated that investment efficiency has a positive effect on the performance of companies listed on the Tehran Stock Exchange. These findings are consistent with those of Nkundabanyanga et al. (2017) and López-Salazar et al. (2012), who emphasized that effective financial resource management and investment in high–value-added projects are key success factors in enhancing value chain performance and cash flow growth. They further argued that research in this domain can provide practical guidance for managers to achieve sustainable growth through cost optimization and strategic investment decisions. Based on these empirical insights, the research hypotheses are formulated as follows:

H3: Investment efficiency has a significant positive effect on the company's value chain performance.

H4: Investment efficiency has a significant positive effect on the company's cash flow growth.

3. Research methodology

3.1. Research design

This study is applied in nature and descriptive in terms of data collection and implementation method. The research data were obtained from Tadbirpardaz and Rahavard-Novin databases, while additional information was extracted directly from firms' financial statements and accompanying notes available on the Codal website. Data processing and variable calculations were conducted using Microsoft Excel, and EViews software was employed for reporting descriptive statistics, estimating the research models, and testing the hypotheses. The statistical population comprises all firms listed on the Tehran Stock Exchange (TSE). The research period spans from 2017 to 2022. Given the large population size and heterogeneity among firms, specific criteria were applied to select the final sample. Accordingly, 115 firms listed on the TSE that met the selection requirements were included in the study (Table 1).

Table 1. Sample selection with the purposive sampling method

Listed companies on the Tehran Stock Exchange (TSE) at the end of 2022		*603*
Companies delisted from the TSE during the 2017–2022 period	*167*	
Financial institutions (e.g., insurance, banks, investment firms) are excluded	*61*	
Companies newly listed on the TSE during the 2017–2022 period	*88*	
Companies with a fiscal year differing from the standard reporting period	*56*	
Companies with incomplete financial reports during the 2017–2022 period	*116*	
Total companies excluded from the statistical population		*(488)*
Total samples (number of firms)		***115***
Total samples for six years = 6 × 115		***690***

3.2. Research models

Based on the theoretical framework and the research variables discussed in the preceding sections, the following regression models were developed to test the research hypotheses in accordance with their order:

[

$$VCP_{i,t} = \beta_0 + \beta_1 CostEff_{i,t} + \beta_2 \text{ControlVariable}_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$CFO_{i,t} = \beta_0 + \beta_1 CostEff_{i,t} + \beta_2 \text{ControlVariable}_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$VCP_{i,t} = \beta_0 + \beta_1 InvestmentEff_{i,t} + \beta_2 \text{ControlVariable}_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$CFO_{i,t} = \beta_0 + \beta_1 InvestmentEff_{i,t} + \beta_2 \text{ControlVariable}_{i,t} + \varepsilon_{i,t} \quad (4)$$

VCP: Value Chain Performance (Dependent Variable).
CFO: Operating Cash Flow Growth (Dependent Variable).
Cost_{Eff}: Cost Efficiency (Independent Variable).
$\text{Investment}_{\text{Eff}}$: Investment Efficiency (Independent Variable).
ControlVariable: Control Variables.

3.3. Research variables

Cost efficiency (CostEff) and investment efficiency (InvestmentEff) are considered as the independent variables of this study, while value chain performance (VCP) and cash flow growth (CFO) serve as the dependent variables. The methods used to measure these variables, along with the control variables included in the research models, are described as follows:

3.3.1. Independent variables

Investment efficiency (Investmen$_{Eff}$): One of the independent variables in this study is investment efficiency. Investment efficiency is achieved when a firm allocates its resources to projects with a positive net present value (NPV). To quantify this variable, the model developed by Biddle et al. (2009) was employed, as specified in the following equation:

$$Invesment_{i,t} = \beta_0 + \beta_1 SalesGrowth_{i,t} + \varepsilon_{i,t} \quad (5)$$

- $\text{Investment}_{i,t}$: Represents firm i's investment in year t, measured as the net increase in tangible and intangible assets divided by total assets at the beginning of the period.
- $\text{SalesGrowth}_{i,t}$: Denotes firm i's sales growth in year t, calculated as the change in sales revenue divided by the sales at the beginning of the period.
- $\varepsilon_{i,t}$: Refers to the residual term of the regression model, which captures the degree of overinvestment or underinvestment in the current period. The absolute value of the residuals is multiplied by (–1) to obtain the measure of investment efficiency, where higher values indicate greater efficiency.

Cost efficiency (Cost$_{Eff}$): To measure cost efficiency, the stochastic cost frontier function was estimated using STATA software. The general form of the stochastic frontier model is expressed as follows:

$$Output_{it} = C_{it} + \beta \times Input_{it} + \varepsilon_{it} \quad (6)$$

$$\varepsilon_{it} = V_{it} - U_{it}$$

$$U_{it} \geq 0$$

- In this model, i denotes the firm and t represents the financial period. The residuals of the stochastic frontier model are decomposed into two components: the inefficiency term and the random error term. Cost efficiency is then calculated as (1 – inefficiency) (Sun et al., 2020; Sharif-Azadeh & Basirat, 2013; Sun & Cui, 2012). To estimate this variable and incorporate it into the final research models, the cost of goods sold (COGS) and selling, general, and administrative expenses (SG&A) were entered as input variables, while sales revenue was considered as the output variable (Kordestani & Mortazavi, 2011; Viverita et al., 2024). The functional form of the cost efficiency model is presented as follows:

$$Ln(Sales_{it}) = \alpha_0 + \alpha_1 \times Ln(COGS_{it}) + \alpha_2 \times Ln(SGA_{it}) + \varepsilon_{it} - \eta_{it} \quad (7)$$

3.3.2. Dependent variables

Value chain performance (VCP): The performance of a firm's value chain was measured using a stochastic frontier function estimated in STATA software (Equation 2). To achieve accurate and reliable estimates of value chain performance efficiency, appropriate input and output variables were incorporated into the model. Specifically, trade receivables, working capital, retained earnings, cost of goods sold (COGS), and selling, general, and administrative expenses (SG&A) were used as input variables. At the same time, cash flows were designated as the output variable. In this framework, trade receivables serve as an indicator of customer relationships and the firm's credit policy; retained earnings and working capital represent internal financial support; cost of goods sold reflects production efficiency and the quality and quantity of relationships with suppliers; and selling, administrative, and general expenses indicate marketing and customer service efforts. Collectively,

these input variables capture the diverse components and stages of the intra-firm value chain, providing a comprehensive measure of its overall performance efficiency (Gruca and Rego, 2005; Luo and Homburg, 2008; Sun and Cui, 2012; Dutta et al., 1999; Sun et al., 2020; Narasimhan et al., 2006; Fang et al., 2008). The applied research model for extracting data regarding the performance of the company's value chain is as follows:

$$Ln(CF_{it}) = \alpha_0 + \alpha_1 \times Ln(COGS_{it}) + \alpha_2 \times Ln(RE_{it}) + \alpha_3 \times Ln(WCAP_{it}) + \alpha_4 \times Ln(SGA_{it}) + \alpha_5 \times Ln(REC_{it}) + \varepsilon_{it} - \eta_{it} \quad (8)$$

CF_{it}: Current cash flows
$COGS_{it}$: Cost of goods sold
RE_{it}: Retained earnings
$WCAP_{it}$: Working capital
SGA_{it}: Firm's selling, administrative, and general expenses
REC_{it}: Trade receivables

Cash flow growth (CFO): The difference between the current year's operating cash flows and those of the previous year is calculated and then divided by the cash flows of the last year (Sun and Cui, 2012).

3.3.3. Control variables

Company size: Equals the natural logarithm of the assets at the end of the period (Harymawan et al., 2019).

Growth opportunity: Equals the ratio of the market value to the book value of the company's equity (Frank and Goyal, 2009).

Asset structure: Equals the ratio of net fixed assets to total assets of the company (Frank and Goyal, 2009).

Return on assets: Equals the ratio of net profit to total assets of the company (He et al., 2019).

4. Findings

Before presenting the descriptive statistics of the study's final variables, data on value chain performance, cost efficiency, and investment efficiency were first extracted. Specifically, investment efficiency was calculated using Equation (1) in EViews software. The cost efficiency variable was derived using the stochastic cost frontier function estimated in STATA software based on Equation (3). Similarly, data on value chain performance were obtained using the stochastic frontier function in STATA software, as outlined in Equation (4).

4.1. Descriptive statistics

Table 2 presents the descriptive statistics for the study variables. As shown in the table, the average level of cost efficiency is approximately 0.4. Since efficiency is measured as a ratio ranging between 0 and 1, this result indicates that the cost efficiency of the sample firms is below the optimal level. This suggests that the manufacturing firms listed on the Tehran Stock Exchange could improve their cost efficiency by adopting advanced machinery, innovative production methods, and modern management practices. In addition, investment efficiency, derived from the residuals of the investment opportunity model, exhibits a relatively large standard deviation. This dispersion implies noticeable variation in the investment behavior and efficiency levels across the sampled firms.

Table 2. Descriptive statistics

Research variables		Mean	Median	SD	Minimum	Maximum
Cost efficiency		0.402	0.411	0.103	0.391	0.523
Investment efficiency		-0.218	-0.101	0.522	-0.489	-0.156
Input and output variables of the value chain stochastic frontier function*	Trade receivables	0.587	0.327	0.435	0.113	0.754
	Working capital	0.652	0.412	0.651	0.003	0.851
	Retained earnings	0.478	0.217	0.232	0.004	0.634
	Cost of goods sold	0.617	0.656	0.145	0.087	0.883
	Selling, general, and administrative expenses	0.292	0.102	0.109	0.093	0.814
	Cash flows	0.014	-0.460	0.205	0.171	1.641
Value chain performance		0.761	0.572	0.109	0.001	0.953
Operating cash flow growth		0.615	0.598	1.036	0.156	0.856
Control variables	Return on assets	0.492	0.502	0.109	0.206	0.814
	Company size*	8.431	7.523	0.201	2.121	13.109
	Growth opportunity	2.145	2.316	1.037	1.061	5.613
	Asset Structure	0.268	0.271	0.091	0.259	0.603

*The natural logarithm of these variables has been calculated.

The value chain performance (VCP) variable, obtained through the efficiency function, has an average value of approximately 0.76, which is above the midpoint level of 0.50. This indicates that, despite the suboptimal cost efficiency observed among the sample firms, other components of the value chain exhibit satisfactory performance. The remaining descriptive statistics for all variables are presented in Table 2.

4.2. Inferential statistics

To analyze the relationships between the independent and dependent variables, it is essential to conduct regression assumption tests to ensure the reliability of the results. The classical regression assumptions represent a set of conditions that must be satisfied for the estimated regression models to yield valid results. These assumptions include the normality of the dependent variable, homoscedasticity (equal variance) of the residuals, absence of multicollinearity among explanatory variables, and independence (lack of autocorrelation) of the model errors. Violation of any of these assumptions can result in biased estimations and unreliable statistical results.

4.2.1. Testing research hypotheses

The models can be estimated after verifying that the assumptions of linear regression are satisfied. The purpose of model estimation is to employ the coefficient results to test the research hypotheses. Each hypothesis is subsequently tested statistically and independently. Since the research data combine both time-series and cross-sectional elements, it is necessary to determine the appropriate estimation method—either pooled or panel data—based on the data structure before fitting the regression models. At this stage, the type of estimation model is identified using the F-Limer test. If the results of this test reject the pooled data method, the Hausman test is then applied to decide whether the model should be estimated using fixed effects or random effects. The results of the F-Limer and Hausman diagnostic tests for all research models are presented in Table 3.

4.2.1.1. Results of testing the first hypothesis

Based on the first hypothesis, the effect of cost efficiency on the company's value chain

performance was examined (Equation 1). According to the results of the regression assumption and diagnostic tests (F-Limer and Hausman), this model was estimated using the fixed-effects method. Furthermore, to address the issue of heteroskedasticity, a weighted regression approach—specifically, generalized least squares (GLS) rather than ordinary least squares (OLS)—was employed. The results of the model estimation are presented in Table 4.

Table 3. Diagnostic tests for model estimation

Model	Test	Statistic	Prob	Result
Equation 5	*F-Limer*	3.718	0.000	Fixed effects model
	Hausman	53.576	0.000	
Equation 6	*F-Limer*	6.157	0.000	Fixed effects model
	Hausman	78.103	0.000	
Equation 7	*F-Limer*	4.154	0.000	Fixed effects model
	Hausman	62.239	0.000	
Equation 8	*F-Limer*	8.281	0.000	Fixed effects model
	Hausman	91.258	0.000	

Table 4. The effect of cost efficiency on value chain performance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.168	0.194	21.513	0.000
Cost efficiency	0.214	0.044	4.911	0.000
Company size	1.156	0.117	9.918	0.000
Growth opportunity	2.065	5.419	0.381	0.805
Asset Structure	-0.719	0.101	-7.088	0.000
Return on assets	1.249	0.122	10.221	0.000
F-statistic	209.229			
Prob (F-statistic)	0.000			
Adjusted R-squared	0.591			
Durbin-Watson stat	2.109			

The model estimation results presented in Table 4 indicate that the probability value of the F-statistic is less than 5%, confirming the overall significance of the linear regression model. The Durbin–Watson statistic falls between 1.5 and 2.5, suggesting no significant autocorrelation among the model's error terms. The adjusted coefficient of determination (R^2) reveals that approximately 59% of the variation in the value chain performance variable is explained by the model's independent and control variables. Furthermore, the probability value of the t-statistic for the cost efficiency variable is below the 5% significance level, and its t-value (4.91) lies outside the critical interval (–1.96 to 1.96). Therefore, the first research hypothesis is confirmed at the 95% confidence level. The positive sign of the beta coefficient for cost efficiency indicates a statistically significant and positive relationship between cost efficiency and value chain performance. In other words, higher cost efficiency leads to improved performance in the value chain. An examination of the control variables reveals that firm size and return on assets have a positive and statistically significant effect on value chain performance. In contrast, growth opportunity has no statistically significant impact.

4.2.1.2. Results of testing the second hypothesis

Based on the second hypothesis, the effect of cost efficiency on the company's cash flow growth was examined (Equation 2). According to the results of the regression assumption and diagnostic tests (F-Limer and Hausman), this model was estimated using the fixed-effects method. Furthermore, to address the issue of heteroskedasticity, a weighted regression approach—specifically, generalized least squares (GLS) rather than ordinary least squares (OLS)—was employed. The results of the model estimation are presented in Table 5.

Table 5. The effect of cost efficiency on the company's cash flow growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.911	0.175	16.584	0.000
Cost efficiency	0.205	0.040	5.049	0.003
Company size	0.411	0.052	7.885	0.000
Growth opportunity	-0.074	0.019	-3.775	0.006
Asset Structure	1.611	0.140	11.453	0.000
Return on assets	2.165	10.362	0.209	0.882
F-statistic	193.719			
Prob (F-statistic)	0.000			
Adjusted R-squared	0.509			
Durbin-Watson stat	2.083			

The model estimation results presented in Table 5 indicate that the probability value of the F-statistic is less than 5%, confirming the overall significance of the linear regression model. The Durbin–Watson statistic lies between 1.5 and 2.5, suggesting no significant autocorrelation among the model's residuals. The adjusted coefficient of determination (R^2) shows that approximately 51% of the variation in the company's cash flow growth is explained by the model's independent and control variables. Furthermore, the probability value of the t-statistic for the cost efficiency variable is below the 5% significance level, and its t-value (5.049) lies outside the critical interval (–1.96 to 1.96). Therefore, the second research hypothesis is confirmed at the 95% confidence level. The positive sign of the beta coefficient for cost efficiency indicates a statistically significant and positive relationship between cost efficiency and the company's cash flow growth. In other words, higher cost efficiency leads to improved cash flow growth. An analysis of the control variables and their significance levels reveals that firm size and asset structure have a positive impact on cash flow growth, whereas growth opportunity has a negative effect. Return on assets, however, exhibits no statistically significant impact on cash flow growth.

4.2.1.3. Results of testing the third hypothesis

Based on the third hypothesis, the effect of investment efficiency on the company's value chain performance was examined (Equation 3). According to the results of the regression assumption and diagnostic tests (F-Limer and Hausman), this model was estimated using the fixed-effects method. Furthermore, to address the issue of heteroskedasticity, a weighted regression approach—specifically, generalized least squares (GLS) rather than ordinary least squares (OLS)—was employed. The results of the model estimation are presented in Table 6.

Table 6. The effect of investment efficiency on value chain performance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.265	0.202	16.152	0.000
Investment efficiency	0.082	0.031	2.646	0.019
Company size	1.195	0.112	10.619	0.000
Growth opportunity	0.719	1.712	0.420	0.720
Asset Structure	-0.611	0.068	-8.940	0.000
Return on assets	0.719	0.074	9.699	0.000
F-statistic	109.991			
Prob (F-statistic)	0.000			
Adjusted R-squared	0.472			
Durbin-Watson stat	1.878			

The model estimation results presented in Table 6 indicate that the probability value of the F-

statistic is less than 5%, confirming the overall significance of the linear regression model. The Durbin–Watson statistic lies between 1.5 and 2.5, suggesting no significant autocorrelation among the model's residuals. The adjusted coefficient of determination (R^2) shows that approximately 47% of the variation in value chain performance is explained by the model's independent and control variables. Furthermore, the probability value of the t-statistic for the investment efficiency variable is below the 5% significance level, and its t-value (2.647) lies outside the critical interval (–1.96 to 1.96). Therefore, the third research hypothesis is confirmed at the 95% confidence level. The positive sign of the beta coefficient for investment efficiency indicates a statistically significant and positive relationship between investment efficiency and value chain performance. In other words, greater investment efficiency leads to improved performance in the company's value chain. An examination of the control variables reveals that firm size and return on assets have a positive influence on value chain performance, whereas asset structure has a negative effect. Growth opportunity, however, does not exhibit a statistically significant relationship with value chain performance.

4.2.1.4. Results of testing the fourth hypothesis

Based on the fourth hypothesis, the effect of investment efficiency on the company's cash flow growth was examined (Equation 4). According to the results of the regression assumption and diagnostic tests (F-Limer and Hausman), this model was estimated using the fixed-effects method. Furthermore, to address the issue of heteroskedasticity, a weighted regression approach—specifically, generalized least squares (GLS) rather than ordinary least squares (OLS)—was employed. The results of the model estimation are presented in Table 7.

Table 7. The effect of investment efficiency on cash flow growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.847	0.209	18.419	0.000
Investment efficiency	0.098	0.032	3.048	0.002
Company size	0.482	0.055	8.719	0.000
Growth opportunity	-0.166	0.035	-4.720	0.000
Asset Structure	1.320	0.113	11.624	0.000
Return on assets	2.419	12.514	0.193	0.873
F-statistic	216.619			
Prob (F-statistic)	0.000			
Adjusted R-squared	0.514			
Durbin-Watson stat	1.885			

The model estimation results presented in Table 7 indicate that the probability value of the F-statistic is less than 5%, confirming the overall significance of the linear regression model. The Durbin–Watson statistic lies between 1.5 and 2.5, suggesting no significant autocorrelation among the model's residuals. The adjusted coefficient of determination (R^2) shows that approximately 51% of the variation in the company's cash flow growth is explained by the model's independent and control variables. Furthermore, the probability value of the t-statistic for the investment efficiency variable is below the 5% significance level, and its t-value (3.048) lies outside the critical interval (–1.96 to 1.96). Therefore, the fourth research hypothesis is confirmed at the 95% confidence level. The positive sign of the beta coefficient for investment efficiency indicates a statistically significant and positive relationship between investment efficiency and the company's cash flow growth. In other words, higher investment efficiency leads to improved cash flow growth. An examination of the control variables reveals that firm size and asset structure have a positive influence on cash flow growth, whereas growth opportunity has a negative effect. Return on assets, however, does not show a statistically significant impact on cash flow growth.

5. Discussion and conclusion

The capital market plays a crucial role in the economic development of every country by mobilizing capital for corporations. Successful companies in the capital market continually create value, which directly and indirectly affects various segments of society, including shareholders, customers, suppliers, and employees. Given the critical importance of capital markets, evaluating the performance of manufacturing companies and assessing the efficiency of their operations are essential (Zhang & Zhang, 2012). The primary objective of management accounting is to assist managers in making better decisions, thereby enhancing corporate success and value creation. Management accountants employ modern management approaches—such as customer orientation—to create value, with customer satisfaction achieved through the optimal performance of the company's value chain (Blocher et al., 2009). However, firms whose top management fails to pursue new business opportunities or adopt innovative management practices risk losing their market share, and the inability to create value may ultimately lead to bankruptcy (Gupta et al., 2018). Therefore, companies can enhance value creation and achieve sustainable cash flows by improving efficiency through cost management and making optimal investment decisions. Accordingly, enhancing investment efficiency and cost management are regarded as strategic imperatives for business success (Xu et al., 2019). In this context, the present study examines the effects of cost efficiency and investment efficiency on value chain performance and cash flow growth among 115 companies listed on the Tehran Stock Exchange over the five years from 2017 to 2022. Cost efficiency and value chain performance were measured using accounting data and the stochastic frontier approach, which represents one of the methodological innovations of this study. Moreover, analyzing the effects of cost and investment efficiency on both value chain performance and cash flow growth constitutes a key theoretical and empirical contribution of the present research.

The research findings, at a 95% confidence level, indicate that cost efficiency has a significant and positive effect on value chain performance. In other words, better control and management of the cost of goods sold and operating expenses enhance a company's performance across various stages of its value chain. This result is consistent with Kinyugo (2014), who demonstrated that cost efficiency has a positive effect on firms' return on assets in Nairobi. It also aligns with the findings of Kordestani and Mortazavi (2011), who showed that, in the presence of efficiency, operating expenses can play a crucial role in achieving operating profit, and the optimal cost and expense control can increase future profitability. Similarly, Blocher et al. (2009) and Alu (2023) argued that effective expense management improves company performance across value chain stages and has a positive impact on shareholder wealth. Porter (1985) also emphasized that optimal control of production costs can create a competitive advantage for firms. Accordingly, it is recommended that policymakers, government officials, and managers develop strategies to optimize production costs. Providing financial incentives and support to companies that actively improve their cost efficiency can further motivate them. Such efforts not only enhance profitability but can also improve product and service quality. To achieve this, mechanisms for improving cost efficiency should include training programs for managers and employees in cost control techniques, as well as the adoption of new technologies to optimize production processes and eliminate unnecessary costs. Moreover, clarifying the relationship between cost efficiency and value chain performance can help promote this strategic mindset within organizations.

The findings also revealed that cost efficiency has a significant and positive effect on cash flow

growth. In other words, better control and management of the cost of goods sold and operating expenses enhance the company's cash flows. This result is consistent with the findings of Viverita et al. (2024), who demonstrated that improving the efficiency of bank expenditures leads to greater liquidity. It also aligns with the results of Dechow et al. (1998), who examined the relationship between corporate financial performance and future cash flows using profitability as an indicator of firm performance. Their results showed that higher profitability improves the predictability of future cash flows. Based on these findings, it is recommended that analysts rank companies according to their level of cost efficiency, as improvements in cost efficiency reduce unnecessary expenditures and cash outflows while increasing profit margins. This, in turn, can lead to higher dividend payments to shareholders. Moreover, investors, creditors, and shareholders are advised to consider a firm's expense management performance in relation to its profitability and capital structure when constructing their investment portfolios.

Additionally, the findings suggest that investment efficiency has a significant and positive impact on value chain performance. In other words, optimal investment decisions enhance the company's overall performance across the stages of its value chain. Investment inefficiency reflects either overinvestment or underinvestment—where overinvestment reduces liquidity and returns despite favorable growth opportunities, and underinvestment limits the firm's ability to capitalize on such opportunities, thereby lowering operational efficiency. These results are consistent with the findings of Badpa and Mohamadvali (2023), who demonstrated that entrepreneurial orientation—reflecting innovation and risk-taking—enhances value chain performance. Similarly, Salehi et al. (2022) found that investment efficiency has a significant impact on firm value. Furthermore, the results of Foroughnejad et al. (2016), Nkundabanyanga et al. (2017), and López Salazar et al. (2012) confirm that the optimal utilization of financial resources, including investment efficiency, has a positive impact on corporate performance. Abbas et al. (2018) also reported a positive relationship between overinvestment (inefficiency) and the cost of equity, supporting the conclusions of the present study. Based on the findings related to the third hypothesis, it is recommended that managers and analysts avoid relying solely on direct measures of investment efficiency or inefficiency ratios. Instead, they should align their evaluations with value chain performance, since investment efficiency improves when firms are capable of creating value in competitive markets. Likewise, investors and shareholders are encouraged to base their investment decisions on value chain performance—an outcome closely linked to investment efficiency—to achieve sustainable long-term returns.

Finally, the findings indicate that investment efficiency has a significant and positive effect on the company's cash flow growth. In other words, optimal investment decisions enhance corporate cash flows. Richardson (2006) argued that efficient investment increases a firm's value, which in turn improves its cash flows. The results of this hypothesis test are consistent with the findings of Foroughnejad et al. (2016), Abbas et al. (2018), Nkundabanyanga et al. (2017), and López Salazar et al. (2012), all of whom reported that investment efficiency enhances firms' financial performance. This hypothesis aligns with the long-standing view in accounting that improvements in cash flows are often realized through enhancements in financial performance indicators. Investment efficiency is recognized as a key measure of corporate performance and constitutes a component of operational

efficiency. Some accounting theories suggest that improvements in performance indicators and increases in firm value (e.g., stock price) may stem from changes in accounting methods or earnings management. However, the generation of cash flows through operational efficiency reflects genuine, value-creating activities within the firm—an outcome supported by most conventional accounting theories. Therefore, it is recommended that analysts, managers, and investors avoid relying solely on conventional performance indicators when evaluating firms. Instead, they should assess companies based on their ability to generate sustainable cash flows relative to their investment activities and the efficiency of their resource management.

Practical recommendations were provided based on the results of each hypothesis test. This research contributes to the existing literature on corporate value creation, performance evaluation, and optimal resource allocation in the capital market. Moreover, the findings can help investors select an optimal stock portfolio, thereby supporting improved market efficiency and economic growth. For future research, managerial and psychological characteristics can be incorporated to examine how individual traits—such as overconfidence, myopia, optimism, and pessimism—affect investment efficiency, cost efficiency, and overall firm performance.

References

1. Abbas, N., Ahmed, H., Malik, Q. A. and Waheed, A. (2018). Impact of investment efficiency on cost of equity: an empirical study on shariah and non shariah compliance firms listed on Pakistan Stock Exchange. *Pakistan Administrative Review*, 2(3), pp. 307-322. https://www.ssoar.info/ssoar/handle/document/60206
2. Alu, A. J. (2023). Impact of project cost control on the financial performance of selected construction firms in north-central Nigeria. *Educational Administration: Theory and Practice*, 29(4), pp. 3610-3623. https://doi.org/10.4236/ojbm.2024.124145
3. Arianpoor, A. and Mehrfard, N. (2023). The impact of managerial attributes on cash holding and investment efficiency and the mediator role of cash holding. *Journal of Islamic Accounting and Business Research*, 14(4), pp. 610-628. https://doi.org/10.1108/JIABR-02-2022-0046
4. Ascioglu, A., Hegde, S. P. and McDermott, J. B. (2008). Information asymmetry and investment–cash flow sensitivity. *Journal of Banking & Finance*, 32(6), 1036-1048. https://doi.org/10.1016/j.jbankfin.2007.09.018
5. Badpa, B. and Mohamadvali, A. (2023). The effect of entrepreneurial orientation on the intra-firm value chain efficiency in Tehran Stock Exchange. *Journal of Entrepreneurship Research*, 2(3), pp. 53-72 (In Persian). https://doi.org/10.22034/jer.2023.2015847.1063
6. Beladi, H., Deng, J. and Hu, M. (2021). Cash flow uncertainty, financial constraints and R&D investment. *International Review of Financial Analysis*, 76, A. 101785. https://doi.org/10.1016/j.irfa.2021.101785
7. Biddle, G. C., Hilary, G. and Verdi, R. S. (2009). How does financial reporting quality relate to

investment efficiency?. *Journal of Accounting and Economics*, 48(2-3), pp. 112-131. https://doi.org/10.1016/j.jacceco.2009.09.001

8. Blocher, E., Stout, D. and Cokins, G. (2009). *Cost management: A strategic emphasis*. 5th edition. McGraw-Hill, Irwin, Pennsylvania. https://www.amazon.com/Cost-Management-Strategic-Emphasis-International/dp/126571455X
9. Dechow, P. M., Kothari, S. P. and Watts, R. L. (1998). The relation between earnings and cash flows. *Journal of Accounting and Economics*, 25(2), pp. 133-168. https://doi.org/10.1016/S0165-4101(98)00020-2
10. Dutta, S., Narasimhan, O. and Rajiv, S. (1999). Success in high-technology markets: Is marketing capability critical?. *Marketing Science*, 18(4), pp. 547-568. https://doi.org/10.1287/mksc.18.4.547
11. Fang, E., Palmatier, R. W. and Steenkamp, J. B. E. (2008). Effect of service transition strategies on firm value. *Journal of Marketing*, 72(5), pp. 1-14. https://doi.org/10.1509/jmkg.72.5.001
12. Foroughnejad, H., Moradi Joz, M., Heidari, H. and Masoumi Khanghah, G. (2016). Stock liquidity, investment efficiency, and firm's performance: evidence from Tehran stock exchange. *Journal of Investment Knowledge*, 5(18), pp. 179-196 (In Persian). http://www.jik-ifea.ir/article_8624.html?lang=en
13. Frank, M. Z. and Goyal, V. K. (2009). Capital structure decisions: which factors are reliably important? *Financial Management*, 38(1), pp. 1-37. https://doi.org/10.1111/j.1755-053X.2009.01026.x
14. Ghaffari Darab, M., Yarmohammadian, M. H., Khorasani, E. and Alaghemandan, H. (2015). The role of value chain for improving health care quality. *Health Information Management*, 11(6), pp. 799-811 (In Persian). https://him.mui.ac.ir/article_11355.html
15. Gruca, T. S. and Rego, L. L. (2005). Customer satisfaction, cash flow, and shareholder value. *Journal of Marketing*, 69(3), pp. 115-130. https://doi.org/10.1509/jmkg.69.3.115.66364
16. Gupta, V., Mortal, S. C. and Yang, T. (2018). Entrepreneurial orientation and firm value: does managerial discretion play a role? *Review of Managerial Science*, 12(1), pp. 1-26. https://doi.org/10.1007/s11846-016-0210-3
17. Harymawan, I., Nasih, M., Ratri, M. C. and Nowland, J. (2019). CEO busyness and firm performance: evidence from Indonesia. *Heliyon*, 5(5), A. e01601. https://doi.org/10.1016/j.heliyon.2019.e01601
18. He, Y., Chen, C. and Hu, Y. (2019). Managerial overconfidence, internal financing, and investment efficiency: Evidence from China. *Research in International Business and Finance*, 47, pp. 501-510. https://doi.org/10.1016/j.ribaf.2018.09.010
19. Hubbard, R. G. (1998). Capital-market imperfections and investment. *Journal of Economic Literature*, 36(1), pp. 193-225. https://www.jstor.org/stable/2564955
20. Ju, T. L., Lin, B., Lin, C. and Kuo, H. J. (2006). TQM critical factors and KM value chain activities. *Total Quality Management & Business Excellence*, 17(3), pp. 373-393. https://doi.org/10.1080/14783360500451614
21. Kinyugo, J. M. (2014). *The effect of cost efficiency on financial performance of companies listed on Nairobi Securities Exchange*. Master's thesis in Business Administration, Faculty of Arts & Social Sciences, Law, Business, University of Nairobi, Nairobi, Kenya. https://erepository.uonbi.ac.ke/handle/11295/74950
22. Kordestani, G. H. and Mortazavi, S. M. (2011). The impact of cost efficiency on the relation between sales, general and administrative ratio (SG&A ratio) and future performance. *Empirical Studies in Financial Accounting*, 9(34), pp. 77-102 (In Persian). https://qjma.atu.ac.ir/article_1711.html

23. Lin, P. W. (2005). An empirical analysis of bank mergers and cost efficiency in Taiwan. *Small Business Economics*, 25(2), pp. 197-206. https://doi.org/10.1007/s11187-003-6451-y
24. López Salazar, A., Contreras Soto, R. and Espinosa Mosqueda, R. (2012). The impact of financial decisions and strategy on small business competitiveness. *Global Journal of Business Research*, 6(2), pp. 93-103. https://ideas.repec.org/a/ibf/gjbres/v6y2012i2p93-103.html
25. Luo, X. and Homburg, C. (2008). Satisfaction, complaint, and the stock value gap. *Journal of Marketing*, 72(4), pp. 29-43. https://doi.org/10.1509/jmkg.72.4.029
26. Madan, K. (2007). An analysis of the debt-equity structure of leading hotel chains in India. *International Journal of Contemporary Hospitality Management*, 19(5), pp. 397-414. https://doi.org/10.1108/09596110710757561
27. Meeusen, W. and Van Den Broeck, J. (1977). Efficiency estimation from Cobb-Douglas production functions with composed error. *International Economic Review*, 18(2), pp. 435-444. https://doi.org/10.2307/2525757
28. Muñoz, F. (2013). Liquidity and firm investment: Evidence for Latin America. *Journal of empirical finance*, 20, pp. 18-29. https://doi.org/10.1016/j.jempfin.2012.10.001
29. Narasimhan, O., Rajiv, S. and Dutta, S. (2006). Absorptive capacity in high-technology markets: The competitive advantage of the haves. *Marketing Science*, 25(5), pp. 510-524. https://doi.org/10.1287/mksc.1060.0219
30. Nkundabanyanga, S. K., Akankunda, B., Nalukenge, I. and Tusiime, I. (2017). The impact of financial management practices and competitive advantage on the loan performance of MFIs. *International Journal of Social Economics*, 44(1), pp. 114-131. https://doi.org/10.1108/IJSE-05-2014-0104
31. Porter, M.E. (1985). *Competitive advantage: creating and sustaining superior performance*. New York: Free Press, New York. https://www.hbs.edu/faculty/Pages/item.aspx?num=193
32. Ray, S. C. (2002). Did India's economic reforms improve efficiency and productivity? A nonparametric analysis of the initial evidence from manufacturing. *Indian Economic Review*, 37, pp. 23-57. https://www.jstor.org/stable/29794258
33. Richardson, S. (2006). Over-investment of free cash flow. *Review of Accounting Studies*, 11(2), pp. 159-189. http://dx.doi.org/10.1007/s11142-006-9012-1
34. Salehi, M., Zimon, G., Arianpoor, A. and Gholezoo, F. E. (2022). The impact of investment efficiency on firm value and moderating role of institutional ownership and board independence. *Journal of Risk and Financial Management*, 15(4), p. 170. https://doi.org/10.3390/jrfm15040170
35. Seth, H., Chadha, S., Sharma, S. K. and Ruparel, N. (2021). Exploring predictors of working capital management efficiency and their influence on firm performance: An integrated DEA-SEM approach. *Benchmarking: An International Journal*, 28(4), pp. 1120-1145. https://doi.org/10.1108/BIJ-05-2020-0251
36. Sharif Azadeh, M. R. and Basirat, M. (2013). Estimating technical efficiency of Iranian oil and gas pipe manufacturing industry using stochastic frontier function estimation. *The Journal of Economic Studies and Policies*, (24), pp. 181-200 (In Persian). https://economic.mofidu.ac.ir/article_26127.html?lang=en
37. Sun, W. and Cui, K. (2012). Value chain capability, value strategies and firm default risk. *Journal of Financial Services Marketing*, 17(4), pp. 301-315. https://doi.org/10.1057/fsm.2012.25
38. Sun, W., Ding, Z. and Price, J. (2020). Board structure and firm capability: an environment-embedded relationship between board diversity and marketing capability. *Industrial Marketing Management*, 90, pp. 14-29. https://doi.org/10.1016/j.indmarman.2020.06.010
39. Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H. and Idris, M. (2021). Economic growth, increasing productivity of SMEs, and open innovation. *Journal of Open Innovation:*

Technology, Market, and Complexity, 7(1), p. 20. https://doi.org/10.3390/joitmc7010020

40. Viverita, V., Danarsari, D. N., Bustaman, Y. and Septianto, F. (2024). The effect of banks' cost efficiency and competition on liquidity creation. *Banks and Bank Systems*, 19(1), pp. 48-57. https://doi.org/10.21511/bbs.19(1).2024.05
41. Xu, X., Isaac, A., Hao, L. and Wang, D. (2019). Investor sentiment, innovation investment and cash dividend. *International Journal of Economics and Finance*, 11(7), pp. 1-97. https://doi.org/10.5539/ijef.v11n7p97
42. Zhang, Y. and Zhang, X. E. (2012). The effect of entrepreneurial orientation on business performance: A role of network capabilities in China. *Journal of Chinese Entrepreneurship*, 4(2), pp. 132-142. https://doi.org/10.1108/17561391211242744

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Disclosure of Key Audit Matters in Assessing the Level of Financial Distress of Companies

Mohsen Tanani, Seyedalireza Hosseini*

Department of Accounting, Faculty of Financial Sciences, Kharazmi University, Tehran, Iran

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Abstract

This study examines the relationship between the disclosure of Key Audit Matters (KAMs) and the assessment of financial distress among companies listed on the Tehran Stock Exchange (TSE). Grounded in Agency Theory, Signaling Theory, and Transaction Cost Theory, the research posits that KAM disclosures help mitigate information asymmetry between managers and shareholders. According to Signaling Theory, such disclosures convey signals about a firm's market risk. In contrast, Transaction Cost Theory suggests that greater transparency—through KAM disclosure—can reduce transaction costs and facilitate the evaluation of financial distress. The analysis investigates the association between the quantity and characteristics of KAM disclosures and financial distress using four distinct models. Based on a systematic elimination sampling method, 93 firms were selected, covering eleven years from 2012 to 2022, yielding 1,032 firm-year observations. The study's hypotheses were tested using multivariate regression analysis performed with EViews software and the partial least squares (PLS) approach. The results indicate a significant relationship between the quantity, risk level, classification, and nature of KAM disclosures and firms' levels of financial distress.

Keywords:
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Corporate Financial Risks,
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*Corresponding Author: Seyedalireza Hosseini
Email: alireza.h1377y@gmail.com
Tel: 09117793353
ORCID:

1. Introduction

The auditor's report is one of the most important channels of communication between auditors and stakeholders, particularly investors, as it conveys the results of the audit process. In recent years, international regulatory bodies, such as the International Auditing and Assurance Standards Board (IAASB), have revised and strengthened audit reporting standards. These reforms aim to enhance the informational value of audit reports and improve the decision-making processes of users of these reports. A key component of these updates is the disclosure of Key Audit Matters (KAMs), which play a central role in promoting transparency and improving the quality of financial information. Contemporary audit reports place strong emphasis on issues related to internal controls that critically influence a company's ability to produce reliable financial statements. Within this context, particular attention is often given to matters involving management judgment and financial reporting practices (Izi et al., 2020). Key Audit Matters (KAMs) refer to issues that auditors are required to communicate to those charged with governance during the audit process. This process relies heavily on auditors' professional judgment, which can influence the quality of interactions between auditors and corporate governance bodies (Mohamadi & Saatsaz, 2023). In contrast, financial distress—often resulting from economic or political pressures—continues to be a persistent risk faced by companies. The design and implementation of an efficient financial system are fundamental topics in financial studies (Gorji & Raei, 2015). With the increasing complexity of financial markets and intensified competition, many firms experience financial distress and, in some cases, bankruptcy due to ineffective resource management and inadequate responses to financial crises. This phenomenon stems not from market development itself, but from firms' inability to adapt to evolving competitive environments. Moreover, the concealment of financial problems in corporate reports and a lack of transparency further exacerbate distress conditions. Timely identification of financial difficulties can facilitate more effective use of investment opportunities and enhance resource allocation (Azizi, 2021). Considering these factors, this study aims to investigate the relationship between the disclosure of Key Audit Matters and the assessment of financial distress among companies.

2. Theoretical fundamentals and research background

The global adoption of new and comprehensive regulations on audit reporting has sparked significant debate regarding the benefits of greater transparency for users of financial statements. A central element of these reforms is the requirement for auditors to disclose areas where there is the highest potential for material misstatement in a company's financial reports. Under the International Standards on Auditing (ISA) and the disclosure guidelines for Key Audit Matters (KAMs) introduced in jurisdictions such as the United Kingdom and the United States, regulators have sought to enhance both the clarity and the decision-usefulness of audit reports. These reports, which highlight sensitive and complex areas that require substantial audit judgment, play a crucial role in enhancing the public's understanding of firms' financial risks (FRC, 2013; PCAOB, 2018). Recent studies (e.g., Moroney et al., 2021; Smith, 2023; Seebeck & Kaya, 2023) provide evidence that the disclosure of KAMs enhances users' comprehension of company-specific audit risks and increases the overall usefulness of financial reports. Similarly, Liu et al. (2022), in a study of Chinese firms, found that such disclosures are significant for highly leveraged companies. However, other studies (e.g., Köhler et al., 2020; Camacho-Miñano et al., 2024) found no significant evidence that investors derive substantial benefits from the disclosure of critical audit issues.

Over the past two decades, international audit regulations have undergone substantial changes. For instance, in 2003, France introduced new auditing requirements mandating the disclosure of audit information for entities listed on the French stock exchange. Such disclosures enable users of annual reports to gain a clearer understanding of financial statements (Bédard et al., 2019). Likewise, since

2013, firms listed on the London Stock Exchange have been required to include specific audit-related details in their reports (Gutierrez et al., 2018). In addition, the International Auditing and Assurance Standards Board (IAASB) issued International Standard on Auditing (ISA) 701, which focuses on the disclosure of Key Audit Matters (KAMs) in audit reports across developed economies (Sierra-García et al., 2019). Under this standard, auditors must disclose significant matters that affect financial statements for periods ending on or after December 15, 2016 (Al Lawati & Hussainey, 2022; IAASB, 2015). Theoretical perspectives further support the importance of these disclosures. Agency Theory suggests that revealing key audit matters can mitigate information asymmetry between management and investors. Signaling Theory posits that such disclosures serve as signals of a company's financial condition and risk, thereby enhancing stakeholder confidence. Ultimately, Transaction Cost Theory posits that increased transparency, achieved through the precise disclosure of key audit matters, can reduce transaction costs and improve the efficiency of economic decision-making.

Given the above, further research is needed on the disclosure of key audit matters and their role in improving judgments about firms' financial conditions (Minutti-Meza, 2021). One of the most critical challenges auditors face in this context is assessing a company's going-concern status—particularly following the 2008 global financial crisis, which raised substantial concerns about auditors' ability to issue credible opinions in this regard (Laitinen & Laitinen, 2020). Empirical evidence suggests that precise and transparent disclosures in this area can play a crucial role in predicting corporate bankruptcy and assessing financial distress levels (Franzel, 2017; Gutiérrez et al., 2020; Muñoz-Izquierdo et al., 2020). Accordingly, the disclosure of Key Audit Matters may function as an early warning mechanism regarding firms' financial distress. Building on this foundation, the present study aims to investigate the role of KAM disclosures in assessing financial distress among firms listed on the national capital market. Specifically, it examines the potential association between the extent of KAM disclosure and firms' levels of financial distress.

2.1. Research background

Camacho-Miñano et al. (2024) examined the impact of disclosing Key Audit Matters (KAMs) on the assessment of financial distress among UK-listed companies. Using data from firms listed on the UK Stock Exchange beginning in 2013, their analysis examined the relationship between financial distress levels and various dimensions of KAM disclosures. The results revealed that firms experiencing higher levels of financial distress tended to disclose a greater number of KAMs.

Neiroukh and Caglar (2024) conducted an empirical study investigating how the characteristics of Key Audit Matter (KAM) disclosures affect the understandability of financial statements and investor decision-making. Their results indicate that KAM accuracy, reliability, audit quality, and financial reporting quality significantly enhance the perceived understandability of financial statements, which, in turn, positively influences investor judgments. The study highlights the crucial role of detailed and well-structured KAM disclosures in enhancing financial transparency and facilitating more informed decision-making.

Ram Roz et al. (2024) evaluated the impact of Key Audit Matter (KAM) disclosures on the relationship between credit risk and earnings quality among firms listed on the Tehran Stock Exchange (TSE). The findings reveal that KAM disclosures moderate the association between credit risk and earnings quality, implying that enhanced audit transparency strengthens the credibility of financial reporting.

Bepari et al. (2024) assessed the perceived impact of Key Audit Matter (KAM) disclosures on audit effort, audit fees, audit quality, and audit report transparency from the perspectives of auditors, regulators, and financial statement preparers. Their results suggest that although audit quality has

improved due to heightened professional and regulatory scrutiny, audit fees have not changed significantly. Nevertheless, the study raises concerns that some auditors tend to disclose generic KAMs rather than transparently report critical audit issues, which may diminish the effectiveness of KAM disclosures in enhancing audit transparency.

Batara et al. (2024) explored trends in Key Audit Matter (KAM) disclosures in Indonesia by reviewing the audit reports of 806 publicly listed firms for the year 2022. The findings indicate that the most frequently reported KAMs concern doubtful debt provisions, revenue recognition, inventory valuation, fixed asset depreciation, and property valuation. The study further reveals that firms operating in high-risk industries disclose a greater number of KAMs, and that Big Four audit firms tend to provide more detailed KAM disclosures than their non–Big Four counterparts. These results suggest that KAM reporting plays a vital role in enhancing financial reporting transparency and audit quality in emerging markets.

Abbaspour Sani et al. (2022) examined the impact of Key Audit Matter (KAM) disclosures on mitigating corporate failure risk in capital markets. Their findings indicate that firms exhibiting greater financial transparency in audit reports tend to experience lower bankruptcy risk. The study concludes that enhanced KAM disclosures strengthen stakeholders' ability to evaluate financial vulnerabilities, thereby contributing to more stable and sustainable business operations.

Malekan et al. (2022) investigated the effects of auditor rotation and Key Audit Matter (KAM) disclosures on the quality of financial reporting among firms listed on the Tehran Stock Exchange (TSE). Using regression analysis on a sample of 110 firms over the period 2017–2021, they found that auditor rotation has a positive influence on financial reporting quality. Moreover, KAM disclosures related to assets, liabilities, revenues, expenses, company outlook, and going-concern status were found to have a positive and significant association with reporting quality. In contrast, variables such as accumulated losses, interpretations of working capital, and management program insights showed no significant relationship with financial reporting quality.

2.2. Research hypotheses

To address the objectives of this study, the following hypotheses are proposed:

1. There is a significant association between the number of disclosed Key Audit Matters (KAMs) and the level of financial distress experienced by the company. The number of disclosed KAMs may reflect the complexity and risk profile of a firm's operations. Companies that disclose a larger number of these matters are likely to face greater challenges in their audit processes and internal financial controls. From the perspective of agency theory, an increase in the number of disclosed KAMs may indicate that auditors have identified higher risks within the financial statements, requiring additional clarification to mitigate information asymmetry between managers and stakeholders. Conversely, a high volume of KAM disclosures may also signal severe financial difficulties that contribute to corporate distress. In this context, enhanced audit transparency enables investors to identify early warning signs regarding a firm's financial condition and take timely corrective actions.
2. There is a significant relationship between the risk level of disclosed Key Audit Matters (KAMs) and the degree of financial distress experienced by the company. The risk level associated with disclosed KAMs reflects the sensitivity and materiality of these matters to stakeholders. High-risk KAMs often indicate weaknesses in internal controls, deficiencies in managerial decisions, or issues related to taxation—all of which can contribute to a company's financial distress. According to Signaling Theory, the disclosure of high-risk matters serves as a signal to stakeholders that the firm's financial condition is fragile or uncertain. Such signals can negatively affect investor confidence, potentially leading to declines in stock value and liquidity, thereby

increasing the likelihood of financial distress.

3. There is a significant relationship between the classification of disclosed Key Audit Matters (KAMs) and the level of financial distress faced by the company. The classification of KAMs refers to the type and specific nature of the issues disclosed, such as those related to liabilities, assets, cash flows, or taxation. Frequently disclosed matters within sensitive classifications may serve as important indicators for assessing a firm's financial distress risk. According to Stakeholder Theory, the accurate classification and disclosure of such matters enable stakeholders to better understand the risks associated with different components of the financial statements, thereby facilitating more informed investment and partnership decisions. Conversely, inaccurate or incomplete disclosures increase uncertainty regarding a company's financial condition and may ultimately contribute to financial distress.
4. There is a significant relationship between the nature of disclosed Key Audit Matters (KAMs) and the level of financial distress experienced by the company. The nature of KAMs refers to the specific characteristics and contextual conditions surrounding these issues, including their long-term implications for a firm's financial health. Matters that inherently reflect structural weaknesses in financial performance or deficiencies in internal oversight may serve as early warning indicators of financial distress. According to Transaction Cost Theory, greater transparency in disclosing the nature of such matters can reduce information costs and enhance the efficiency of economic decision-making. When KAMs highlight serious risks to a firm's viability, accurate and transparent disclosure enables investors to better assess associated risks and take appropriate measures to mitigate potential losses.

3. Methodology

This study is applied in nature, aiming to develop practical knowledge within a specific domain. From a methodological perspective, it is classified as descriptive and correlational research. In terms of data collection, the study adopts a retrospective approach, employing descriptive statistics, inferential statistics, and multivariate regression analysis for data evaluation.

In the theoretical framework section, the required information was collected from specialized academic literature and a review of recent articles published on reputable domestic and international databases. Additionally, the data necessary for calculating the research variables were obtained from the Rahavard Novin database and the financial reports of publicly listed companies on the Tehran Stock Exchange (TSE).

For data collection and analysis, Excel and EViews software were employed. To test the research hypotheses, the F-test was used first to assess the suitability of the data integration. Subsequently, based on the results of the Hausman test, the appropriate estimation method—either fixed effects or random effects—was selected. The F-statistic was then applied to evaluate the overall significance of the estimated model.

The statistical population of the study includes all firms listed on the Tehran Stock Exchange (TSE) that operated continuously from 2012 to 2022. During this period, a total of 716 firms were active in the market. Given the large population size, a systematic screening method was applied to obtain a suitable research sample. Accordingly, the final sample consists of 93 firms, as presented in Table 1.

Table 1. How to select the sample

Description	Number
Total number of firms registered on the stock exchange up to 2022.	716
Exclusion of companies delisted from the TSE between 2012 and 2022.	(213)

Exclusion of companies that experienced trading suspensions lasting six consecutive months or longer.	(148)
Exclusion of companies operating in the financial, services, insurance, banking, and holding sectors.	(131)
Exclusion of companies whose fiscal year-end did not fall on March 20.	(68)
Exclusion of companies for which the required research data were unavailable or incomplete during the study period.	(63)
The remaining firms, which had complete and accessible information, constituted the final research sample.	93

Based on the results obtained, the research sample comprises 93 companies over 11 years, from 2012 to 2022, resulting in 1,023 company-year observations.

3.1. Handling key audit matters (KAMs) data before 2022

Since Auditing Standard 701 was formally implemented in Iran in 2022, the disclosure of Key Audit Matters (KAMs) became mandatory. However, even before this regulation, many companies and auditors voluntarily reported significant audit risks in their audit reports. To ensure consistency within the dataset covering the 2012–2022 period, a manual content analysis of audit reports was conducted, focusing on the "Emphasis of Matter" and "Basis for Qualified Opinion" sections, which often contained information conceptually comparable to KAMs. Furthermore, consultations with senior auditors were undertaken to validate the classifications and ensure the accuracy of the extracted data. This methodological approach enhances the reliability of the dataset and mitigates potential biases that may arise from the regulatory transition.

3.2. Research model and variables

To examine the relationship between the disclosure of Key Audit Matters (KAMs) and firms' financial distress (corresponding to Hypotheses 1 through 4), the following regression models are employed, consistent with the approach of Camacho-Miñano et al. (2024).

For the first hypothesis, if the coefficient of the independent variable (β_1) in the model is statistically significant, it can be inferred that H1 is supported. The model is specified as follows:

$$FD_{it} = \beta_0 + \beta_1 NOKAM_{it} + \sum CONTROLS_{it} + \mu_{it} \quad (1)$$

3.3. Dependent variable: Financial Distress (FD)

In this study, financial distress is measured based on the modified Altman Z-score model proposed by Kordestani et al. (2014), as presented below:

$$T\_score\_A = 0.291\, X_1 + 2.458\, X_2 - 0.301\, X_3 - 0.079\, X_4 - 0.05\, X_5 \quad (2)$$

Where:

- X_1: Working capital, calculated as current assets minus current liabilities, is divided by total assets
- X_2: Retained earnings as a proportion of total assets
- X_3: Earnings before interest and taxes (EBIT) relative to total assets
- X_4: Book equity relative to total debt
- X_5: Sales divided by total assets

Interpretation of Tscores_A:

- If $T \leq -0.14$: Very high probability of bankruptcy (95%)
- If $-0.14 < T < 0.02$: Company is in complete financial distress
- If $0.02 < T < 0.36$: Company is in a cash shortfall and unable to meet financial obligations
- If $0.36 < T < 0.6$: Company is in a latent financial distress stage

- If $T \geq 0.6$: Company is financially healthy

3.4. Independent variable: Number of Key Audit Matters Disclosed (NOKAM)

Following the studies of Camacho-Miñano et al. (2024), Sierra-García et al. (2019), and Lennox et al. (2023), the independent variable—the disclosure of Key Audit Matters (KAMs)—is measured by the total number of KAMs reported in the auditor's report for each fiscal year. The disclosed KAMs typically encompass the following categories:

- Uncertainties arising from political and economic conditions (e.g., economic sanctions or the Joint Comprehensive Plan of Action – JCPOA)
- Revenue recognition issues
- Amortization of goodwill or other intangible assets
- Legal claims and contingent liabilities
- Ambiguous or disputed tax obligations
- Mergers and acquisitions
- Parent company risk (e.g., recoverability of investments in subsidiaries)
- Macroeconomic factors and their effects on operations
- Investment valuation and impairment issues
- Retirement plans and defined benefit accounting

3.5. Control variables

Several audit-related and firm-specific characteristics are controlled for in the regression models Camacho-Miñano et al. (2024), Francis and Wang (2008), Lennox et al. (2023), and Sierra-García et al. (2019) In line with previous studies in this area:

- **Audit Fees (AFEE):** Calculated as the natural logarithm of audit fees at the fiscal year-end.
- **Auditor Change (ACH):** A dummy variable equal to 1 if there was a change in the external auditor during the current fiscal year, and zero otherwise.
- **Auditor Opinion (OPIN):** A dummy variable that takes the value of 1 if the auditor issued a qualified opinion, and zero otherwise.
- **Firm Size (SIZE):** Measured as the natural logarithm of total assets at the end of the fiscal year.
- **Restatement of Financial Statements (REST):** A binary indicator equal to 1 if financial statements were restated during the period, and zero otherwise.
- **Company Loss (LOSS):** Assigned a value of 1 if the firm reported a net loss for the fiscal year, and zero if it reported a profit.
- **Ownership Concentration (CON):** Defined as the percentage of shares held by the largest shareholder relative to the total number of outstanding shares at fiscal year-end.

For Hypothesis 2, the study investigates the relationship between the risk level of disclosed Key Audit Matters (KAMs) and firms' financial distress using the following regression model. If the coefficients of the independent variables (β_1 and β_2) are statistically significant, H2 is considered supported:

$$FD_{it} = \beta_0 + \beta_1 ENTKAM_{it} + \beta_2 ACCKAM_{it} + \sum CONTROLS_{it} + \mu_{it} \quad (3)$$

3.6. Independent Variables: Level of Risk in Disclosing Key Audit Matters

The independent variables in this model are defined in accordance with Camacho-Miñano et al. (2024) as follows:

- **ENTKAM:** Total number of Key Audit Matters (KAMs) reported at the *entity level* in the audit report.
- **ACCKAM:** Total number of Key Audit Matters (KAMs) reported at the *account level* in the audit report.
- For Hypothesis 3, the study examines the classification of KAMs and their relationship with firms' financial distress using the following regression model. If the coefficients of the independent variables (β_1 through β_5) are statistically significant, H3 is considered supported: (4)
- $FD_{it} = \beta_0 + \beta_1 GC + \beta_2 OTHERENT_{it} + \beta_3 PROF_{it} + \beta_4 LIQU_{it} + \beta_5 SOLV_{it} + \sum CONTROLS_{it} + \mu_{it}$
  In this model:
- **GC: Number** of KAMs related to uncertainties concerning the firm's going-concern status.
- **OTHERENT: Number** of KAMs disclosed at the entity level, excluding *GC*.
- **PROF, LIQU, SOLV:** Number of KAMs classified as having direct implications for profitability, liquidity, and solvency, respectively.

For Hypothesis 4, the study examines the nature of disclosed Key Audit Matters (KAMs) and their relationship with firms' financial distress using the following regression model. If the coefficients of the independent variables (β_1 to $\beta_{1\ 8}$) are found to be statistically significant, H4 is considered supported.

Table 2. Classification of key audit matters (KAMs)

Category	Classification	Variable	Explanation of Categorical Variables
Entity-level KAMs (ENTKAM)			
Going concern	Other Entity-level KAMs (OTHERENT)	GC	Total disclosed KAMs regarding the going concern status
Internal control and fraud		ICFRAUD	Total KAMs associated with internal control issues or fraud
Restructuring and discontinued operations		RDO	Total KAMs covering restructuring or discontinued operations
Merger and acquisition (M&A) accounting		MA	Total KAMs on mergers and acquisitions
Tax-related		TAX	Total KAMs addressing tax-related concerns
Exceptional items and specific disclosures		EIPD	Total KAMs on exceptional items or special disclosures
Litigation, macroeconomic, and system implementation		LITMACRO	Total KAMs about legal claims, macroeconomic issues, or system implementation
Account-level KAMs (ACCKAM)			
Management and/or performance fees	Profitability (PROF)	MGFEES	Total disclosed KAMs related to fees for management and performance
Revenue recognition		REV	Total KAMs concerning revenue recognition
Expense recognition		EXP	Total KAMs about expense recognition
Accruals, deferrals, and management estimates		ACCREST	Total KAMs associated with accruals, deferrals, and managerial estimates
Inventory	Liquidity (LIQU)	INV	Total KAMs related to inventory levels
Cash and receivables		CASHREC	Total KAMs covering cash and receivable matters
Investments and related impairment issues	Solvency (SOLV)	INVEST	Total KAMs for investment and impairment-related concerns

Intangibles and related impairment issues	INTANG	Total KAMs related to intangibles and their impairment
Property, plant, and equipment and related impairment issues	PPE	Total disclosed KAMs about property, plant, and equipment
Leases and long-term debt	LLTD	Total KAMs on leases and long-term liabilities
Pension and defined benefit plan accounting	PENS	Total KAMs related to pension and defined benefit plan obligations

$$FD_{it} = \beta_0 + \beta_1 GC + \beta_2 ICFRAUD_{it} + \beta_3 RDO_{it} + \beta_4 MA_{it} + \beta_5 TAX_{it} + \cdots + \beta_{18} PENS_{it} + \sum CONTROLS_{it} + \mu_{it} \quad (5)$$

In this model:

- GC, ICFRAUD, RDO, MA, TAX, ..., PENS: Different categories of Key Audit Matters (KAMs), each referring to a specific nature of audit issues. These categories will be described in detail in the subsequent sections.

4. Findings

Table 3 presents the descriptive statistics for the study's main variables. The mean financial distress (FD) score is 1.67, with a standard deviation of 3.08, indicating substantial variation in the financial conditions of firms. On average, firms disclosed 1.40 company-level KAMs (ENTKAM) and 0.55 account-level KAMs (ACCKAM). The mean values for audit fees (AFEE) and firm size (SIZE) are 6.98 and 14.63, respectively, while ownership concentration (CON) averages 0.49.

The table also summarizes the frequency distribution of the binary variables. Approximately 35% of firms disclosed at least one KAM (NOKAM = 1). Going Concern (GC) uncertainties were reported in 364 cases, whereas Internal Control and Fraud-related disclosures (ICFRAUD) appeared in 241 instances. Among KAM classifications, issues related to liquidity (LIQU) and profitability (PROF) were disclosed more frequently than those associated with solvency (SOLV).

Overall, these descriptive statistics provide a comprehensive overview of the dataset and serve as a foundation for subsequent empirical analyses.

4.1. First regression model

The Partial Least Squares (PLS) method was employed. The details are presented below to evaluate the first regression model of the study:

4.1.1. Model fit tests

- **F-Test Significance**: Based on the model's goodness-of-fit indices, the significance level of the F-statistic from the analysis of variance is less than 0.05, indicating that the estimated regression model is statistically significant.
- **Adjusted R-Squared:** The adjusted R^2 value indicates that approximately 2% of the variation in firms' financial distress listed on the Tehran Stock Exchange is explained by the independent and control variables included in the model.
- **Multicollinearity**: Multicollinearity refers to a strong linear relationship among the explanatory variables in the regression model. Severe multicollinearity can distort the estimated coefficients and reduce the reliability of significance tests. The Variance Inflation Factor (VIF) was calculated to assess this issue. A VIF value below 10 suggests that multicollinearity is not a serious concern.
- **Autocorrelation of Residuals**: The presence of autocorrelation in the model residuals was examined using the Durbin–Watson (DW) test. A DW statistic between 1.5 and 2.5 indicates no

significant autocorrelation, confirming the independence of residuals.

A summary of the findings concerning model fit tests is provided in Table 4.

4.1.2. Estimation of the regression model

In this section, the estimated regression results are presented, with the detailed coefficients reported in Table 4.

The independent variable representing Key Audit Matters (NOKAM) shows a significance level below 5%, indicating a statistically significant relationship between the number of disclosed KAMs and firms' financial distress on the Tehran Stock Exchange. Moreover, the negative coefficient associated with this variable suggests an inverse relationship, thereby supporting the study's first hypothesis (H1).

Table 3. Descriptive statistics of variables

Variable	Symbol	Mean	Median	Maximum	Minimum	Standard Deviation
Financial Distress	FD	1.678516	1.047430	33.903	-25.190	3.089
Entity -Level KAM Disclosure	ENTKAM	1.401	0.000	14.000	0.000	2.256
Account -Level KAM Disclosure	ACCKAM	0.552	0.000	7.000	0.000	1.085
Audit Fees	AFEE	6.988	6.938	9.403	4.787	0.805
Company Size	SIZE	14.631	14.460	21.057	10.532	1.644
Ownership Concentration	CON	0.494	0.510	0.954	0.023	0.200
Variable	**Symbol**		**Value = 0**		**Value = 1**	
KAM Disclosure	NOKAM		667		356	
Going Concern Uncertainty	GC		659		364	
Non-GC Key Audit Matters	OTHERENT		484		539	
Profitability	PROF		457		566	
Liquidity	LIQU		428		595	
Solvency	SOLV		544		479	
Internal Control and Fraud	ICFRAUD		782		241	
Restructuring and Discontinued Operations	RDO		918		105	
Mergers and Acquisitions Accounting	MA		879		144	
Tax-Related	TAX		430		593	
Exceptional Items and Special Disclosures	EIPD		789		234	
Legal, Macroeconomic, and System Implementation	LITMARCO		963		60	
Management and Performance Fees	MGFEES		969		54	
Revenue Recognition	REV		451		572	
Expense Recognition	EXP		548		475	
Accruals and Managerial Estimates	ACCREST		688		335	
Inventory	INV		198		825	
Cash and Receivables	CASHREC		523		500	
Investments and related impairment issues	INVEST		789		234	
Intangibles and related impairment issues	INTANG		923		100	
Property, plant, and equipment and related impairment issues	PPE		368		655	
Leases and long-term debt	LLTD		843		180	
Pension and defined benefit plan accounting	PENS		456		567	
New Auditor	ACH		463		560	

Auditor's Opinion	OPIN	420	603
Restatement of Financial Statements	REST	293	730
Company Loss	LOSS	906	117

4.2. Second regression model

To test the second regression model, the Partial Least Squares (PLS) method was employed, as described below.

4.2.1. Model fit tests

- Based on the model's goodness-of-fit metrics, the significance level of the F-statistic obtained from the analysis of variance is less than the Type I error threshold ($\alpha = 0.05$), indicating that the estimated regression model is statistically significant.

Table 4. The results of the first regression model estimation and goodness-of-fit tests

$$zeroeroeroFD_{it} = \beta_0 + \beta_1 NOKAM_{it} + \sum CONTROLS_{it} + \mu_{it}$$

Variable	Symbol	Beta	Standard Deviation	t-Statistic	Significance	VIF
Constant number		6.330	1.105	5.726	0.000	-
Number of KAMs	NOKAM	-0.439	0.194	-2.257	0.024	2.459
Audit Fees	AFEE	-0.049	0.150	-0.328	0.742	1.619
New Auditor	ACH	0.031	0.199	0.158	0.874	1.081
Auditor Opinion	OPIN	-1.118	0.302	-3.691	0.000	2.439
Company Size	SIZE	-0.207	0.074	-2.792	0.005	1.644
Restatement of Financial Statements	REST	-0.079	0.211	-0.375	0.707	1.008
Company Loss	LOSS	0.049	0.303	0.164	0.869	1.025
Ownership Concentration	CON	-0.739	0.481	-1.536	0.124	1.024
Coefficient of Determination				0.031		
Adjusted Coefficient of Determination				0.024		
F-Statistic				4.156		
Significance Level				0.000		
Durbin-Watson				2.021		

- The adjusted R^2 value indicates that the independent and control variables together explain approximately 2% of the variation in financial distress among publicly listed firms on the Tehran Stock Exchange (TSE).
- Multicollinearity refers to a strong linear relationship among the explanatory variables in the regression model. Severe multicollinearity can distort the estimated coefficients and reduce the reliability of their significance tests. To assess this issue, the Variance Inflation Factor (VIF) was calculated. A VIF value below 10 indicates that multicollinearity is not a serious concern.
- The Durbin–Watson (DW) test was applied to examine residual autocorrelation. Since the DW statistic falls within the acceptable range of 1.5 to 2.5, it suggests the absence of significant autocorrelation among the residuals.

A comprehensive summary of the results from the model fit tests is shown in Table 5.

4.2.2. Estimation of the regression model

In this section, the regression model has been estimated. The results for each variable are presented in Table 5:

- The independent variable representing company-level Key Audit Matters (ENTKAM) exhibits a significance level below 5% ($p < 0.05$), indicating a statistically significant relationship between the number of disclosed company-level KAMs and financial instability among firms listed on the Tehran Stock Exchange (TSE). Furthermore, the negative coefficient associated with this variable suggests an inverse relationship, thereby supporting the study's second hypothesis (H2).
- The independent variable representing accounting-level Key Audit Matters (ACCKAM) also shows a significance level below 5%, confirming a statistically significant association between the number of disclosed account-level KAMs and firms' financial distress on the TSE. The positive coefficient for this variable indicates a direct relationship, further validating the study's second hypothesis (H2).

4.3. Third regression model

To examine the third regression model of the research, the Partial Least Squares (PLS) model has been utilized, as detailed below:

Table 5. The results of the second regression model estimation and goodness-of-fit tests

$$FD_{it} = \beta_0 + \beta_1 ENTKAM_{it} + \beta_2 ACCKAM_{it} + \sum CONTROLS_{it} + \mu_{it}$$

Variable	Symbol	Beta	Standard Deviation	t-Statistic	Significance	VIF
Constant number		6.229	1.104	5.640	0.000	-
Entity-level KAMs	*ENTKAM*	-0.059	0.023	-2.525	0.011	2.078
Account-level KAMs	*ACCKAM*	0.164	0.063	2.579	0.010	2.165
Audit Fees	*AFEE*	-0.052	0.151	-0.344	0.730	1.621
New Auditor	*ACH*	0.031	0.199	0.157	0.874	1.081
Auditor Opinion	*OPIN*	-0.982	0.287	-3.417	0.000	2.191
Company Size	*SIZE*	-0.209	0.074	-2.808	0.005	1.649
Restatement of Financial Statements	*REST*	-0.077	0.212	-0.366	0.714	1.008
Company Loss	*LOSS*	0.061	0.303	0.201	0.840	1.026
Ownership Concentration	*CON*	-0.744	0.481	-1.544	0.122	1.026
Coefficient of Determination				0.031		
Adjusted Coefficient of Determination				0.022		
F-Statistic				3.606		
Significance Level				0.000		
Durbin-Watson				2.020		

4.3.1. Model fit tests

- Based on the model's goodness-of-fit indices, the significance level of the F-statistic from the analysis of variance is less than the Type I error threshold ($\alpha = 0.05$), indicating that the estimated regression model is statistically significant.
- The adjusted R^2 value indicates that approximately 2% of the variation in financial distress

among firms listed on the Tehran Stock Exchange (TSE) is explained by the independent and control variables included in the model.

- Multicollinearity refers to a strong linear association among explanatory variables in the regression model. Severe multicollinearity can distort coefficient estimates and undermine the validity of their significance tests. The Variance Inflation Factor (VIF) was used to assess this issue, and a VIF value below 10 suggests that multicollinearity is not a serious concern.
- The Durbin–Watson (DW) statistic was employed to detect autocorrelation in the model's residuals. Since the DW value lies within the acceptable range of 1.5 to 2.5, it indicates the absence of significant autocorrelation among residuals.

A summary of the findings related to the model fit tests is presented in Table (6).

4.3.2. Estimation of the regression model

In this section, the regression model has been estimated. The results for each variable are presented in Table 6:

- The independent variable representing company uncertainty (GC) exhibits a significance level below 5% ($p < 0.05$), indicating a statistically significant relationship between going-concern uncertainty and financial distress among firms listed on the Tehran Stock Exchange (TSE). Moreover, the negative coefficient associated with this variable suggests an inverse relationship, thereby supporting the study's third hypothesis (H3).
- The independent variable representing other entity-level key audit matters (OTHERENT) has a significance level exceeding 5% ($p > 0.05$), indicating no statistically significant association between these matters and financial distress among TSE-listed firms. Accordingly, this result leads to the rejection of the third hypothesis (H3) for this specific variable.

Table 6. The results of the third regression model estimation and the Goodness-of-Fit tests

$$FD_{it} = \beta_0 + \beta_1 GC + \beta_2 OTHERENT_{it} + \beta_3 PROF_{it} + \beta_4 LIQU_{it} + \beta_5 SOLV_{it} + \sum CONTROLS_{it} + \mu_{it}$$

Variable	Symbol	Beta	Standard Deviation	t-Statistic	Significance	VIF
Constant number		5.743	1.070	5.364	0.000	-
Going concern	GC	-0.080	0.025	-3.175	0.001	1.035
Other Entity-level KAMs	OTHERENT	-0.298	0.204	-1.461	0.144	1.136
Profitability	PROF	0.557	0.141	3.925	0.000	1.145
Liquidity	LIQU	-0.051	0.026	-1.972	0.049	1.074
Solvency	SOLV	0.061	0.036	1.652	0.099	1.062
Audit Fees	AFEE	-0.046	0.151	-0.308	0.757	1.623
New Auditor	ACH	0.025	0.200	0.126	0.899	1.086
Auditor Opinion	OPIN	-0.662	0.196	-3.375	0.000	1.019
Company Size	SIZE	-0.189	0.075	-2.528	0.011	1.663
Restatement of Financial Statements	REST	-0.067	0.213	-0.314	0.753	1.017
Company Loss	LOSS	-0.009	0.306	-0.030	0.976	1.042

Ownership Concentration	CON	-0.760	0.482	-1.576	0.115	1.027
Coefficient of Determination				0.031		
Adjusted Coefficient of Determination				0.020		
F-Statistic				2.772		
Significance Level				0.001		
Durbin-Watson				2.030		

- The independent variable representing KAMs related to company profitability (PROF) has a significance level below 5% ($p < 0.05$), indicating a statistically significant relationship between profitability-related audit matters and financial distress among firms listed on the Tehran Stock Exchange (TSE). Furthermore, the positive coefficient associated with this variable suggests a direct relationship, thereby confirming the study's third hypothesis (H3).
- The independent variable for liquidity-related KAMs (LIQU) also shows a significance level below 5% ($p < 0.05$), highlighting a statistically significant relationship between liquidity-related disclosures and financial distress among TSE-listed firms. The negative coefficient indicates an inverse relationship, further supporting the study's third hypothesis (H3).
- The independent variable representing solvency-related KAMs (SOLV) yields a significance level greater than 5% ($p > 0.05$), indicating no statistically significant association between solvency-related disclosures and financial distress among firms listed on the TSE. Therefore, the third hypothesis (H3) is rejected for this variable.

4.4. Fourth regression model

To examine the fourth regression model of the research, the Partial Least Squares (PLS) model has been utilized, as detailed below:

4.4.1. Model fit tests

- Based on the model's goodness-of-fit indices, the significance level of the F-statistic from the analysis of variance is less than the Type I error threshold ($\alpha = 0.05$), indicating that the estimated regression model is statistically significant.
- The adjusted R^2 value shows that the independent and control variables collectively explain approximately 3% of the variation in financial distress among firms listed on the Tehran Stock Exchange (TSE).
- Multicollinearity refers to the presence of a strong linear relationship among the explanatory variables in the regression model. Severe multicollinearity can distort coefficient estimates and compromise the accuracy of their significance tests. To evaluate this issue, the Variance Inflation Factor (VIF) was calculated. A VIF value below 10 indicates that multicollinearity is not a serious concern.
- The Durbin–Watson (DW) statistic was used to test for autocorrelation in the residuals. Since the DW value falls within the acceptable range of 1.5 to 2.5, it confirms the absence of significant autocorrelation among the model's residuals.

A summary of the findings related to the model fit tests is presented in Table (7).

4.4.2. Estimation of the regression model

In this section, the regression model has been estimated. The results for each variable are presented in Table 7:

Table 7. The results of the fourth regression model estimation and goodness-of-fit tests

$$zeroeroeroFD_{it} = \beta_0 + \beta_1 GC + \beta_2 ICFRAUD_{it} + \beta_3 RDO_{it} + \beta_4 MA_{it} + \beta_5 TAX_{it} + \cdots + \beta_{18} PENS_{it} + \sum CONTROLS_{it} + \mu_{it}$$

Variable	Symbol	Beta	Standard Deviation	t-Statistic	Significance	VIF
Constant number		5.983	1.118	5.347	0.000	-
Going concern	GC	-0.150	0.072	-2.075	0.039	1.228
Internal control and fraud	ICFRAUD	-0.272	0.238	-1.143	0.253	1.135
Restructuring and discontinued operations	RDO	0.020	0.009	2.170	0.030	1.232
Merger and acquisition (M&A) accounting	MA	-0.187	0.094	-1.984	0.051	1.195
Tax-related	TAX	-0.199	0.068	-2.894	0.005	1.425
Exceptional items and presentation, and disclosure	EIPD	0.207	0.094	2.202	0.028	1.297
Litigation, macroeconomic, and system implementation	LITMARCO	0.552	0.435	1.266	0.205	1.164
Management and/or performance fees	MGFEES	-0.138	0.079	-1.740	0.083	1.106
Revenue recognition	REV	-0.161	0.069	-2.320	0.023	2.327
Expense recognition	EXP	0.058	0.292	0.199	0.841	2.361
Accruals, deferrals, and management estimates	ACCREST	0.087	0.036	2.380	0.017	1.399
Inventory	INV	0.241	0.322	0.750	0.452	1.799
Cash and receivables	CASHREC	0.222	0.252	0.881	0.378	1.772
Investments and related impairment issues	INVEST	-0.694	0.294	-2.360	0.018	1.696
Intangibles and related impairment issues	INTANG	1.450	0.379	3.820	0.000	1.411
Property, plant, and equipment and related impairment issues	PPE	-0.463	0.207	-2.236	0.025	1.096
Leases and long-term debt	LLTD	-0.388	0.290	-1.336	0.181	1.359
Pension and defined benefit plan accounting	PENS	-0.013	0.232	-0.058	0.953	1.483
Audit Fees	AFEE	-0.020	0.155	-0.129	0.896	1.742
New Auditor	ACH	-0.010	0.204	-0.048	0.961	1.151
Auditor Opinion	OPIN	-0.737	0.202	-3.645	0.000	1.098
Company Size	SIZE	-0.198	0.076	-2.579	0.010	1.769
Restatement of Financial Statements	REST	-0.036	0.213	-0.172	0.863	1.034
Company Loss	LOSS	-0.017	0.305	-0.055	0.955	1.051
Ownership Concentration	CON	-0.720	0.480	-1.498	0.134	1.033
Coefficient of Determination				0.058		
Adjusted Coefficient of Determination				0.034		
F-Statistic				2.468		
Significance Level				0.000087		
Durbin-Watson				2.078711		

- The significance levels obtained for the independent variables related to going-concern uncertainty, reconstruction and discontinued operations, tax-related matters, disclosure and presentation of specific items, revenue recognition, accrual items and managerial forecasts, investments and similar issues, intangible assets, and property, plant, and equipment (PPE) are all below 5% ($p < 0.05$). This finding indicates a statistically significant relationship between these specific categories of Key Audit Matters (KAMs) and the financial distress of firms listed on the Tehran Stock Exchange (TSE). However, this relationship was not confirmed for the remaining variables, thereby partially supporting the study's fourth hypothesis (H4).

5. Discussion and conclusions

The disclosure of accounting information has long been a central topic in financial and accounting research, due to its potential to mitigate agency conflicts within firms and reduce information asymmetry between organizations and their stakeholders, who rely on their financial reports. From the perspective of creditors, accounting disclosures also influence financing costs and affect firms' access to external funding sources. Consequently, managers often seek to positively influence creditors and financial providers by presenting transparent and comprehensive financial and accounting information. In this context, the present study examines the importance of Key Audit Matters (KAMs) in assessing financial distress levels among companies listed on the Tehran Stock Exchange (TSE). Following Camacho-Miñano et al. (2024), we analyzed the relationship between the volume and nature of KAM disclosures and corporate financial distress, as measured using the model by Kordestani et al. (2014), across four distinct regression frameworks.

The findings demonstrate a statistically significant association between the quantity, risk level, classification, and nature of disclosed Key Audit Matters (KAMs) and the financial distress of firms. These results are consistent with the principles of Agency Theory and Signaling Theory, suggesting that enhanced audit disclosures help reduce information asymmetry, thereby lowering agency risk, while simultaneously acting as signals of a company's financial condition—enabling stakeholders to make more informed assessments. The insights derived from this study contribute to the ongoing evaluation of emerging audit reporting standards and emphasize the critical role of KAM disclosures as an analytical tool for users to assess and monitor corporate financial health.

In testing the first hypothesis (H1), a significant inverse relationship was observed between the number of disclosed KAMs and the financial distress of firms. This finding aligns with prior research, including Malekan et al. (2022), Camacho-Miñano et al. (2024), and Wuttichindanon and Issarawornrawanich (2020), all of which reported that greater audit transparency contributes to improved understanding of financial risks and enhances the quality of financial reporting.

The second hypothesis (H2) examined the risk level of disclosed Key Audit Matters (KAMs) and revealed a significant direct relationship between the number of account-level KAMs and firms' financial distress. In contrast, an inverse relationship was observed between the number of entity-level KAMs and the level of financial distress. These results are consistent with the findings of Camacho-Miñano et al. (2024) and Abbaspour Sani et al. (2021), suggesting that the depth and scope of audit disclosures reflect differing dimensions of financial vulnerability across organizational levels.

Regarding the third hypothesis (H3), the analysis revealed a significant association between KAM classifications related to uncertainty, profitability, and liquidity, and the financial distress of firms. Specifically, profitability-related KAMs showed a direct relationship with financial distress, whereas uncertainty and liquidity-related KAMs demonstrated inverse associations. These findings align with previous research by Camacho-Miñano et al. (2024) and Gold et al. (2020), reinforcing the notion

that different KAM categories signal distinct risk patterns within firms.

Finally, the fourth hypothesis (H4) examined the nature of disclosed KAMs and found significant relationships between various KAM categories—such as going-concern uncertainty, tax issues, revenue recognition, and asset management—and corporate financial distress. In contrast, other KAM variables showed no significant effect. These results align with studies by Camacho-Miñano et al. (2024), Al Lawati and Hussainey (2022), and Malekan et al. (2022), which emphasize the significance of the qualitative dimensions of KAM disclosure in evaluating firms' financial stability.

5.1. Research implications and practical recommendations

This study provides significant theoretical, practical, and regulatory contributions to the literature on audit transparency and financial reporting quality.

From a theoretical perspective, the findings strengthen the assumptions of Agency Theory by demonstrating that the disclosure of Key Audit Matters (KAMs) reduces information asymmetry between managers and stakeholders. The results also support Signaling Theory, indicating that firms experiencing higher levels of financial distress tend to disclose more KAMs, thereby providing investors with early warning signals regarding potential financial risks.

From a practical standpoint, the study highlights the need to enhance the informativeness and specificity of KAM disclosures. Auditors should avoid using standardized or generic statements and instead provide tailored insights that accurately reflect the firm's specific financial risks. Investors and creditors can utilize the quantity, nature, and classification of KAMs as analytical tools to evaluate corporate financial health and make informed investment and lending decisions. Corporate managers, in turn, should recognize that transparent and substantive KAM disclosures strengthen investor confidence and corporate governance practices, motivating improvements in financial reporting quality and risk communication strategies.

From a regulatory perspective, the findings reaffirm the effectiveness of International Standard on Auditing (ISA) 701 in enhancing audit transparency. However, the observed inconsistencies in KAM reporting underscore the need for stricter and more standardized disclosure guidelines to ensure that such information remains both meaningful and comparable across firms. Regulatory bodies, such as the Tehran Stock Exchange (TSE) and the Audit Organization of Iran, should consider developing sector-specific KAM disclosure requirements, particularly for high-risk industries, to enhance the reliability and relevance of financial reports. Strengthening these regulations would also help prevent financially distressed firms from concealing material risks from stakeholders, thereby safeguarding the integrity of financial reporting.

Future research could extend this study by examining the long-term effects of KAM disclosures on market reactions, stock price volatility, and investor decision-making. Exploring these dimensions would further advance understanding of the role that KAM transparency plays in promoting financial stability, audit quality, and overall market confidence.

5.2. Future recommendations

To conduct further research aligned with this topic and to develop it, the following suggestions are offered for future studies:

- Future research is encouraged to investigate this topic specifically within the non-metallic mineral, pharmaceutical, and petrochemical industries.
- Subsequent studies could also examine how managerial characteristics—such as competence, narcissism, and overconfidence—moderate or influence the relationship between KAM disclosures and financial distress.

- Finally, further research may explore the impact of KAM disclosures on additional financial and accounting dimensions, including stock price crash risk, stock price synchronicity, and the readability of financial reports.

References

1. Abbaspour Sani, A., Hajiha, Z., Hejazi, R. and Najafi Moghadam, A. (2022). Analyzing the impact of disclosure of key audit report items on reducing the business success of capital market companies. *Financial Accounting Knowledge*, 9(4), pp. 219-250. https://doi.org/10.30479/jfak.2021.16048.2906
2. Abbaspour Sani, A., Hajiha, Z., Hejazi, R. and Najafi-Moghaddam, A. (2021). Investigating the effect of disclosure of key audit report items on reducing business failure of capital market companies. *Financial Accounting Knowledge*, 46(9), pp. 220-250 (In Persian).
3. Al Lawati, H. and Hussainey, K. (2022). The determinants and impact of key audit matters disclosure in the auditor's report. *International Journal of Financial Studies*, 10(4), p. 107. https://doi.org/10.3390/ijfs10040107
4. Azizi, S. (2021). Modeling and determining the power of working capital management in predicting corporate financial bankruptcy using artificial intelligence algorithm. *Financial Knowledge of Securities Analysis*, 14(51), pp. 171-190. https://doi.org/10.30495/jfksa.2021.19258
5. Batara, G., Jalaluddin, J. and Yahya, M. R. (2024). Analysis of key audit matters disclosures in financial reporting: the first evidence from indonesia. *Journal of Accounting Auditing and Business*, 7(2), pp. 52-63. https://doi.org/https://doi.org/10.24198/jaab.v7i2.56263
6. Bédard, J., Gonthier-Besacier, N. and Schatt, A. (2019). Consequences of expanded audit reports: Evidence from the justifications of assessments in France. *Auditing: A Journal of Practice & Theory*, 38(3), pp. 23-45. https://doi.org/10.2308/ajpt-52339
7. Bepari, M. K., Nahar, S. and Mollik, A. T. (2024). Perceived effects of key audit matters reporting on audit efforts, audit fees, audit quality, and audit report transparency: stakeholders' perspectives. *Qualitative Research in Accounting & Management*, 21(2), pp. 192-218. https://doi.org/10.1108/QRAM-06-2022-0098
8. Camacho‐Miñano, M. D. M., Campa, D. and Parte, L. (2024). Earnings management reactions to key audit matters. *Global Policy*, 15, pp. 115-130. https://doi.org/10.1111/1758-5899.13408
9. Financial Reporting Counci (FRC). (2013). International standard on auditing (UK and Ireland) 700. In the independent auditor's report on financial statements. UK and Ireland.
10. Francis, J. R. and Wang, D. (2008). The joint effect of investor protection and Big 4 audits on earnings quality around the world. *Contemporary Accounting Research*, 25(1), pp. 157-191. https://doi.org/10.1506/car.25.1.6
11. Franzel, J. (2017). Statement on adoption of an auditing standard on the auditor's report. *In PCAOB Open Board Meeting*, 1(1), p. 2017
12. Gold, A., Heilmann, M., Pott, C. and Rematzki, J. (2020). Do key audit matters impact financial reporting behavior?. *International Journal of Auditing*, 24(2), pp. 232-244. https://doi.org/10.1111/ijau.12190
13. Gorji, A. and Raei, R. (2015). Identification of capital structure adjustment speed using a dynamic model of optimal capital structure; emphasis on product market competition factor. *Financial Knowledge of Securities Analysis*, 25(8), pp. 43-67.
14. Gutiérrez, E., Krupa, J., Minutti-Meza, M. and Vulcheva, M. (2020). Do going concern opinions provide incremental information to predict corporate defaults? *Review of Accounting Studies*, 25, pp. 1-22. https://doi.org/10.1007/s11142-020-09544-x

15. Gutierrez, E., Minutti-Meza, M., Tatum, K. W. and Vulcheva, M. (2018). Consequences of adopting an expanded auditor's report in the United Kingdom. *Review of Accounting Studies*, 23(4), pp. 1543-1587. https://doi.org/10.1007/s11142-018-9464-0
16. International Auditing and Assurance Standards Board (IAASB). (2015). Handbook of international quality control, auditing, review, other assurance, and related services pronouncements. New York.
17. Izi, R., Garkaz, M., Saeidi, P. and Matoofi, A. (2020). Reporting quality of financial information based on behavioral and value accounting. *Advances in Mathematical Finance and Applications*, 1(1), p. 95. https://doi.org/10.22034/amfa.2019.582810.1164
18. Köhler, A., Ratzinger-Sakel, N. and Theis, J. (2020). The effects of key audit matters on the auditor's report's communicative value: Experimental evidence from investment professionals and non-professional investors. *Accounting in Europe*, 17(2), pp. 105-128. https://doi.org/10.1080/17449480.2020.1726420
19. Kordestani, G., Tatli, R. and Kosari Far, H. (2014). The evaluate ability of altman adjusted model to prediction stages of financial distress newton and bankruptcy. *Journal of Investment Knowledge*, 3(1), pp. 83-100 (In Persian).
20. Laitinen, E. K. and Laitinen, T. (2020). Why does an auditor not issue a going concern opinion for a failing company? Impact of financial risk, time to bankruptcy, and cognitive style. *Theoretical Economics Letters*, 10(1), pp. 131-153. https://doi.org/10.4236/tel.2020.101009
21. Lennox, C. S., Schmidt, J. J. and Thompson, A. M. (2023). Why are expanded audit reports not informative to investors? Evidence from the United Kingdom. *Review of Accounting Studies*, 28(2), pp. 497-532. https://doi.org/10.1007/s11142-021-09650-4
22. Liu, H., Ning, J., Zhang, Y. and Zhang, J. (2022). Key audit matters and debt contracting: evidence from China. *Managerial Auditing Journal*, 37(6), pp. 657-678. https://doi.org/10.1108/MAJ-06-2021-3210
23. Malekan, M., Karamlo, M. and Hatami, A. (2022). Investigating the relationship between auditor rotation and disclosure of key audit matters on the quality of financial reporting in companies admitted to the Tehran Stock Exchange. *9th International Conference on Management, Accounting and Economic Development*, Tehran, Iran (In Persian).
24. Minutti-Meza, M. (2021). The art of conversation: The expanded audit report. *Accounting and Business Research*, 51(5), pp. 548-581. https://doi.org/10.1080/00014788.2021.1932264
25. Mohamadi, M. and Saatsaz, P. (2023). Auditor rotation, disclosure of important audit issues and financial reporting quality. *Journal of Accounting and Management Vision*, 5(75), pp. 130-148 (In Persian).
26. Moroney, R., Phang, S. Y. and Xiao, X. (2021). When do investors value key audit matters?. *European Accounting Review*, 30(1), pp. 63-82. https://doi.org/10.1080/09638180.2020.1733040
27. Muñoz‐Izquierdo, N., Laitinen, E. K., Camacho‐Miñano, M. D. M. and Pascual‐Ezama, D. (2020). Does audit report information improve financial distress prediction over Altman's traditional Z‐Score model?. *Journal of International Financial Management & Accounting*, 31(1), pp. 65-97. https://doi.org/10.1111/jifm.12110
28. Neiroukh, N. and Caglar, D. (2024). The impact of key audit matter characteristics on financial statement understandability and investor decision-making: An empirical study. *Decision Science Letters*, 13(4), pp. 909-920. https://doi.org/10.5267/j.dsl.2024.8.001
29. Public Company Accounting Oversight Board (PCAOB). (2018). Auditing standards—the auditor's report on an audit of financial statements when the auditor expresses an unqualified opinion (AS 3101). Washington, D.C.

30. Ram Roz, A., Naqdi Bahar, M. and Hajizadeh, N. (2024). Investigating the effect of disclosure of key audit matters on the relationship between credit risk and earnings quality in companies listed on the Tehran Stock Exchange, The 24th National Conference on New Approaches in Management, Economics and Accounting, Babol, Iran (In Persian).
31. Seebeck, A. and Kaya, D. (2023). The power of words: an empirical analysis of the communicative value of extended auditor reports. *European Accounting Review*, 32(5), pp. 1185-1215. https://doi.org/10.1080/09638180.2021.2021097
32. Sierra-García, L., Gambetta, N., García-Benau, M. A. and Orta-Pérez, M. (2019). Understanding the determinants of the magnitude of entity-level risk and account-level risk key audit matters: The case of the United Kingdom. *The British Accounting Review*, 51(3), pp. 227-240. https://doi.org/10.1016/j.bar.2019.02.004
33. Smith, K. W. (2023). Tell me more: A content analysis of expanded auditor reporting in the United Kingdom. *Accounting, Organizations and Society*, 108, A. 101456. https://doi.org/10.1016/j.aos.2023.101456
34. Wuttichindanon, S. and Issarawornrawanich, P. (2020). Determining factors of key audit matter disclosure in Thailand. *Pacific Accounting Review*, 32(4), pp. 563-584. https://doi.org/10.1108/PAR-01-2020-0004

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Identifying and Ranking Client Acquisition Techniques among Members of the Iranian Association of Certified Tax Consultants

Oktay Yamrali*
Department of Management, Economics and Accounting, Payame Noor University, Tehran, Iran

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Abstract

In today's competitive environment, possessing tax knowledge alone is insufficient for success in tax consulting; the use of effective client acquisition techniques is essential. Accordingly, this study aims to identify client acquisition strategies employed by members of the Iranian Association of Certified Tax Consultants during 2024–2025. In the first phase, a survey was conducted among association members to identify the range of client acquisition methods they employ. Following processes of homogenization, integration, and the elimination of redundant items, the final set of techniques was determined. In the second phase, these techniques were validated through a two-stage screening process using the fuzzy Delphi method, incorporating expert opinions. Finally, the Step-wise Weight Assessment Ratio Analysis (SWARA) method was applied to rank the techniques based on expert evaluations. The results indicate that word-of-mouth marketing ranked first, followed by client referral programs, while advertising through local radio and television received the lowest ranking. The novelty of this study lies in developing a localized and structured model tailored to the Iranian context by combining multiple multi-criteria decision-making methods. This topic has not been previously explored in the national literature.

Keywords:
Client Acquisition Methods,
Certified Tax Consultant,
Fuzzy Delphi, SWARA

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*Corresponding Author: Oktay Yamrali
Email: o.yamrali@pnu.ac.ir
Tel: 09112783309
ORCID: 0000-0001-6320-6733

1. Introduction

In today's world, rapid technological advancements, economic transformations, and increasingly complex tax regulations have intensified competition in the tax advisory services sector. Tax consultants, as key professionals responsible for interpreting, implementing, and advising on tax laws, must adopt innovative marketing strategies to attract and retain clients. Effective marketing not only enhances visibility and brand recognition but also plays a crucial role in building trust and fostering long-term relationships with clients (Kotler and Keller, 2012). Given the distinctive nature of professional tax services, the theoretical foundation of this study is grounded in established frameworks of services marketing and consumer behavior. Relationship Marketing Theory emphasizes that success in this domain depends on cultivating mutual trust and commitment (Morgan and Hunt, 1994; Evetts, 2003; Carter, 2021; Rasul, 2018; Yamrali et al., 2024). For instance, Morgan and Hunt (1994) demonstrated, within their Commitment–Trust Framework, that relationship quality serves as a key predictor of success in service marketing (Mardani et al., 2017). According to Trust Theory, the concept of trust—one of the fundamental elements in building and maintaining client relationships—is particularly critical in consulting services where sensitive information and strategic decision-making are involved (Shankar et al., 2022; Mahdieh et al., 2024). In contrast, the Customer Experience Theory suggests that consulting services extend beyond their technical aspects to encompass all touchpoints—from initial interactions to post-service engagement (Razak, 2023; Pranata et al., 2024; Nugraha et al., 2024). Collectively, these theories form the conceptual foundation for identifying and prioritizing client acquisition techniques tailored to the Iranian tax consulting market. The importance of adopting modern marketing strategies in tax advisory services can be viewed from two perspectives. First, the unique characteristics of tax services—such as their intangible nature, the complexity of tax information, and the high level of expertise required—pose distinct challenges for marketing these services. Clients require precise and well-documented information, positive recommendations, and the experiences of others before selecting a consultant. Consequently, leveraging digital marketing tools—such as search engine optimization (SEO), content marketing, and social media engagement—can significantly enhance trust, strengthen client relationships, and increase interaction by improving online visibility and credibility (Zeithaml et al., 2018; Moser et al., 2015).

Second, shifts in consumer behavior and the rapid emergence of new communication technologies have challenged traditional marketing approaches, such as print advertising and price-based promotions. International studies indicate that consultants who actively utilize digital tools have achieved significantly higher client acquisition rates (Kotler and Keller, 2012; Pranata et al., 2024; Moser et al., 2015). For example, a study conducted in the United States found that consistent application of SEO and specialized content production increased client acquisition by up to 40% (Aggarwal and Mittal, 2022). Similarly, research in the United Kingdom and Australia revealed that regular social media engagement and referral programs led to increases of 35% and 70% in client acquisition, respectively (Buteau, 2021; Pranata et al., 2024). Despite these positive international findings, studies in Iran remain primarily focused on traditional marketing techniques (Yamrali et al., 2024; Almasi et al., 2023; Amini Khoei et al., 2024), although recent evidence suggests emerging shifts. For instance, domestic studies by Sohrabi et al. (2022) and Ebrahimi et al. (2019) highlight the growing importance of website optimization and online advertising, reporting a 28% to 32% increase in new client engagement. These differences highlight the need to align Iran's marketing strategies with contemporary international best practices while also adapting them to local conditions. Given Iran's distinctive economic, social, and legal environment, there is a pressing need to design a localized marketing model tailored to the specific requirements of tax consultants. Accordingly, this study seeks to contribute to the development of such a model by employing a comprehensive

scientific framework.

Given these considerations, existing research indicates that although several international studies have reported the success of digital marketing tools, a substantial gap remains in the comprehensive and integrated examination of marketing techniques for tax consultants—particularly within the Iranian market. Prior studies have primarily concentrated on individual marketing methods rather than developing a holistic framework that integrates both traditional and digital approaches to enhance consultants' performance.

To address this research gap, the present study aims to identify and rank marketing techniques employed by certified tax consultants in Iran using the fuzzy Delphi method. The findings of this research are expected to provide a strategic foundation for tax consultants to enhance their marketing performance, attract new clients, and foster long-term relationships. More specifically, this study pursues two primary objectives:

1. To identify the most effective marketing techniques in the field of tax advisory services, drawing on both domestic and international empirical studies.

2. To develop a comprehensive and practical model for selecting and optimizing marketing strategies that contributes to both theoretical advancement and functional improvement in tax consultancy.

Accordingly, this study aims to address the following primary research question: What types of techniques do certified tax consultants in Iran use to attract clients? Which marketing techniques have the most significant impact on increasing market share for certified tax consultants? How do the identified marketing techniques rank in terms of their effectiveness?

This study systematically analyzes data collected from interviews conducted between 2024 and 2025 to identify and rank these techniques. In the first phase, a survey was administered to 25 certified tax consultants to determine the range of client acquisition methods they employ. Following harmonization, integration, and the elimination of redundant responses, ten final techniques were identified. In the second phase, these techniques were refined and validated through two screening rounds using the fuzzy triangular method and expert opinions from 12 professionals. Finally, the Step-wise Weight Assessment Ratio Analysis (SWARA) method was applied, incorporating insights from 16 experts, to rank the identified techniques. The novelty of this study lies in developing a localized and structured model tailored to the Iranian context by combining multiple multi-criteria decision-making methods. This approach has not been previously addressed in the national literature.

The findings of this study contribute not only to the theoretical understanding of marketing within the tax consulting industry but also provide a practical framework for optimizing marketing strategies. By identifying and presenting effective marketing techniques, this research advances the body of knowledge in tax service marketing and offers actionable insights for both practitioners and scholars in the field. Accordingly, the study not only bridges an existing research gap but also serves as a reference point for developing innovative strategies in the tax consulting sector. The remainder of this paper is organized as follows: Section 2 presents the theoretical framework and literature review; Section 3 outlines the research methodology; Section 4 reports the empirical findings; and Section 5 concludes with implications and future research directions.

2. Theoretical framework and literature review

The theoretical framework of this study seeks to examine modern marketing theories and review empirical research related to tax consulting marketing. This section first discusses both fundamental and contemporary theories in service marketing. It then analyzes and explains various dimensions of tax consultants' marketing techniques based on validated empirical evidence.

2.1 Introduction to marketing in professional services

Marketing in professional services fundamentally differs from product-based marketing due to the intangible, heterogeneous, and trust-dependent nature of services (Zeithaml et al., 2018). According to Perceived Risk Theory (Bauer, 1960), the inability to evaluate service outcomes before consumption compels clients to rely heavily on the credibility and reputation of the provider (Kotler and Keller, 2016). Unlike tangible goods, professional services—such as those offered by legal advisors, auditors, and tax consultants—cannot be assessed in advance, thereby heightening clients' perceived risk and their dependence on the provider's trustworthiness (Kotler and Keller, 2016). In such contexts, personal relationships, word-of-mouth referrals, and client satisfaction play a critical role, as clients often depend on prior experiences or peer recommendations when selecting a professional service provider (Sohrabi et al., 2022; Hidayati, 2020). Consequently, the marketing of professional services requires a relational and knowledge-based approach that emphasizes demonstrating expertise, building trust, and delivering consistent value over time. This is particularly relevant in tax advisory services, where the regulatory environment is complex and clients seek reliability, discretion, and long-term professional guidance (Zeithaml et al., 2018). Advisory services—especially in financial, managerial, and legal domains—are inherently information-intensive and sensitive. Thus, developing deep, long-term relationships with clients is essential to ensure sustained engagement and value creation.

2.2 Relationship marketing theory

Relationship Marketing Theory emphasizes that success in service marketing depends on establishing mutual trust and commitment between service providers and clients. Morgan and Hunt (1994), through their Commitment–Trust Framework, demonstrated that relationship quality is a key predictor of marketing success in service-oriented contexts.

Building upon this foundation, several empirical studies have examined specific marketing practices that foster strong client relationships. Hollebeek and Macky (2019) investigated the effectiveness of email marketing and digital advertising, reporting that personalized emails and targeted advertisements increased open rates by 45%.

Pranata et al. (2024) explored the impact of word-of-mouth marketing and referral programs, concluding that approximately 70% of new clients in tax consulting were acquired through positive recommendations from existing clients.

Similarly, Buteau (2021) highlighted the importance of social media engagement, demonstrating that consistent activity on platforms such as LinkedIn resulted in a 35% increase in client acquisition.

In a related context, Maranjory (2020) identified several key marketing strategies adopted by auditing firms, including competitive pricing, service diversification, leveraging professional networks, and maintaining high-quality audits to secure long-term client retention. Extending these insights, Aggarwal and Mittal (2022) found that search engine optimization (SEO) and content marketing strategies enhanced customer acquisition rates by up to 40%, underscoring the growing importance of digital marketing for tax consultants.

Similarly, Ebrahimi et al. (2019) reported that internet advertising—particularly on social media platforms such as Instagram and through educational video content—increased client awareness of tax advisory services by approximately 32%. Carter (2021) further analyzed how digital transformation is reshaping relationship marketing strategies within consultancy services, while Razak (2023) examined the ongoing evolution of client relationship strategies in the digital era.

Almasi et al. (2023) reported a direct relationship between trust, commitment, and the quality of advisory relationships. Similarly, Amini Khoei et al. (2024) analyzed the role of relationship

marketing in client retention within management consulting firms and found that bilateral interactions foster repeat service usage. Tashakkori et al. (2024) highlighted the effectiveness of email marketing, demonstrating that educational newsletters and informational campaigns improved client acquisition rates by 25%. Furthermore, Yamrali et al. (2024) revealed that implementing customer relationship management (CRM) systems based on modern technologies significantly enhances client loyalty in advisory services.

2.3 Trust theory

Trust is a fundamental component in establishing and maintaining relationships within advisory services—particularly in contexts involving sensitive information and strategic decision-making. Doney and Cannon (1997) emphasized that transparency in communication and behavioral consistency are essential drivers of trust. Mardani et al. (2017) examined the mechanisms of trust formation in management consulting and found that regular and meaningful interactions significantly strengthen trust between consultants and clients.

Similarly, Ghobadi Lamuki and Khani (2022) examined the relationship between trust and service quality, concluding that higher levels of trust are associated with greater customer satisfaction. Additionally, Mahdieh et al. (2024) investigated the impact of social media engagement. They reported that publishing specialized articles and fostering digital interactions substantially enhance the credibility and perceived trustworthiness of tax consultants.

2.4 Customer experience theory

Customer experience in advisory services extends beyond technical performance and encompasses all client touchpoints—from initial interactions to post-service support. In this regard, Teimouri and Goodarzvand Chegini (2018) found that digital transformation and personalized services significantly enhance customer experience in tax advisory settings. Similarly, Kiptoo (2019) analyzed the design of comprehensive customer touchpoints in advisory services and confirmed their positive influence on client satisfaction. Eslami and Ghaderi (2020) provided empirical evidence that personalized services substantially improve the overall customer experience in strategic consulting. Nasehi Far et al. (2021) examined the effectiveness of digital physical evidence—such as online documentation and digital interfaces—in enhancing customer experience through the use of modern technologies. In a related line of inquiry, Yamrali and Fakhari (2023) examined marketing practices among auditing firms. They found that techniques such as excessive document formalization, reduced audit quality, and offering free consulting services were commonly employed, raising concerns about the long-term reputational risks associated with these practices. Furthermore, Kedi et al. (2024) demonstrated that emerging technologies can significantly improve the customer experience in consultancy contexts, while Yamrali et al. (2024) showed that digital technologies strengthen physical evidence and elevate the overall customer experience.

This section has provided a comprehensive theoretical foundation for the study by integrating modern service marketing and digital marketing theories with a review of relevant empirical research. The reviewed literature indicates that combining digital and relationship-based marketing approaches can significantly improve performance and client acquisition in the tax consulting industry. Accordingly, this research seeks to bridge the existing knowledge gap in tax consulting marketing, contribute to the academic discourse, and provide practical insights for identifying and optimizing effective marketing strategies. The following section presents the research methodology.

2.5 Marketing strategies for tax advisors

Trust-based relationships, as emphasized in Relationship Marketing Theory (Berry, 1983, cited in Yamrali and Fakhari, 2023), play a central role in professional service contexts. In line with Social Exchange Theory (Shahbazitakabi et al., 2023), tax advisors rely on long-term value exchanges to foster client loyalty and encourage referrals. As a subset of professional services, tax advisory work requires tailored marketing strategies that align with the expectations of informed and often risk-averse clients. Traditional marketing approaches—such as personal networking, word-of-mouth referrals, and participation in industry events—have long been recognized as practical tools for attracting clients in this field (Zeithaml et al., 2018; Ohman and Wallerstedt, 2012). In particular, client referrals remain the dominant source of new business, as trust and credibility are central to clients' decision-making processes when selecting tax consultants. Additionally, some practitioners continue to rely on printed brochures, public seminars, and participation in professional associations to enhance their visibility and establish reputational authority.

In recent years, tax consultants have increasingly adopted modern marketing strategies—particularly digital channels—to remain competitive and reach a broader audience. Digital content marketing, including blogs, newsletters, and online articles, enables tax advisors to showcase their expertise and provide value-added insights to both current and prospective clients (Zolfani and Saparauskas, 2013). Moreover, platforms such as LinkedIn and Instagram offer opportunities for professional engagement and personal branding, particularly among younger and more technologically adept consultants. Search engine optimization (SEO), email campaigns, and targeted social media advertising have also gained popularity among firms seeking to enhance trust, credibility, and visibility in an increasingly crowded market (Maranjory, 2020; Nasehi Far et al., 2021; Razak, 2023). However, the adoption of marketing strategies within the tax advisory sector is often shaped by professional codes of ethics, legal restrictions on advertising, and consultants' own marketing competencies and perceptions. Consequently, identifying and prioritizing the most suitable and effective marketing techniques for tax consultants—particularly within specific regulatory and cultural contexts such as Iran—necessitates a structured and context-sensitive approach. This study seeks to address this gap by systematically identifying and ranking these strategies using expert-based multi-criteria decision-making tools.

2.6. Integration of Fuzzy Delphi and SWARA in marketing studies

Combining expert knowledge with structured analysis, as proposed in Knowledge-Based Decision-Making Theory (Nonaka and Takeuchi, 2007), the hybrid FDM–SWARA approach enables context-sensitive prioritization in complex, qualitative domains (Kahraman et al., 2003). The integration of the Fuzzy Delphi Method (FDM) and the Step-wise Weight Assessment Ratio Analysis (SWARA) provides a robust framework for addressing multi-criteria decision-making problems in marketing research, particularly when qualitative and context-dependent factors are involved. FDM is well-suited for filtering and validating expert opinions under uncertainty, whereas SWARA systematically prioritizes the identified factors based on expert-assigned weights. Together, these methods form a complementary system that enhances both the validity and reliability of multi-criteria evaluations (Kahraman et al., 2003). In marketing—especially in service industries such as tax consultancy—many strategic decisions, including the selection of promotional techniques, communication channels, and branding strategies, rely heavily on expert intuition and contextual understanding. Such subjective insights are often difficult to capture through conventional quantitative approaches. The combined FDM–SWARA framework addresses this limitation by first

identifying the most relevant criteria through expert consensus (FDM) and then ranking them according to their relative importance (SWARA), while effectively managing the vagueness inherent in linguistic evaluations (Kumar et al., 2017). Previous studies have confirmed the applicability of this hybrid model across various marketing-related domains, such as selecting customer relationship management strategies (Shih et al., 2007), prioritizing sustainability marketing initiatives (Zolfani and Saparauskas, 2013), and ranking service quality dimensions in financial consulting (Cheng and Lin, 2002). Building upon this foundation, the present research develops a localized, expert-informed model designed to identify and rank marketing techniques suitable for certified tax advisors in Iran. The findings are expected to make both theoretical contributions and provide practical guidance for professionals seeking to strengthen their market presence in an ethical and effective manner.

3. Research methodology

This study is exploratory in nature, aiming to identify client acquisition techniques employed by members of the Iranian Certified Tax Advisors (CTA) community. Given its reliance on primary data collected directly from the target population, the research also qualifies as a field study. The study was conducted between 2024 and 2025 among members of the Iranian CTA community. In the first phase, a survey was administered to 25 tax advisors to identify various client acquisition techniques.

Notably, no new techniques emerged after the 19th interview, indicating theoretical saturation. To ensure the completeness of the findings, responses from six additional participants were collected. After standardizing and merging similar responses and eliminating redundancies, a final list of ten client acquisition techniques was established. In the second phase, the identified techniques were validated using the fuzzy triangular method, incorporating expert opinions from twelve professionals. Following two rounds of screening, the techniques were finalized. Finally, the Step-wise Weight Assessment Ratio Analysis (SWARA) method was applied to rank the techniques based on input from sixteen experts. A purposive sampling strategy, combined with the snowball sampling method, was employed to ensure the inclusion of highly relevant experts in the study.

4. Findings

4.1. Identifying client acquisition techniques

In this phase, the validity of the categories derived from the qualitative analysis of expert interviews was evaluated. After removing redundancies and merging similar or homogeneous categories, a final set of ten client acquisition techniques used by members of the Certified Tax Advisors (CTA) community was identified. To screen and finalize these techniques, a fuzzy logic approach was applied.

The fuzzy analysis was conducted based on the opinions of twelve members of the Iranian CTA community. Although experts rely on their cognitive competencies to perform comparisons, traditional methods of quantifying expert judgments often fail to fully capture the complexity of human reasoning. In contrast, fuzzy set theory offers a closer alignment with linguistic expressions and the inherent ambiguity of human thought, making it a more suitable tool for long-term forecasting and real-world decision-making (Kahraman et al., 2003, cited in Yamrali and Fakhari, 2023). In this study, triangular fuzzy numbers were employed to quantify expert opinions. The experts' assessments of the relative significance of each criterion were collected using a seven-point fuzzy scale, as presented in Table 1.

4.2. Fuzzy method – first round

In the first round of the fuzzy analysis, the opinions of twelve members of the Iranian Certified Tax Advisors (CTA) community—each possessing at least ten years of professional experience in tax consulting—were used to validate and confirm the identified marketing techniques at the institutional level. The results for each method are presented in Table 5. It is worth noting that a questionnaire was initially distributed to fifteen experts. Despite three follow-up attempts by the researcher, only twelve participants returned completed responses. The consolidated findings from this stage are summarized in Table 2.

Table 1. Seven-Point Fuzzy scale for evaluating the criteria

Linguistic Variable	Fuzzy Equivalent	Triangular Fuzzy Equivalent
Completely Irrelevant	$\tilde{1}$	(0,0,0.1)
Very Irrelevant	$\tilde{2}$	(0,0.1,0.3)
Irrelevant	$\tilde{3}$	(0.1,0.3,0.5)
Medium Importance	$\tilde{4}$	(0.3,0.5,0.75)
Importance	$\tilde{5}$	(0.5,0.75,0.9)
Very Importance	$\tilde{6}$	(0.75,0.9,1)
Highly Importance	$\tilde{7}$	(0.9,1,1)

Source: yamrali and fakhari (2023)

Table 2. Fuzzy panel for experts' opinions on each client acquisition technique

Client Acquisition Techniques	M	P01	P02	P03	P04	...	P12
Word of mouth marketing – customer recommendation	M01	(0.75,0.9,1)	(0.75,0.9,1)	(0.9,1,1)	(0.5,0.75,0.9)	...	(0.75,0.9,1)
Search dumdum optimization	M02	(0.5,0.75,0.9)	(0.5,0.75,0.9)	(0.9,1,1)	(0.5,0.75,0.9)	...	(0.5,0.75,0.9)
Video marketing	M03	(0.5,0.75,0.9)	(0.75,0.9,1)	(0.75,0.9,1)	(0.75,0.9,1)	...	(0.5,0.75,0.9)
Activity on social networks	M04	(0.75,0.9,1)	(0.9,1,1)	(0.5,0.75,0.9)	(0.75,0.9,1)	...	(0.3,0.5,0.75)
Customer referral programs	M05	(0.9,1,1)	(0.75,0.9,1)	(0.5,0.75,0.9)	(0.75,0.9,1)	...	(0.5,0.75,0.9)
Email Marketing	M06	(0.9,1,1)	(0.9,1,1)	(0.9,1,1)	(0.3,0.5,0.75)	...	(0.75,0.9,1)
Holding webinars and training courses	M07	(0.75,0.9,1)	(0.9,1,1)	(0.75,0.9,1)	(0.75,0.9,1)	...	(0.75,0.9,1)
Online advertising	M08	(0.5,0.75,0.9)	(0.5,0.75,0.9)	(0.9,1,1)	(0.3,0.5,0.75)	...	(0.5,0.75,0.9)
Advertisements in the local media of the Iranian Broadcasting Corporation	M09	(0.75,0.9,1)	(0.9,1,1)	(0.5,0.75,0.9)	(0.5,0.75,0.9)	...	(0.75,0.9,1)
Dumdum	M10	(0.5,0.75,0.9)	(0.75,0.9,1)	(0.75,0.9,1)	(0.75,0.9,1)	...	(0.5,0.75,0.9)

In the next step, expert opinions were aggregated. Several methods have been proposed in the literature for consolidating the responses of n participants, each representing a different empirical approach to aggregation. In this study, the fuzzy mean method was employed for this purpose, as expressed in Equation (1).

Equation 1: Calculation of the Fuzzy Mean

$$F_{AVE} = \left(\left\{ \frac{\sum l}{n} \right\}, \left\{ \frac{\sum m}{n} \right\}, \left\{ \frac{\sum u}{n} \right\} \right) \quad (1)$$

4.3. Defuzzification method

In this study, the Center of Area (CoA) method was employed for defuzzification, following the procedure proposed by Kumar et al. (2017) and later applied by Yamrali and Fakhari (2023). This method is widely recognized for converting fuzzy values into crisp scores, thereby ensuring a more objective interpretation of expert opinions.

Equation 2: Defuzzification Formula

$$DF_{ij} = \frac{[(u_{ij} - l_{ij}) + (m_{ij} - l_{ij})]}{3} + l_{ij} \qquad (2)$$

The fuzzy mean values and the corresponding defuzzified outputs for the indicators are presented in Tables 3 and 4. In this study, any defuzzified value greater than 0.7 was considered acceptable, whereas indicators with scores below 0.7 were rejected. In other words, the acceptance–rejection threshold in this approach was set at 0.7.

Table 3. Results of screening indicators (Round 1).

Client Acquisition Techniques	Fuzzy average	Definite amount	Round 1 result
Word of mouth marketing - customer recommendation	(0.945,0.889,0.955)	0.930	Acceptance
Search engine optimization	(0.667,0.817,0.880)	0.788	Acceptance
Video marketing	(0.771,0.865,0.854)	0.830	Acceptance
Activity on social networks	(0.599,0.785,923)	0.769	Acceptance
Customer referral programs	(0.665,0.795,0.765)	0.742	Acceptance
Email Marketing	(0.816,0.899,0.946)	0.887	Acceptance
Holding webinars and training courses	(0.774,0.838,0.945)	0.852	Acceptance
Online advertising	(0.844,0.798,0.679)	0.774	Acceptance
Advertisements in the local media of the Iranian Broadcasting Corporation	(0.865,0.771,0.915)	0.850	Acceptance
Dumping	(0.773,0.867,0.949)	0.863	Acceptance

Based on the results of the first round, all client acquisition techniques used by tax consultants received scores above the acceptance threshold of 0.7, as evaluated by the experts. Therefore, these techniques were approved in the first round and subsequently used as inputs for further analysis in the second round.

4.4. Fuzzy method – second round

After completing the second round, the results obtained from the fuzzy Delphi method were summarized and are presented in Table 4.

Table 4. Fuzzy average and fuzzy screening of indicators (round 2)

Client Acquisition Techniques	Fuzzy average	Definite amount	Round 2 result
Word of mouth marketing - customer recommendation	(0.885,0.891,0776)	0.851	Acceptance
Search engine optimization	(0.654,0.773,0.886)	0.771	Acceptance
Video marketing	(0.721,0.886,0.937)	0.848	Acceptance
Activity on social networks	(0.763,0.827,0931)	0.840	Acceptance
Customer referral programs	(0.814,0.795,0.837)	0.815	Acceptance
Email Marketing	(0.765,0.837,0.776)	0.793	Acceptance
Holding webinars and training courses	(0.821,0.867,0956)	0.881	Acceptance
Online advertising	(0.746,0.853,0.914)	0.838	Acceptance
Advertisements in the local media of the Iranian Broadcasting Corporation	(0.816,0.774,0.863)	0.818	Acceptance
Dumping	(0.721,0.946,0.969)	0.879	Acceptance

The second round did not lead to the elimination of any techniques, indicating the conclusion of the survey phase. In general, the common practice for terminating the fuzzy Delphi process is to compare the average scores of two consecutive rounds. If the difference between these averages is less than the defined threshold (0.2), the survey process is considered complete and is therefore discontinued.

Table 5. The difference between the first round and the second round final values

Client Acquisition Techniques	Round1	Round2	Difference	Result
Word of mouth marketing - customer recommendation	0.930	0.851	0.079	fixation
Search engine optimization	0.788	0.771	0.017	fixation
Video marketing	0.830	0.848	0.018	fixation
Activity on social networks	0.769	0.840	0.071	fixation
Customer referral programs	0.742	0.815	0.073	fixation
Email Marketing	0.887	0.793	0.094	fixation
Holding webinars and training courses	0.852	0.881	0.029	fixation
Online advertising	0.774	0.838	0.064	fixation
Advertisements in the local media of the Iranian Broadcasting Corporation	0.850	0.818	0.032	fixation
Dumping	0.863	0.879	0.016	fixation

Based on the results obtained, the differences in all cases were smaller than 0.2; therefore, the Delphi rounds were concluded. The results presented in Table 5 confirm that certified tax consultants are indeed implementing the identified techniques in practice.

4.5. Ranking of identified techniques - application of the swara method

After identifying and validating the client acquisition techniques used by certified tax consultants, this section proceeds to rank the identified techniques using the SWARA method. SWARA, which stands for Step-wise Weight Assessment Ratio Analysis, is a relatively new multi-criteria decision-making method introduced by Kersuliene, Zolfani, and Saparauskas (2013). In the SWARA approach, experts first arrange the criteria in order of importance, assigning the most important criterion a comparative importance score of one. Subsequently, the criteria are ranked based on their average relative importance values. Initially, the criteria were ordered according to their perceived importance. Then, the relative importance of each criterion compared to the previous one was determined, and these values—denoted as S_i —are presented in the Average Relative Importance column of Table 6. In the third step of the SWARA method, the coefficient K_i is calculated. The coefficient for the essential criterion is set to one, while the coefficients for the remaining criteria are computed sequentially. The preliminary weight of each criterion is then determined using the following formula. At this stage, the survey form was distributed to twenty certified tax consultants. After four follow-up attempts, sixteen valid responses were received. The final scores for each technique were calculated by averaging the values obtained from these respondents.

$$Q_i = \frac{Q_{i-1}}{K_i}$$

$$Q_1 = 1$$

$$Q_2 = \frac{Q_1}{K_2} = \frac{1}{1.81} = 0.553$$

$$Q_3 = \frac{Q_2}{K_3} = \frac{0.553}{1.72} = 0.321$$

These values are presented in the *Initial Weight* column of Table 6. To obtain the final weights, the linear normalization method was applied using the following formula:

$$W_i = \frac{Q_i}{\sum Q_i}$$

$$W_1 = \frac{Q_i}{\sum Q_i} = \frac{1}{2.537} = 0.394$$

$$W_2 = \frac{Q_i}{\sum Q_i} = \frac{0.553}{2.537} = 0.218$$

Thus, the final weight of each method has been obtained.

Table 6. Prioritization of customer acquisition techniques among tax consultants using the SUORA method.

Client Acquisition Techniques	Moderate Relative Importance	Kj	Initial weight	Normalized weight
Word of mouth marketing - customer recommendation	1.00	1.00	1	0.394
Search engine optimization	0.81	1.81	0.553	0.218
Video marketing	0.72	1.72	0.321	0.127
Activity on social networks	0.53	1.53	0.210	0.083
Customer referral programs	0.50	1.50	0.140	0.055
Email Marketing	0.45	1.45	0.097	0.038
Holding webinars and training courses	0.37	1.37	0.071	0.028
Online advertising	0.27	1.27	0.056	0.022
Advertisements in the local media of the Iranian Broadcasting Corporation	0.18	1.18	0.047	0.019
Dumping	0.12	1.12	0.042	0.017

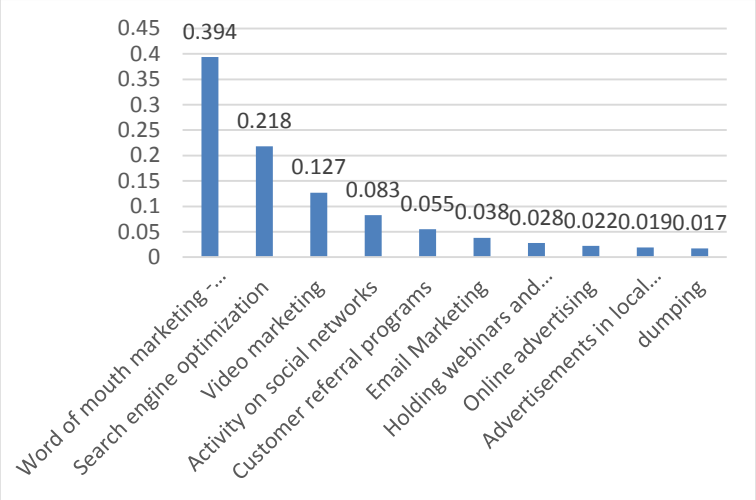

Figure1. Final weights of customer acquisition techniques among tax consultants using the swara method

Based on Table 6 and Figure 1

The ranking of the techniques is shown in Table 7.

Table 7. Ranking client acquisition techniques among members of the Iranian Association of Certified Tax Consultants

Client Acquisition Techniques	Rank
Word of mouth marketing - customer recommendation	1
Search engine optimization	2
Video marketing	3
Activity on social networks	4
Customer referral programs	5
Email Marketing	6
Holding webinars and training courses	7
Online advertising	8
Advertisements in the local media of the Iranian Broadcasting Corporation	9
Dumping	10

Based on the results presented in the table, word-of-mouth marketing ranked first with a weight of 0.394, followed by client referral programs with a weight of 0.218. In contrast, advertising through local public media received the lowest rank, with a weight of 0.017.

4.6. Sensitivity analysis of client acquisition techniques

To evaluate the robustness of the ranking results obtained through the SWARA method, a sensitivity analysis was performed. In this analysis, the weights assigned to each identified client acquisition technique were systematically increased and decreased by 10%. The primary objective of this procedure was to investigate whether minor variations in expert judgments would lead to significant changes in the final prioritization of techniques. Accordingly, for each client acquisition technique, two additional scenarios were developed:

1. +10% Scenario: The initial weight of each technique was increased by 10%.
2. –10% Scenario: The initial weight of each technique was decreased by 10%.

Following this, the normalization procedure was repeated for each scenario to derive the adjusted rankings. The comparison between the original and adjusted ranks (±10%) demonstrated a high degree of stability. Techniques such as word-of-mouth marketing, client recommendations, and search engine optimization consistently maintained their top positions, regardless of weight changes. Conversely, techniques such as dumping and advertising through local media of the Iranian Broadcasting Corporation consistently remained at the bottom of the rankings under both adjustment scenarios.

Table 8. The recalculated and summarized normalized weights and rankings

Client Acquisition Techniques	Original Rank	Adjusted Rank (+10%)	Adjusted Rank (-10%)
Word of mouth marketing - customer recommendation	1	1	1
Search engine optimization	2	2	2
Video marketing	3	3	3
Activity on social networks	4	4	4
Customer referral programs	5	5	5

The results of the sensitivity analysis indicate that the final prioritization of client acquisition techniques is robust and insensitive primarily to minor variations in expert judgments. This outcome enhances the credibility of the research findings and confirms the reliability of the SWARA method within this context. Accordingly, the identified priorities can serve as a solid foundation for strategic

decision-making by certified tax advisors and other relevant stakeholders. The recalculated normalized weights and rankings are summarized in Table 8.

5. Conclusion

In today's dynamic environment—characterized by rapid technological advancements, economic transformations, and increasingly complex tax regulations—competition among tax consultants has become more intense than ever. As key professionals responsible for interpreting and applying tax legislation, certified tax consultants in Iran must adopt targeted and effective marketing strategies to sustain and expand their client base. Accordingly, this study aimed to identify and prioritize the most effective client acquisition techniques used by tax consultants during 2024–2025 through an integrated fuzzy Delphi–SWARA approach.

The findings identified ten key marketing techniques: word-of-mouth marketing, client referral programs, service price reductions, video marketing, webinars and training courses, social media presence, online advertising, search engine optimization, email marketing, and advertising through local media. The SWARA analysis revealed that word-of-mouth marketing ranked first, followed by referral programs and educational content marketing, while local media advertising ranked lowest. These results underscore the central role of trust and credibility in the tax consultancy profession. Clients often rely on recommendations from trusted peers before engaging with a consultant, highlighting the importance of interpersonal networks and informal reputation systems. This is particularly relevant in professional service contexts that demand technical expertise and ethical assurance. The findings are supported by the Commitment–Trust Theory (Morgan and Hunt, 1994, cited in Buteau, 2021), which posits that trust forms the foundation of relationship longevity and loyalty in service-based industries. Furthermore, the strong performance of video marketing and webinars reflects a shift toward more visual, accessible, and educational content—practical tools for demystifying complex tax topics. This aligns with modern content marketing perspectives proposed by Aggarwal and Mittal (2022). Conversely, email marketing, although cost-effective and scalable, was found to be less impactful—possibly due to low engagement rates or saturation in email-based campaigns. From a cultural perspective, the findings resonate with Hofstede's (1984) cultural dimensions, particularly the high-context nature of communication in Iranian society, where personal connections and indirect channels (such as referrals) are valued more highly than formal advertising. These outcomes are consistent with studies by Pranata et al. (2024) and Kiptoo (2019), which emphasize the pivotal role of word-of-mouth marketing in specialized services. Similarly, the present results regarding video marketing align with those of Aggarwal and Mittal (2022), while the findings on email marketing correspond to Moser et al. (2015). Finally, the results were validated through sensitivity analysis, which confirmed the stability of the rankings under minor variations in criteria weights.

This study makes a significant contribution to the existing body of literature in several key dimensions. First, it develops a localized and empirically grounded framework for marketing in the tax consultancy sector. Second, it integrates expert-based analytical methods—specifically the fuzzy Delphi and SWARA approaches—with marketing theory, thereby enhancing both academic rigor and practical applicability. Third, it provides tax consultants with a clear hierarchy of effective client

acquisition techniques, enabling them to allocate marketing resources and budgets more strategically.

From a practical standpoint, the findings underscore the importance of investing in relationship-building initiatives, client satisfaction programs, and educational content development. Professional associations are encouraged to offer targeted training in areas such as networking, digital branding, and trust-based communication to strengthen consultants' market presence and professional credibility.

Despite its contributions, this study has limitations. The expert sample, although methodologically appropriate, may not fully represent the diversity of perspectives within the broader tax consultancy community. Additionally, the study's focus on Iran limits the generalizability of its findings to other socio-economic contexts. External factors, such as tax regulation changes or macroeconomic volatility, were also not incorporated into the model, and emerging tools—including artificial intelligence and predictive analytics—were beyond the scope of the present study. Future research could extend these findings through longitudinal or cross-national analyses, providing deeper insights into marketing dynamics within professional tax services.

References

1. Aggarwal, R. and Mittal, S. (2022). Impact of social media marketing activities on purchase intentions via customer equity drivers: An empirical case study on smartphone brands. *International Journal of Online Marketing*, 12(1), pp. 1–19. https://doi.org/10.4018/IJOM.299402.
2. Almasi, F., Mohammadifar, Y. and Jamshidi, M. J. (2023). Identifying the dimensions of digital marketing of electronic businesses of the insurance industry in Iran. *New Marketing Research Journal*, 13(2), pp. 169-192. https://doi: 10.22108/nmrj.2023.136171.2829
3. Amini-Khoei, M., Rousta, A., Asayesh, K. and Ahmadi, M. (2024). Studying the effect of mass communication management and relational marketing orientation to build trust in the automotive industry: a study on customers of Ilia Khodro company in Tehran. *Iranian journal of management sciences*, 19(73), pp. 119-137.https://doi:100/jiams.2024.8730.7640.
4. Bauer, R. A. (1960). Consumer behavior as risk taking. In R. S. Hancock (Ed.). *American Marketing Association, Dynamic Marketing for a Changing World.* 593, pp. 389–398.
5. Berry, L. L. (1983). Relationship marketing. *Emerging Perspectives on Services Marketing*, 66(3), pp. 33-47.
6. Buteau, S. (2021). Roadmap for digital technology to foster India's MSME ecosystem—opportunities and challenges. *CSI Transactions on ICT*, 9(4), pp. 233-244. https://doi.org/10.1007/s40012-021-00345-4
7. Carter, J. L. (2021). Digital marketing education brand management for organizational strategizing in the present-and post-covid-19 era. *South Asian Journal of Marketing and Management Research*, 11(11), pp. 64-75. https://doi.org/10.5958/2249-877x.2021.00100.4
8. Cheng, C. H. and Lin, Y. (2002). Evaluating the best main battle tank using fuzzy decision theory with linguistic criteria evaluation. *European journal of operational research*, 142(1), pp. 174-186. https://doi.org/10.1016/S0377-2217(01)00280-6.
9. Doney, P. M. and Cannon, J. P. (1997). An examination of the nature of trust in buyer–seller relationships. *Journal of Marketing*, 61(2), pp. 35-51. https://doi.org/10.1177/002224299706100203.
10. Ebrahimi, P., Hajmohammadi, A. and Khajeheian, D. (2019). Place branding and moderating role of social media. *Current Issues in Tourism*, 23(14), pp. 1723-1731.

https://doi.org/10.1080/13683500.2019.1658725.
11. Eslami, G. and Ghaderi, F. (2020). Investigating the effect of strategic dimensions of E-CRM on customer satisfaction in critical situations. *Journal of International Business Administration*, 3(10), pp. 137-154. https://doi: 10.22034/jiba.2020.11203.
12. Evetts, J. (2003). The sociological analysis of professionalism: Occupational change in the modern world. *International sociology*, 18(2), pp. 395-415. https://doi.org/10.1177/0268580903018002005.
13. Ghobadi-lamuki, T. and Khani, M. (2022). Investigating the impact of electronic service quality on customer satisfaction and trust in online shopping (Case Study: Digikala Online Store). *Journal of Advertising and Sales Management*, 3(1), pp. 93-111. https://doi:10.52547/JABM.3.1.93
14. Hidayati, A. (2020). The role of social media in marketing of micro, small, and medium enterprises (MSMES) product during Covid 19 pandemic. *Jurnal Ilmiah Teunuleh*, 1(2), pp. 239-249. https://doi.org/10.51612/teunuleh.v1i2.39
15. Hofstede, G. (1984). Culture's consequences: International differences in work-related values (2nd ed.). Sage, London, U.K.
16. Hollebeek, L. D. and Macky, K. (2019). Digital content marketing's role in fostering consumer engagement, trust, and value: Framework, fundamental propositions, and implications. *Journal of Interactive Marketing*, 45(1), pp. 27-41. https://doi.org/10.1016/j.intmar.2018.07.003
17. https://doi: 10.22059/ijms.2024.364512.676155
18. Kahraman, C., Cebeci, U. and Ulukan, Z. (2003). Multi-criteria supplier selection using fuzzy AHP. *Logistics Information Management*, 16(6), pp. 382-394. https://doi.org/10.1108/09576050310503367
19. Kedi, W. E., Ejimuda, C., Idemudia, C. and Ijomah, T. I. (2024). Machine learning software for optimizing SME social media marketing campaigns. *Computer Science and IT Research Journal*, 5(7), pp. 1634–1647. https://doi.org/10.51594/csitrj.v5i7.1349
20. Kiptoo, B. (2019). Pricing strategy and customer satisfaction: an assessment of loyalty and retention of customers in Kenyan commercial banks. *IJARKE Business and Management Journal*, 1(2), pp. 168-172. https://doi: 10.32898/ibmj.01/1.2article16.
21. Kotler, P. and Keller, K. L. (2012). Marketing management, (14th). Pearson Education, London, United Kingdom.
22. Kotler, P. and Keller, K. L. (2016). Marketing management, (15th ed). Pearson, London, UK.
23. Kumar, P., Singh, R. K. and Shankar, R. (2017). Efficiency measurement of fertilizer-manufacturing organizations using Fuzzy data envelopment analysis. *Journal of Management Analytics*, 4(3), pp. 276-295. https://doi:10.1080/23270012.2017.1284622.
24. Mahdieh, O., Mohammadi, S. and Mohammadi, F. (2024). The effect of social media marketing on purchase intention with the mediating role of brand awareness and consumer motivation. *Interdisciplinary Journal of Management Studies*, 17(4), pp. 1043-1062 (In Persian).
25. Maranjory, M. (2020). Identifying and ranking the marketing strategies in auditing Profession. *Accounting and Auditing Review*, 27(1), pp. 114-131 (In Persian). https://doi.org/10.22059/acctgrev.2020.276175.1008129
26. Mardani, M. R., Tootian-isfahani, S. and Boushehrian, H. A. (2017). Identifying and ranking the factors affecting trust between employees and managers. *Organizational Behaviour Studies Quarterly*, 6(1), pp. 177-199. https:// dor.org/ 20.1001.1.23221518.1396.6.1.7.4
27. Morgan, R. M. and Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), pp. 20-38. https://doi.org/10.1177/002224299405800302

28. Moser, H. R., Freeman, G. L. and Loudon, D. (2015). A longitudinal assessment of consumers' attitudes toward accounting advertising. *Services Marketing Quarterly*, 36(3), pp. 281-297. https://doi.org/10.1080/15332969.2015.1046777
29. Nasehi-far, V., dehdashti-Shahrokh, Z., mohammadian, M. and Allahverdi, M. (2021). The multilevel model of customer experience management in E-Banking services. *New Marketing Research Journal*, 11(2), pp. 1-26 (In Persian). https://doi: 10.22108/nmrj.2021.123556.2158.
30. Nonaka, I. and Takeuchi, H. (2007). The knowledge-creating company. Harvard Business Review, 85(7/8), p. 162.
31. Nugraha, A. P., Mulyadi, M. and Suriani, S. (2024). Customer journey mapping: understanding consumer behavior digitally. *Berajah Journal*, 4(2), pp. 327-336. https://doi.org/10.47353/bj.v4i2.322
32. Ohman, P. and Wallerstedt, E. (2012). Audit regulation and the development of the auditing profession: The case of Sweden, *Accounting History*, 17(2), pp. 241-257. https://doi.org/10.1177/1032373211434723
33. Pranata, S., Narimawati, U. and Syafei, M. Y. (2024). Content marketing, social media marketing and search engine optimization (seo) on successful business performance in msmes in cirebon city with digital literacy as an intervening variabl. *Jurnal Riset Ekonomi Manajemen (REKOMEN)*, 7(1), pp. 272-283. https://doi.org/10.31002/rekomen.v7i1.1426
34. Rasul, T. (2018). Social media's growing influence on relationship marketing and corporate culture. *The Journal of Developing Areas*, 52(1), pp. 261-268. https://doi: 10.1353/jda.2018.0016
35. Razak, I. (2023). Implementing marketing strategies in the tax preparation business. *Atestasi: Jurnal Ilmiah Akuntansi*, 6(2), pp. 741-752. https://doi.org/10.57178/atestasi.v6i2.741
36. Shahbazitakabi, A., Amiri, H. and Karami, R. (2023). Provide a digital marketing model in auditing. *Journal of Management Accounting and Auditing Knowledge*, 12(45), pp. 197-216 (In Persian).
37. Shankar, V., Grewal, D., Sunder, S., Fossen, B., Peters, K. and Agarwal, A. (2022). Digital marketing communication in global marketplaces: a review of extant research, future directions, and potential approaches. *International Journal of research in Marketing*, 39(2), pp. 541-565. https://doi.org/10.1016/j.ijresmar.2021.09.005.
38. Shih, H. S., Shyur, H. J. and Lee, E. S. (2007). An extension of TOPSIS for group decision making. *Mathematical and Computer Modelling*, 45(7-8), pp. 801-813. https://doi.org/10.1016/j.mcm.2006.03.023.
39. Sohrabi, H., Razavi, S. A. A., Tahmasebi Limoei, S. and Zareei, A. (2022). Designing a model for the effect of content marketing on the effectiveness of e-customer relationship management. *International Journal of Information Science and Management (IJISM)*, 20(3), pp. 187-214. https://dorl.net/dor/20.1001.1.20088302.2022.20.3.11.8
40. Tashakkori, A. A., Lotfizadeh, F. and Doroudi, H. (2024). Developing a model for customer retention through value co-creation in service projects: a study of relationships and interactions between Iranian firms and their clients. *Interdisciplinary Journal of Management Studies*, 17(1), P. 219-237. https://doi.org/10.22059/ijms.2023.337212.675040.
41. Teimouri, H. and goodarzvand-chegini, M. (2018). Investigating the effective factors on formation of E-Loyalty through the mediating role of E-Commitment (The Case of E-Banking Industry in Iran). *New Marketing Research Journal*, 7(4), pp. 117-144 (In Persian). https://doi.org/10.22108/nmrj.2018.101752.1090
42. Yamrali, O. and Fakhari, H. (2023). Identifying and ranking of marketing techniques for audit firms in Iran. *Professional Auditing Research*, 3(12), pp. 38-65 (In Persian). https://doi.org/10.22034/jpar.2023.2006276.1184.

43. Yamrali, O., Fakhari, H. and Shirkhodaie, M. (2024). Marketing in auditing: application of the 7P model. *Iranian Journal of Accounting, Auditing and Finance (IJAAF),* 8(1), pp. 1-16 (In Persian). https://doi: 10.22067/ijaaf.2024.44012.1313.
44. Zeithaml, V. A., Bitner, M. J., and Gremler, D. D. (2018). Services marketing: Integrating customer focus across the firm (7th ed.). McGraw-Hill Education, Columbus, Ohio.
45. Zolfani, S. H. and Saparauskas, J. (2013). New application of SWARA method in prioritizing sustainability assessment indicators of energy system. *Engineering Economics*, 24(5), pp. 408-414. https://doi.org/10.5755/j01.ee.24.5.4526.

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Designing a Social Responsibility Reporting Framework for Listed Companies

Parvaneh Alimohammadi*, Zahra Yousefi Amin, Seyed Atafeh Hosseini, Seyyed Yusuf Ahadi Sarkani

Department of Accounting, Firouzkoh Branch, Islamic Azad University, Tehran, Iran

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Abstract

The purpose of this study is to develop a corporate social responsibility (CSR) reporting framework based on a content analysis of international reporting practices for companies listed on the stock exchange. This qualitative research employs content analysis to examine global CSR disclosure patterns. Data were collected from publicly listed companies, and a systematic approach was adopted to identify the key dimensions and indicators relevant to CSR reporting. The study proposes a comprehensive CSR reporting model comprising four primary dimensions: value creation, corporate governance, social participation, and environmental protection. Subcategories include investment in valuable products, sustainable services, ethical governance, transparency, environmental stewardship, and compliance with social and ethical standards. Together, these elements form the foundation of a robust framework that enables companies to align with corporate governance principles. This framework provides a structured approach to CSR reporting, supporting firms in enhancing transparency, accountability, and adherence to governance guidelines in their social responsibility practices. The study contributes to the literature by presenting an initial, context-specific CSR reporting model tailored to stock exchange–listed companies, addressing both regulatory requirements and stakeholder expectations.

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*Corresponding Author: Parvaneh Alimohammadi
Email: parvanealimohammadi@yahoo.com
Tel:
ORCID:

1. Introduction

One of the most significant challenges in organizational management over the past decade has been the increasing emphasis on social responsibility and the dissemination of related information. Social responsibility encompasses the activities undertaken by an organization to fulfill its social mission and to generate a positive impact on society and the environment (Su, 2019). Given the increasing economic complexities and intense business competition, companies are expected not only to generate profits and create wealth but also to address social demands and maintain a balance between financial performance and social responsibility, while adhering to ethical values shared by both the organization and society. Consequently, social responsibility reporting has emerged as a significant area of interest among researchers in recent years.

The growing interaction between companies and society, along with the crucial role of corporate social responsibility (CSR) in addressing stakeholder needs, has highlighted a significant challenge in the field of social responsibility reporting. Traditional financial reporting—primarily through annual financial statements—has become insufficient to meet the expanding informational demands of shareholders and other stakeholders. In other words, as global business activities expand, the continued reliance on traditional reporting frameworks has limited companies' ability to measure and evaluate their social responsibility performance and to meet the information requirements of shareholders, stakeholders, and government bodies—the three main pillars of decision-making.

The fundamental purpose of CSR is to allocate corporate resources toward enhancing social welfare, thereby strengthening relationships with key stakeholders. Moreover, corporate governance principles help policymakers assess and improve the legal, regulatory, and institutional frameworks that underpin companies' effectiveness, efficiency, sustainable growth, and financial stability.

Social responsibility reporting involves the disclosure of economic, environmental, social, and corporate governance information for an organization's stakeholders. The primary objectives of such reporting are to enhance transparency, strengthen brand value, reputation, and legitimacy, increase competitiveness, and motivate employees. Furthermore, social responsibility reporting supports the company's control and information processes while reinforcing organizational accountability to society, stakeholders, and government bodies across various domains. In recent years, two key initiatives have been undertaken in the areas of social responsibility and sustainable development in Iran. According to Chapter Six of the Corporate Governance Guidelines for listed publishers, issued by the Securities and Exchange Organization in December 2022, companies listed on the stock exchange are required to disclose social responsibility information on their official websites, adopting a sustainable development approach. Additionally, at the end of 2022, the Standards Development Department of the Audit Organization prepared a draft of the Sustainability Reporting Standard, which was finalized in 2023 following a public consultation process.

This study presents a social responsibility reporting framework that incorporates components derived from the examination of global patterns and related conceptual developments through content analysis. The research aimed to design a CSR reporting framework tailored for Iranian companies by systematically analyzing international practices and adapting them to the local context. Beyond the valuable contributions of prior studies, the proposed model establishes fundamental requirements for implementing corporate governance guidelines and sustainability standards in Iran. This study also expands the existing literature on social responsibility reporting, providing insights that can serve as a foundation for future research. Despite the existence of numerous international social reporting models since 1975, in Iran, the discourse on social responsibility and the necessity of reporting has dominated accounting studies; however, the relevant authorities have not introduced a standardized reporting framework. Given the absence of such a framework—and in light of the 2023 directive from the Securities and Exchange Organization requiring listed companies to disclose social

responsibility measures in their annual reports—there is a clear need to develop a localized CSR reporting model for listed firms. This necessity underscores both the relevance and the innovation of the present study.

The present study aims to develop a social responsibility reporting framework for Iran based on the latest international models, while also identifying the causal conditions, background factors, strategies, and consequences associated with CSR reporting. In this research, an effort has been made to design a reporting framework for Iranian companies that not only builds upon the valuable findings of previous studies but also provides practical implications for the development of future standards and guidelines related to CSR reporting.

The remainder of this paper is organized as follows: the next section presents the theoretical foundations and prior research, followed by the research questions, methodology, and findings.

2. Theoretical principles and literature review

Many scholars have examined the concept of social responsibility, and while numerous definitions have been proposed for corporations, a universal consensus has yet to be reached. Emeka-Okoli et al. (2024) define social responsibility as the provision of information that enables organizations to make informed judgments about matters entrusted to them by society. Similarly, Liang and Chen (2024) describe social responsibility as the process through which an economic enterprise identifies and responds to societal needs, ethical considerations, and the environmental impacts of its activities.

As an essential component of the overall strategy of emerging organizations, corporate social responsibility (CSR) integrates social and environmental considerations into business strategies and involves voluntarily assuming responsibilities toward stakeholders. Through CSR, companies demonstrate their commitment to contributing positively to society (Malhotra, 2024). However, the contemporary concept of social responsibility is often interpreted in purely material terms, with its implementation primarily focused on supporting profit-enhancing activities. Companies that disregard the social and environmental dimensions of CSR and focus solely on maximizing profits are unlikely to achieve long-term sustainability (Dewi et al., 2024).

Corporate social responsibility (CSR) is a comprehensive concept that encompasses various ideas, including corporate responsibility, corporate accountability, business ethics, corporate citizenship, responsible entrepreneurship, and sustainable development. The origins of CSR can be traced back to the writings of Andrew Carnegie (1835–1919), the founder of the Carnegie Steel Company—a prominent American capitalist and philanthropist. Carnegie introduced two fundamental principles: the principle of charity and the principle of stewardship. He argued that both were essential for the proper functioning of capitalism. The first principle emphasized support for the unemployed, the elderly, and the sick, while the second held that business owners should act as stewards of their wealth for the benefit of society as a whole.

The accounting literature on social responsibility and related topics has expanded considerably in recent years. A review of this literature highlights several theoretical perspectives concerning the disclosure and reporting of social responsibility. Researchers have extensively examined and refined these theories, which now serve as the theoretical foundations for social responsibility reporting. The following section provides a detailed discussion of these theories.

2.1. Moral theory

The Moral Foundations Theory is a social-psychological framework that seeks to explain the origins and diversity of human moral reasoning based on innate, modular foundations. The theory was first proposed by psychologists Jonathan Haidt, Craig Joseph, and Jesse Graham, building on the

earlier work of cultural anthropologist Richard Shweder. According to this theory, companies should embrace social responsibility as a moral obligation toward their stakeholders, acting in accordance with ethical principles and appropriate conduct to contribute to the creation of a just and well-functioning society (Dewi et al., 2024).

2.2. Agency theory

Another critical theory related to social responsibility is agency theory. This theory assumes the existence of potential conflicts of interest between shareholders and managers. In such situations, managers may make decisions that do not necessarily align with the best interests of shareholders, giving rise to moral hazard resulting from information asymmetry between managers and owners. This problem primarily stems from the separation of ownership and control within corporations. To mitigate this issue, shareholders require accurate and reliable information regarding environmental risk assessment, cash flows, ethical compliance in human resource management, and the interests of various stakeholders (Damayanti et al., 2023).

2.3. Stakeholder theory

The dominant organizational theories of the 1980s primarily reflected a production-oriented view and were inconsistent with the evolving nature of the business environment at the time. In 1984, R. Edward Freeman introduced a new conceptual framework known as Stakeholder Theory. Freeman categorized a company's stakeholders into two groups: primary stakeholders, including shareholders, creditors, governments, customers, suppliers, and employees; and secondary stakeholders, who influence public opinion and consist of individuals, groups, or organizations not directly involved with the company. Stakeholder Theory encompasses both ethical and managerial dimensions, integrating elements of organizational and social theory. As a managerial mechanism, it posits that companies should consider the interests of all stakeholders who can be affected or affect corporate activities.

2.4. The theory of legitimacy

This theory is grounded in the idea of a social contract between a company and the society in which it operates, whereby the company must engage with society to maintain stakeholder satisfaction. In other words, Legitimacy Theory posits that companies are compelled to respond to the expectations and demands of various stakeholder groups to legitimize their activities and maintain societal approval (Bapuji et al., 2020).

2.5. Institutional theory

This theory emphasizes that corporate decisions regarding social responsibility are not merely instrumental but carry broader moral and societal significance. Social norms and belief systems influence individuals' and organizations' decision-making processes by shaping their practical behaviors and ethical orientations.

2.6. Signaling theory

This theory posits that corporate social responsibility (CSR) serves as a signaling mechanism across various institutional environments. Given the diversity of institutional contexts worldwide, CSR practices and their disclosure serve as tools to reduce information asymmetry between firms and stakeholders. When institutional environments do not provide sufficient high-quality information to distinguish one firm from another, stakeholders seek additional signals to evaluate a firm's competencies and reliability. According to this theory, the adoption and disclosure of CSR-related

information can serve as an additional channel through which firms communicate their capabilities and strengthen stakeholder confidence.

2.7. Theory of social issues management

The concept of social accountability—defined as an organization's responsiveness in addressing and managing social issues—was first introduced by Ackerman in 1973. This concept emphasizes the processes through which companies respond to social problems and crises. The management of social issues serves as an early warning and control system for identifying potential environmental threats and opportunities, as well as for responding to unexpected events and crises. Crisis management, in this context, refers to making appropriate and timely decisions when dealing with natural disasters such as tsunamis, earthquakes, and hurricanes, or other social and economic crises. During such events, how organizations provide benefits to society through humanitarian initiatives and employee engagement has attracted significant attention from both researchers and managers (Mahmud et al., 2021).

This study is grounded in the Social Issues Management Theory, which highlights the role of accountability in corporate social responsibility and underscores the importance of CSR reporting within companies.

2.8. The empirical background of the research

An examination of the empirical foundations underlying the design of the social responsibility reporting framework reveals that most previous studies have focused on reporting practices that exceed minimum standards and on the impact of CSR disclosure on various social and economic outcomes.

Despite the limited number of studies addressing the development of a social responsibility reporting framework in Iran, extensive research has been conducted internationally on CSR reporting and the expansion of the concept of social responsibility as a strategic tool for managing social crises. In many foreign contexts, the institutionalization of CSR—supported by established legal requirements and the accountability mechanisms of both governments and corporations—has led to significant empirical investigations into the role of social responsibility in responding to different types of crises. The following are some of the most relevant studies, summarized below.

Drobyazkol et al. (2020), in their study on strategic corporate policies in the field of social responsibility, identified five levels of corporate social responsibility (CSR): 1) the mandatory level, reflecting compliance with legal obligations; 2) the charitable level, encompassing voluntary financial support and philanthropic activities; 3) the stakeholder-oriented level, emphasizing responsibility toward both internal and external stakeholders; 4) the strategic level, focusing on social investment at the governmental or community level; and 5) the synergistic level, representing a comprehensive integration of all dimensions of social responsibility within industrial firms. The researchers also developed a three-dimensional positioning matrix to assess the level of CSR development among business units, incorporating social, environmental, and economic components. This model was used to formulate alternative scenarios for validating management decisions and advancing strategic planning.

Popkova et al. (2021) examined corporate social responsibility (CSR) as a tool for social distancing during the COVID-19 pandemic, comparing its application in developing and developed countries. The findings highlight the vital role of governments in fostering corporate involvement in social and economic endeavors. According to the results, governments have an emerging responsibility to create favorable conditions for implementing flexible CSR mechanisms and to ensure indirect oversight of corporate practices. This requires enhanced public oversight and control of CSR implementation, supported by the independent participation of audit institutions and assurance over disclosed

information. The COVID-19 pandemic, necessitating social distancing, has expanded the scope of corporate responsibility into new domains. In both developed and developing economies, one of the most visible manifestations of CSR has been the promotion of entrepreneurship through telecommuting and the encouragement of online purchasing of goods and services for consumers.

Chufama et al. (2021) emphasized the significance of corporate social responsibility (CSR). They demonstrated that, alongside profitability objectives, CSR serves as a strategic mechanism for regulating business relationships with both internal and external stakeholders, including shareholders.

Similarly, Navickas et al. (2021) found that CSR activities are adopted by companies worldwide as a response to social crises, regardless of a country's level of development. Firms with extensive experience in implementing CSR tend to act more responsibly toward their communities and society at large. The results of their study indicate that the companies examined continued to pursue CSR objectives and activities even during periods of crisis, thereby reinforcing their social commitments.

Kanji and Agrawal (2016) evaluated the differences and convergences among the concepts and components used to assess corporate social responsibility (CSR) activities. Their findings indicate that the disclosure of information and CSR reporting in different organizations are aligned with each industry's strategic framework and business model.

Similarly, Tahniyath and Elbanna (2023) analyzed 122 empirical models of reporting elements to develop a unified approach for evaluating executive activities in this field. Their results show that CSR reporting, as a component of sustainability reporting, is structured around three core dimensions—profit (economic), planet (environmental), and people (social)—which are further categorized into five analytical levels: individual, organizational, industry, national, and international.

Khan et al. (2023) demonstrated that both benevolent and self-centered corporate contributions have a positive influence on firm performance. Their study provides insight into how and under what conditions companies enhance their performance through non-governmental charitable activities and the disclosure of such contributions, thereby underscoring their vital role in corporate social responsibility (CSR) accountability.

Similarly, Nawrocki and Szwajca (2021) evaluated CSR activities in energy companies through the lens of sustainable development. Their analysis was based on CSR indicators disclosed in annual reports from 2016 to 2021. These activities were classified into six categories: customers, investment, employees, society, stakeholders, and environment. The findings revealed that the highest levels of CSR activity were directed toward customers, while the lowest were associated with environmental initiatives.

Poursoleyman et al. (2024) used a global sample of 5,410 companies across 24 countries to examine corporate social responsibility (CSR) performance during the pandemic era. The findings demonstrated that firms exhibited notable flexibility in maintaining their CSR commitments in the face of adverse crisis conditions. By comparing shareholder responses during crisis periods, the study observed that the relationship between CSR performance and firm value becomes stronger during times of crisis.

Dewi et al. (2024) explored the development of a CSR model grounded in the Tri Hita Karana philosophical framework and its linkage to Carroll's CSR pyramid. Their findings revealed that CSR reporting models shaped by cultural values tend to generate greater societal benefits and better alignment with stakeholders' reporting expectations.

Waris Ali (2023) investigated the determinants and consequences of corporate social responsibility (CSR) disclosure. This paper systematically analyzes and synthesizes the existing literature on CSR disclosure, focusing on both its drivers and outcomes. The study is distinctive in that it organizes its synthesis based on the geographical settings of the original research. A total of 135 empirical studies published in Chartered Association of Business Schools (ABS)-ranked journals between 1982 and

2020 were reviewed. The findings reveal that a wide range of global, country-specific, market-specific, and firm-specific factors significantly influence corporate CSR disclosure policies. These determinants remain consistently relevant across both developed and developing economies. Furthermore, the synthesis indicates that firms engaging in CSR disclosure derive multiple benefits, including enhanced reputation, improved financial performance, increased access to external financing, more effective stakeholder management, and strengthened corporate accountability.

Bingjie Wang (2023) investigated the development of a conceptual model of corporate social responsibility (CSR) for clubs in the Chinese Super League (CSL). CSR is recognized as one of the key pillars of sustainability within sports organizations. Although the rapid growth of professional sports has been well documented, the evaluation and classification of CSR in this context remain under-researched, particularly in Eastern settings. This study proposes a conceptual CSR model for CSL clubs encompassing five key dimensions: economic, youth, community, environmental, and cultural responsibility. The model is grounded in robust theoretical foundations, including sustainable development, positive youth development, community engagement, and theories of globalization. Each dimension was validated while taking into account the unique characteristics of the Chinese Super League. The study provides theoretical support for the multidimensional nature of CSR and contributes valuable insights to CSR research within the Chinese professional sports sector. At a strategic level, it offers guidance for club managers and the Chinese Football Association in developing more effective CSR strategies.

Francisco Gálvez-Sánchez (2023) explored the three-dimensional impact of corporate social responsibility (CSR) on brand equity (BE), corporate reputation (CR), and consumers' willingness to pay (WTP). The fashion industry—recognized as one of the most significant contributors to negative environmental and social externalities—has increasingly sought to mitigate these effects through CSR initiatives aimed at enhancing societal and sustainability commitments. This study evaluates the value consumers place on CSR activities across three dimensions—economic, social, and environmental—in relation to their influence on BE, CR, and WTP. The findings indicate that each CSR dimension contributes differently to the development of brand equity, corporate reputation, and willingness to pay, while also underscoring the mediating role of brand credibility as a critical variable within this relationship.

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3. Research methodology

This study aims to design a social responsibility reporting model for listed companies. The research adopts an exploratory approach and employs qualitative content analysis as its primary method. To conduct this study, relevant terms and concepts—including social responsibility, social responsibility reporting models, theoretical frameworks of CSR, reporting indicators, and the effects of voluntary CSR disclosure—were reviewed across more than fifty academic articles. The main reasons for adopting a qualitative research approach are as follows:

- The limited number of prior studies on the topic;
- The researcher's reliance on the expertise and experience of interview participants within the relevant field;
- The intention to challenge and expand existing theories; and
- The goal of developing and extending a new theoretical framework.

4. Data analysis

Through the review of reporting models, social responsibility literature, and content analysis of relevant texts—including concept extraction, coding, and categorization—the principal dimensions

and indicators of the social responsibility reporting framework were identified. Although several reporting models have been proposed by scholars over time, these frameworks have not yet been localized to the Iranian context. The review and content analysis of corporate social responsibility reporting models encompassed the works of Davis (1976), Carroll (1979), Wartick and Cochran (1985), Wood (1991), Lantos (2001), Claydon (2011), and Visser (2014). In this study, the key dimensions and indicators of the reporting framework were derived through a systematic examination of these models, including goal identification, recognition of common concepts and dimensions, and the application of open, axial, and selective coding techniques. The subsequent sections provide a detailed review of each of these models.

4.1. The Davis model (1976)

Davis (1976) defines social responsibility as a sense of obligation felt by managers of private-sector commercial organizations. He argues that managers should make decisions in ways that not only generate profit for the organization but also enhance societal welfare. According to Davis, social responsibility extends beyond an organization's limited economic, technical, and legal obligations, requiring responsiveness to broader social concerns. His model is built upon five assumptions related to societal welfare: (1) open and respectful communication between organizations and society, (2) recognition of economic possibilities, (3) the transfer or internalization of the social costs of goods and services, and (4) assistance and contribution to society.

4.2. Carroll model (1979)

According to Carroll's (1979) model, corporate social responsibility (CSR) encompasses four interrelated dimensions: economic, legal, ethical, and philanthropic (or discretionary) responsibilities. In this model, economic responsibility—profitability—is viewed as the foundation of all other responsibilities, emphasizing that organizations must be financially sustainable to fulfill their broader social roles. Legal responsibilities require organizations to conduct their economic activities within the framework of laws and regulations. Ethical responsibilities reflect the expectation that companies will respect societal norms and values, going beyond mere legal compliance. Finally, philanthropic responsibilities refer to voluntary corporate activities that contribute to the community's well-being. Carroll defined CSR as the voluntary fulfillment of society's economic, legal, ethical, and philanthropic expectations over time. His well-known CSR pyramid illustrates these dimensions hierarchically, with economic responsibility forming the base and the other three layers building upon it. The model presents all areas of corporate social responsibility as distinct yet interrelated components, demonstrating the comprehensive nature of CSR and its role in corporate accountability and social issue management.

4.3. Wartick and Cochran (1985)

Wartick and Cochran (1986) developed the social model of the organization, proposing that corporate social performance comprises three interrelated components: social responsibility, social accountability, and public issues management. The foundation of their model lies in understanding the nature and philosophy of social responsibility and recognizing its necessity from multiple organizational perspectives. According to this framework, meaningful progress toward social responsibility occurs only when it is embraced as a core social duty within the organization's values and mindset. Based on its orientation toward social responsibility, an organization then selects strategies consistent with its stance on social accountability and subsequently manages public issues accordingly.

4.4. Wood (1991)

Wood (1991) expanded the corporate social performance (CSP) model by moving beyond the identification of different types of responsibility to include dimensions related to the motivational principles of responsible behavior—specifically, institutional, organizational, and individual principles. The process of responsibility in Wood's framework encompasses environmental assessment, stakeholder assessment and management, and performance outcomes, which include the social effects of corporate programs and practices. Wood conceptualized corporate social performance as the outcome of fundamental principles of social responsibility. Her model marked a significant advancement in CSR research by highlighting that effective responsibility requires not only practical implementation but also complementary instructional and motivational components.

4.5. Lantos (2001)

Lantos (2001) identified three distinct types of corporate social responsibility (CSR) legitimacy based on whether CSR activities are necessary or discretionary, and whether they primarily serve stakeholders, the company, or both. He emphasized that social needs help distinguish among these three types: ethical, altruistic, and strategic CSR. Ethical CSR refers to actions that are morally obligatory and go beyond merely fulfilling economic and legal responsibilities. Even when such actions do not directly benefit the company, they remain essential to prevent social harm. Companies are therefore expected to act ethically and minimize any negative impacts of their operations. For instance, when a firm decides to reduce production, discontinue certain products, or change the source of raw materials, it should carefully consider the potential short-term adverse effects on its employees and the communities in which it operates.

4.6. Claydon's customer-centric model (2011)

Caledon (2011) introduced a new model of corporate social responsibility (CSR) known as customer-centric responsibility. According to this model, achieving profitability requires meeting consumers' expectations regarding social responsibility. In this approach, a company simultaneously pursues profit and engages in socially and environmentally responsible practices. By fulfilling its CSR commitments, the firm enhances its public reputation and credibility, thereby expanding its customer base and attracting more socially conscious consumers who prefer responsible companies. This creates a virtuous cycle in which greater social responsibility leads to a larger customer base, which in turn drives higher profitability—reinforcing the company's motivation to continue its responsible practices.

4.7. DNA model. Corporate Social Responsibility and Sustainability

Visser (2014) proposed a new model of corporate responsibility and sustainability known as radical, systemic corporate social responsibility (CSR). While similar to earlier models, this framework integrates existing knowledge in the field of social responsibility into a unified and holistic structure. The model is built on four pillars of responsibility, which Visser metaphorically compares to the four nucleotide bases of DNA—adenine, cytosine, guanine, and thymine. According to this model, the four pillars are value creation, good governance, social participation, and environmental integrity. Each pillar represents a fundamental goal of CSR, and each goal is associated with key performance indicators that guide implementation and assessment.

A review of studies conducted over the past two decades indicates that, in Iran, research on social responsibility has primarily focused on conceptual frameworks, effective indicators for reporting, the relationship between CSR disclosure and firm value, and sustainability reporting. The findings of these studies have provided valuable insights into the underlying concepts, informational

components, and content of social reporting, as well as the relationship between CSR and corporate responsiveness, and the role of social responsibility in organizational accountability. However, no comprehensive effort has been made to develop an executive framework for social responsibility reporting in Iran based on internationally recognized models. To address this gap, the present research examines global CSR reporting frameworks to design a localized model suited to Iranian listed companies. The originality and contribution of this study lie in developing a social responsibility reporting framework through a systematic content analysis of international models, which involves coding concepts, categorizing findings, and identifying the key dimensions and indicators of CSR reporting applicable to the Iranian context.

The findings of CSR reporting research conducted in Iran over the past two decades indicate that companies have not yet adequately disclosed their social responsibility activities. Most CSR disclosures are concentrated in the economic dimension, while the environmental dimension receives the least attention. Despite the growing importance of environmental disclosure as part of corporate social responsibility, listed companies still fail to provide comprehensive and detailed information in this area. According to the Corporate Governance Guidelines for publishers registered with the Securities and Exchange Organization, announced in December 2022, all listed companies are now required to disclose expenses related to social responsibility in a separate section titled Sustainability Report within both the explanatory notes and the annual report of the board of directors. The implementation of this directive, along with the development of a national Sustainability Reporting Standard by the Audit Organization in 2022, represents an essential first step toward establishing the necessary institutional framework for CSR disclosure in Iran.

4.8. Content analysis of reporting models and presentation of the social responsibility reporting model

4.8.1. Open and axial coding

The coding process resulted in the extraction of a set of related concepts derived from the data, which were subsequently organized during the axial coding phase. To achieve the objectives of this research using the content analysis method, an in-depth review was conducted of all articles related to the reporting patterns discussed in Section 5. Each explanatory sentence or phrase was carefully examined, and a corresponding code was assigned. After extracting the concepts, they were grouped based on their similarities and differences. In the axial coding stage, the relevant concepts were refined and categorized into coherent thematic components. The results of the content analysis and coding process led to the identification of 61 concepts and 11 major categories, which are summarized in Table 1 below.

Table 1. Titles, concepts, and categories of social responsibility reporting models; Source: (research findings)

Title of the category	The title of the concept	Number of codes	Abundance (%)
Philanthropic or generous Economic	The economic growth of the company	10	21
	Increasing the company's profit	5	12
	Increasing the stock price,	2	15
	Improving financial ratios	2	12
	Evaluating the performance of employees based on the economic performance of their unit or the organization	5	10
	The desire and tendency towards short-term financial results) instead of long-term social goals	2	10
	Tactical cost savings	5	10
	Organizational culture and targeting by the board of directors to advance charity affairs	10	10
	Fulfilling the duty of social responsibility and an organizational	15	21

	culture of helping society, and "doing one's right to society		
	Participation of personnel in charity projects by providing the relevant costs,	20	14
	Institutionalizing charity donation through A charitable foundation or fund	6	2
	The allocation of funds to help manage the organization's corporate social responsibility activities is made by the person responsible for charitable contributions or social projects.	51	20
Advertising	Media coverage of the organization's social responsibility activities	10	25
	The conceptualization of corporate social responsibility to strengthen brand equity	2	10
	Public reputation or relations with stakeholders, legal affairs, or marketing departments	3	12
	Allocation of budget and unit personnel (public relations, legal affairs, or marketing department participation in annual institutional or country evaluations for ranking, and receiving corporate social responsibility awards	5	19
	Interviewing the CEO publicly or with the media about the organization's corporate social responsibility performance	2	14
Branding	Encouraging and educating our customers to buy degradable products	5	10
	Producing your products and services with a recognized social, environmental, or ethical label, such as fair trade, organic, etc.	10	12
	Produce your products and services to directly serve the end of the economic pyramid: low-income markets.	2	4
	Participating in industry association agreements to promote social, environmental, or ethical standards.	5	12
Strategic axis	Complying with all financial, environmental, and social laws and guidelines	7	15
	Aligning the organization's business with corporate social responsibility issues.	5	12
	Including corporate social responsibility in internal management systems (policies, goals, results, procedures, reviews, and reports).	12	25
	Provide quantitative evidence of the organization's progress and improvement in complying with social, environmental, and ethical performance standards and audits by independent third parties.	2	10
	Clarifying the organization's failure to comply with social responsibility issues.	2	5
	Designing to solve a specific environmental, social, or ethical challenge for the organization.	15	25
	Presenting your organization's corporate social responsibility performance as a key advantage in the markets in which it operates.	20	35
The axis of transformation and creativity	Fundamental strategic changes within the organization align with social, environmental, or ethical issues.	5	7
	Sustainable innovation of the organization to provide solutions or products in line with social and environmental responsibility	4	12
	Designing your new products, services, and investments to address social and environmental challenges.	10	8
	Supporting, financing, recruiting, or empowering social enterprises or entrepreneurs	15	5
	The culture of acceptance and tolerance of your organization, instead of punishment.	5	25
	Considering corporate social responsibility as a market opportunity or a source of income against market risk or cost.	10	18
Accountability	Presenting social responsibility compliance reports to the public.	5	11
	Lobby the organization with industry or government organizations to enforce stronger social, environmental, and ethical laws.	12	25
	Organizational participation in providing social, environmental, or	10	14

	ethical solutions		
	Membership of non-executive directors with expertise in social, environmental, or ethical issues on the organization's board of directors.	5	10
	The organization's participation and cooperation with the government, society, and official business organizations.	7	8
	Adjust your strategy, operations, products/services, and projects based on feedback received from customers or stakeholders.	8	10
Moral	Compliance with ethical matters in corporate management.	15	25
	Training employees to deal with ethical problems.	14	5
	Preparation of disciplinary and ethical regulations.	12	8
	Providing audited compliance with social and ethical codes or standards.	5	18
	Determining social, environmental, and ethical priorities by managers	7	12
	Prepare the code of ethics for the board of directors and adhere to it.	3	10
Environmental	The organization's commitment to replace water according to consumption.	4	10
	Energy consumption from renewable sources (wind, solar, nuclear, etc.).	5	12
	Reducing waste production.	10	25
	Designing and producing products and services that do not have negative social and environmental effects.	8	12
	Establishment of waste reduction policies and compliance with environmental standards.	11	8
Value creation	Present and disclose a complete and transparent economic added value report publicly.	8	10
	The organization relies on local suppliers and creates indirect jobs.	12	3
	Production of products and services in compliance with social and environmental standards that have positive effects on health, well-being, and the environment.	5	10
	Employees and customers are involved in the organization's ownership.	10	15
	Commitment and compliance with national or international corporate governance standards.	12	22
Corporate governance	Public disclosure of the reports of the organization's payments to the government (taxes, contributions to political parties, etc.).	15	25
	Comply with international sustainability standards and obtain a rating in this field.	14	15
	Designing and implementing policies and procedures to prevent and punish bribery, corruption, and other unethical behaviors	10	5
	Establish internal audits, risk management, and accountability within the aforementioned units to control social, environmental, and ethical issues.	15	25
	Human capital and its development, whose task is to coordinate and strengthen human capital and working communities	8	12

4.8.2. Axial coding

After extracting the concepts, they were grouped based on their similarities and differences, leading to the formation of broader categories. Through content analysis of the reviewed models and the application of axial coding, a foundational model of social responsibility reporting was developed. This model is structured around four main axes, each divided into several dimensions, as summarized in Table 1 and illustrated in Figure 1 below.

The value creation dimension emphasizes that economic development extends beyond mere

profitability. It reflects participation in wealth generation for shareholders and executive managers, as well as the advancement of the broader economy. This dimension encompasses activities such as investment in infrastructure, job creation, and skills development. Good governance represents another critical pillar which, although not new, has not yet received sufficient attention within the traditional CSR framework. Institutional effectiveness is as vital as environmental and social objectives; without transparency and fairness, the broader goals of social responsibility cannot be fully realized. The social participation dimension highlights the traditional emphasis on community involvement and altruism, positioning it as a key element of corporate social responsibility. Finally, the environmental justice dimension extends beyond merely reducing harm. It focuses on maintaining and enhancing environmental sustainability as a fundamental organizational goal.

Table 2. Social responsibility reporting model; Source: (research findings)

AXIS	Strategic objectives	Dimension code	Index code	Indicators
Value creation	Economic development	1	1-1	Investment (Financial, manufacturing, social, human, and natural)
			1-2	Valuable products and sustainable and responsible services
			1-3	Advertising, media coverage of social responsibility activities
			1-4	Participation in annual institutional or country evaluations for social responsibility rating
			1-5	Branding by culturalizing the concept of social responsibility (strengthening brand equity)
			1-6	Comprehensive business (Wealth distribution, markets related to the base of the pyramid)
Corporate governance or strategic system	Institutional Effectiveness	2	2-1	Leadership (strategic commitment to responsibility and sustainability)
			2-2	Aligning the organization's business with corporate social responsibility issues
			2-3	Responding to stakeholders and presenting reports on compliance with social responsibility in public
			2-4	Organizational participation to provide social, environmental, and ethical solutions
			2-5	Compliance with corporate governance guidelines and relevant laws
			2-6	Applying the concept of social responsibility in the strategic program, strategic document, and internal management system
Social participation	Bias toward stakeholders	3	3-1	Altruism (helping charity, providing general services and products)
			3-2	Fair work practices (working conditions, employee rights, natural health and safety)
			3-3	Preparation of the ethical charter and disciplinary and ethical regulations
			3-4	Compliance with ethical issues in corporate management and personnel training
			3-5	Providing audit compliance with social and ethical standards
			3-6	Integrity in the supply chain and empowerment
			3-7	Managing the organization's social responsibility activities by determining the structure and budget
Environmental protection	Sustainable ecosystems	4	4-1	Environmental protection (Protection of biodiversity and ecosystem restoration)
			4-2	Use of renewable resources (dealing with climate change, renewable materials, and energy)
			4-3	Organization's commitment to replace consumable resources
			4-4	Reducing waste generation
			4-5	Encouraging and educating our customers to buy

		biodegradable products
4	4-6	Production of products and services with social and environmental labels (organic)
	4-7	Participation in industry association agreements to promote environmental standards
	4-8	Compliance with environmental laws and public disclosure of information

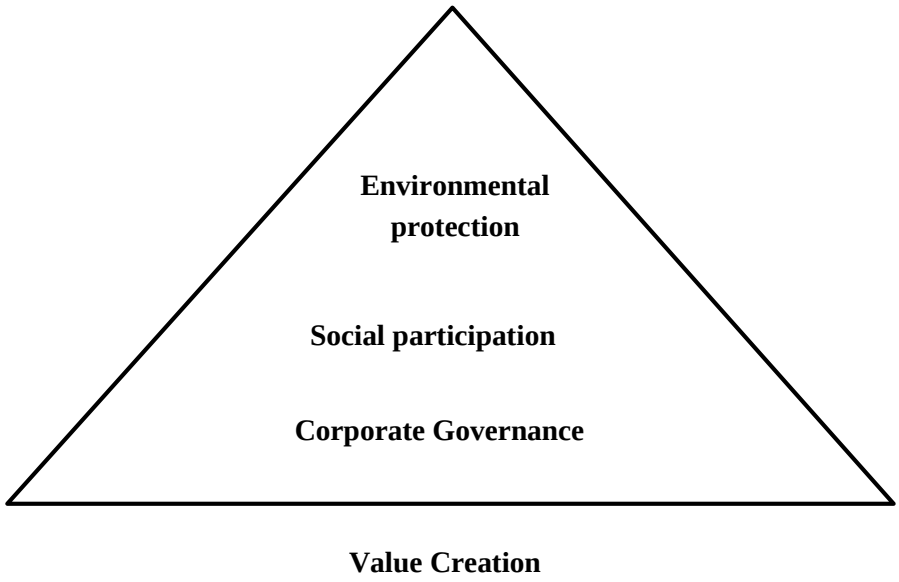

Figure 1. Social responsibility reporting model; Source: (research findings)

4.8.3. Innovation of social responsibility reporting model resulting from research:

The existing social responsibility reporting models primarily focus on three key dimensions: environmental, economic, and social. In the present study, through content analysis and the categorization of shared concepts across these models, an additional dimension—corporate governance or the management system—has been incorporated. Given the importance of social responsibility reporting for companies listed on the stock exchange, presenting this aspect as a distinct dimension provides stakeholders with valuable and relevant information, thereby enhancing the usefulness of corporate disclosures.

5. Discussion and conclusion

This study aims to develop a social responsibility reporting model for companies listed on the Iranian Stock Exchange. The research highlights that appropriate international models, frameworks, and relevant reporting standards have already been established. However, following the preparation of the Sustainability Reporting Standard in 2023 and the issuance of the Corporate Governance Directive in December 2022, which mandates companies to disclose their social responsibility activities, the need to design a localized reporting model for listed firms in Iran became evident. Based on a content analysis of international models and the systematic coding of relevant dimensions, the findings of this research led to the development of a comprehensive social responsibility reporting model comprising three main dimensions: value creation, corporate governance, and social and environmental participation. The value creation dimension, aimed at promoting economic development, includes components such as the level of investment, production, and delivery of valuable and sustainable products and services, advertising volume, media coverage of social

responsibility activities, participation in national or institutional CSR assessments, branding, and overall business responsibility initiatives. The corporate governance dimension encompasses indicators such as the commitment of the board of directors to governance and sustainability principles, the alignment of business operations with CSR objectives, public reporting on CSR compliance, adherence to corporate governance guidelines and related laws, and the integration of social responsibility considerations into the organization's strategic planning processes.

Moreover, the social participation dimension of the model focuses on stakeholders and beneficiaries, encompassing indicators such as contributions to charitable organizations, implementation of fair labor practices, preparation of ethical charters and disciplinary codes, adherence to ethical principles in corporate governance and employee training, integrity within the supply chain, and empowerment initiatives. It also includes the management of social responsibility activities through the establishment of dedicated structures and budgets within organizations.

The environmental protection dimension incorporates indicators related to biodiversity conservation and ecosystem restoration, the use of renewable resources, and the organization's commitment to replacing non-renewable materials. It further includes efforts to minimize waste generation, encourage and educate customers to purchase biodegradable products, and produce goods and services carrying social and environmental (organic) labels. Participation in industry associations and agreements aimed at improving environmental standards and ensuring compliance with environmental regulations is also considered a key indicator within this dimension.

The findings of this research provide practical insights that can facilitate the transition toward comprehensive social responsibility reporting. One of the most significant implications of these findings is the potential use of the proposed tools to help organizations and policymakers manage future social crises more effectively. Based on the results, it is recommended that the government and relevant institutions—including the Audit Organization, the Tehran Stock Exchange, the Iranian Association of Certified Public Accountants, and other related bodies—first establish a dedicated authority to oversee social responsibility initiatives and formalize a national reporting framework. Furthermore, leveraging the experiences and best practices of successful countries should be prioritized.

The findings of this study outline a general framework for social responsibility reporting. Accordingly, institutions such as the government, auditing organizations, the Tehran Stock Exchange, and other bodies related to social responsibility can utilize these results to improve policy and practice in this area. Given the close relationship between the concepts of sustainability and social responsibility, as well as the recent development of sustainability disclosure standards and general requirements for reporting sustainability-related financial information by the Sustainability Reporting Committee of the International Auditing and Assurance Standards Board, significant progress has been made toward environmental preservation and sustainable development initiatives. Although a specific standard for social responsibility reporting has not yet been drafted, the Corporate Governance Guidelines require listed companies to disclose the measures they have undertaken in the field of social responsibility. The establishment of legal frameworks by the government represents the most essential enforcement mechanism for implementing social responsibility reporting. Furthermore, institutionalizing social responsibility education and enhancing public awareness about corporate accountability can contribute to embedding a culture of social responsibility within society. Governmental and regulatory institutions can promote such education and awareness through various media platforms, particularly national broadcasting channels. As the culture of corporate responsibility expands, more companies are expected to voluntarily publish social responsibility reports. It is therefore recommended that the necessary infrastructure for CSR reporting be developed through specialized training programs for company boards of directors. Additionally, the Ministry of

Science, Research, and Technology is advised to integrate courses on social responsibility and its reporting frameworks into academic curricula across all disciplines—particularly at the graduate level. The course content could be based on the CSR concepts and reporting categories identified in this research.

The main limitation of this research was the lack of access to comprehensive social responsibility reporting models from different countries for analysis and comparison, primarily due to their limited availability or non-publication.

Given the mandatory disclosure of social responsibility information by listed companies since 2023, future research is recommended to examine the extent and quality of CSR reporting and disclosure practices among firms listed on the Tehran Stock Exchange. This can be achieved by analyzing interpretive reports and board of directors' activity reports to assess the level of compliance and the effectiveness of current disclosure practices.

References

1. Ali, W., Bekiros, S., Hussain, N., Khan, S. A. and Nguyen, D. K. (2024). Determinants and consequences of corporate social responsibility disclosure: A survey of extant literature. *Journal of Economic Surveys*, 38(3), pp. 793-822. https://doi.org/10.1111/joes.12556
2. Bapuji, H., Patel, C., Ertug, G. and Allen, D. G. (2020). Corona crisis and inequality: why management research needs a societal turn. *Journal of Management*, 46(7), pp. 1205-1222. https://doi.org/10.1177/0149206320925881
3. Carroll, A. B. (1979). A three-dimensional conceptual model of corporate performance. *Academy of Management Review*, 4(4), pp. 497-505. https://doi.org/10.5465/amr.1979.4498296
4. Chufama, M., Sithole, F. and Utaumire, Y. (2021). A review of corporate social responsibility theories and models. *International Journal of Economics, Commerce and Management IX*, 9(3), pp. 104-19.
5. Claydon, J. (2011). A new direction for CSR: the shortcomings of previous CSR models and the rationale for a new model. *Social Responsibility Journal*, 7(3), pp. 405-420. https://doi.org/10.1108/17471111111154545
6. Damayanti, Y., Rismawati, R. and Rusli, A. (2023). Membangun konsep corporate social responsibility (CSR) melalui budaya 3S (Sipakatau, Sipakalebbi, Sipakainge). *Membangun Konsep Corporate Social Responsibility (Csr) Melalui Budaya 3s (Sipakatau, Sipakalebbi, Sipakainge)*, 14(02), pp. 336-345. https://doi.org/10.23887/jimat.v14i02.58167
7. Davis, K. (1976). Social responsibility is inevitable. *California Management Review*, 19(1), pp. 14-20. https://doi.org/10.2307/41164678
8. Dewi, C. I. R. S., Triyuwono, I., Hariadi, B. and Roekhudin. (2024). Corporate social responsibility model based on Tri Hita Karana philosophy. *Cogent Social Sciences*, 10(1), A. 2295056. https://doi.org/10.1080/23311886.2023.2295056
9. Drobyazko, S., Hilorme, T., Solokha, D. and Bieliakova, O. (2020). Strategic policy of companies in the area of social responsibility: Covid-19 challenges. *In E3S Web of Conferences* (Vol. 211, p. 04011). EDP Sciences. Ukraine. https://doi.org/10.1051/e3sconf/202021104011
10. Emeka-Okoli, S., Nwankwo, T. C., Otonnah, C. A. and Nwankwo, E. E. (2024). The evolution of CSR reporting in the oil and gas industry and its future direction: a conceptual review. *World Journal of Advanced Research and Reviews*, 21(3), pp. 100-108. https://doi.org/10.30574/wjarr.2024.21.3.0664
11. Gálvez-Sánchez, F. J., Molina-Prados, A., Molina-Moreno, V. and Moral-Cuadra, S. (2024). Exploring the three-dimensional effect of corporate social responsibility on brand equity, corporate reputation, and willingness to pay. a study of the fashion industry. *Journal of Retailing*

and Consumer Services, 79, A. 103836.
12. Kanji, R. and Agrawal, R. (2016). Models of corporate social responsibility: Comparison, evolution and convergence. *IIM Kozhikode Society & Management Review*, 5(2), pp. 141-155. https://doi.org/10.1177/2277975216634478
13. Khan, I., Jia, M., Lei, X., Niu, R., Khan, J. and Tong, Z. (2023). Corporate social responsibility and firm performance. *Total Quality Management & Business Excellence*, 34(5-6), pp. 672-691. https://doi.org/10.1080/14783363.2022.2092467
14. Lantos, G. P. (2001). The boundaries of strategic corporate social responsibility. *Journal of Consumer Marketing*, 18(7), pp. 595-632. https://doi.org/10.1108/07363760110410281
15. Liang, X. and Chen, X. C. (2024). Mandatory corporate social responsibility disclosure and financial constraints: Evidence from China. *International Review of Economics & Finance*, 89(1), pp. 954-974. https://doi.org/10.1016/j.iref.2023.08.011
16. Mahmud, A., Ding, D. and Hasan, M. M. (2021). Corporate social responsibility: business responses to coronavirus (COVID-19) pandemic. *SAGE open*, 11(1), A. 2158244020988710. https://doi.org/10.1177/2158244020988710
17. Malhotra, A. (2024). Overview of CSR Initiatives: A Case Study of NHPC. *In International Journal for Research Publication and Seminar*, 15(2), pp. 168-185. https://doi.org/10.36676/jrps.v15.i2.1407
18. Navickas, V., Kontautiene, R., Stravinskienė, J. and Bilan, Y. (2021). Paradigm shift in the concept of corporate social responsibility: COVID-19. *Green Finance*, 3(2), pp. 138-152.
19. Nawrocki, T. L. and Szwajca, D. (2021). A multidimensional comparative analysis of involvement in CSR activities of energy companies in the context of sustainable development challenges: Evidence from Poland. *Energies*, 14(15), A. 4592. https://doi.org/10.3390/en14154592
20. Popkova, E., DeLo, P. and Sergi, B. S. (2021). Corporate social responsibility amid social distancing during the COVID-19 crisis: BRICS vs. OECD countries. *Research in International Business and Finance*, 55, A. 101315. https://doi.org/10.1016/j.ribaf.2020.101315
21. Poursoleyman, E., Mansourfar, G., Hassan, M. K. and Homayoun, S. (2024). Did corporate social responsibility vaccinate corporations against COVID-19?. *Journal of Business Ethics*, 189(3), pp. 525-551. https://doi.org/10.1007/s10551-023-05331-1
22. Su, K. (2019). Does religion benefit corporate social responsibility (CSR)? Evidence from China. *Corporate social responsibility and environmental management*, 26(6), pp. 1206-1221. https://doi.org/10.1002/csr.1742
23. Tahniyath, F. and Elbanna, S. (2023). Corporate social responsibility (CSR) implementation: A review and a research agenda towards an integrative framework. *Journal of Business Ethics*, 183(1), pp. 105-121.
24. Visser, W. (2014). CSR 2.0: Transforming corporate sustainability and responsibility. New York, NY: Springer. Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-40874-8
25. Wang, B., Pyun, D. Y. and Piggin, J. (2024). Developing a conceptual model of corporate social responsibility of the chinese super league clubs. *Quest*, 76(3), pp. 382-399. https://doi.org/10.1080/00336297.2024.2354755
26. Wartick, S. L. and Cochran, P. L. (1985). The evolution of the corporate social performance model. *Academy of Management Review*, 10(4), pp. 758-769. https://doi.org/10.5465/amr.1985.4279099
27. Wood, D. J. (1991). Corporate social performance revisited. *Academy of Management Review*, 16(4), pp. 691-718. https://doi.org/10.5465/amr.1991.4279616

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The Impact of Economic Policy Uncertainty on Stock Liquidity with a Focus on the Role of Financial Disclosure

Reza Abbaszadeh Amiri[1], Hamid Reza Bazzazzadeh Torbati[*1], Mohammad Reza Abbaszadeh[2], Alireza Mehrazeen[1], Mohammad Karimi[3]

1. Department of Accounting, Ne.C., Islamic Azad University, Neyshabur, Iran.

2. Department of Accounting, Faculty of Administrative and Economic Sciences, Ferdowsi University of Mashhad, Mashhad, Iran.

3. Department of Management, Ne.C., Islamic Azad University, Neyshabur, Iran.

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Abstract

Low market liquidity is often a direct consequence of economic policy uncertainty. Persistent policy fluctuations and a lack of transparency in economic decision-making erode investor confidence, resulting in lower trading volumes and reduced liquidity. Most stock markets around the world are not frictionless; increased economic policy uncertainty, high transaction costs, investor protection concerns, and information asymmetry further exacerbate market frictions. Changes in government policies or actions that alter the economic environment can significantly influence price reactions in financial markets. This study aims to investigate the relationship between economic policy uncertainty and stock liquidity, as well as the moderating effect of information disclosure on this relationship. To achieve this, accurate and consistent data were required; therefore, all companies listed on the Tehran Stock Exchange (TSE) were considered the study population. Data from 64 listed firms, spanning the period 2007–2021, were collected as the accessible sample to test the research hypotheses. Following the model proposed by Baker et al. (2016), a newspaper-based index of policy uncertainty was used to measure economic policy uncertainty. The moderating variable—information disclosure—was assessed using the Botosan (1997) disclosure index. Panel data econometrics and Estimated Generalized Least Squares (EGLS) regression models were employed to test the hypotheses, supported by diagnostic tests for stationarity, multicollinearity, normality, heteroscedasticity, and autocorrelation. The results indicate that economic policy uncertainty has a negative effect on stock liquidity. Moreover, economic policy uncertainty has no positive influence on information disclosure. Finally, information disclosure was found to mitigate the adverse impact of economic policy uncertainty on stock liquidity, confirming its moderating role. Overall, the findings suggest that managers tend to produce more information in response to information asymmetry shocks induced by economic policy uncertainty, thereby bridging the informational gap between insiders and market participants. When information asymmetry intensifies due to policy uncertainty—between informed traders (firms) and uninformed traders (potential investors)—managers have more substantial incentives to engage in voluntary disclosure to reduce informational frictions.

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*Corresponding Author:
Hamid Reza Bazzazzadeh Torbati
Email: hr.bazaz@iau.ac.ir
Tel: 05138946282
ORCID: 0000-0002-4772-3623

1. Introduction

Liquidity has garnered substantial attention in academic research over the past few years. It refers to the ease and speed with which an asset can be bought or sold with minimal transaction costs. Liquidity plays a crucial role in price discovery and serves as a key indicator of market efficiency, particularly in relation to the dissemination of information. Beyond its theoretical importance, liquidity also has significant practical implications. Given market realities such as order imbalances, trading queues, and other frictions, addressing liquidity issues remains essential (Dang & Nguyen, 2021). Higher liquidity facilitates a more efficient distribution of financial risk by reducing portfolio management costs and encouraging investors to make more informed trading decisions. Studies have demonstrated that transaction costs in developed markets hold considerable economic significance (Kubick et al., 2015). As liquidity increases, transaction costs decrease accordingly, and market efficiency improves. Moreover, liquidity plays a vital role in the price discovery process. However, liquidity levels in Iran's capital market remain relatively low due to several structural and institutional factors, as confirmed by prior research. Given liquidity's critical function in the market, examining the determinants that influence stock liquidity and cause its fluctuation is of great importance. It is worth noting that low liquidity is not unique to Iran; it is a global challenge that affects many countries. For instance, Wang et al. (2022) report that only 6% of the Chinese economy's assets are liquid. Similarly, Dash et al. (2021) document average liquidity levels of 0.5% in Canada, 1% in France, 4% in Germany, 1% in Italy, 17% in the United Kingdom, and 8% in the United States, highlighting significant cross-country variation in liquidity conditions. Recent studies have increasingly focused on the influence of economic policy uncertainty (EPU) on stock liquidity—an issue of considerable relevance with compelling empirical findings. Uncertainty stemming from environmental crises, political instability, and the COVID-19 pandemic has imposed severe strains on global economies (Goodell, 2020). In light of these developments, an expanding body of literature (e.g., Julio & Yook, 2012; Gulen & Ion, 2016; Jens, 2017; Baker et al., 2016; Bonaime et al., 2018; Yang et al., 2019; Phan et al., 2021; Dang & Nguyen, 2021; Wang et al., 2022) has examined the real-world effects of policy uncertainty shocks on financial markets.

Liquidity plays a crucial role in the efficient functioning of capital markets by facilitating asset pricing, risk-sharing, and investment. However, in emerging economies such as Iran, stock market liquidity has consistently faced significant challenges stemming from structural inefficiencies, regulatory constraints, and macroeconomic instability. Recent evidence suggests that one of the key obstacles to developing deep and liquid markets in Iran is the volatility of economic policies and the lack of transparent financial information—factors that undermine investor confidence and elevate transaction costs (Khajavi et al., 2022; Moradi et al., 2022). For instance, Moradi et al. (2022) report that more than 60% of individual investors attribute information asymmetry and low liquidity as primary reasons for engaging in short-term speculation rather than long-term investment. Likewise, Khajavi et al. (2022) document a direct relationship between low levels of voluntary disclosure and wider bid–ask spreads on the Tehran Stock Exchange, indicating liquidity deterioration among firms operating in poor information environments. These findings underscore the necessity for systematic investigation into the determinants of stock liquidity, particularly within the Iranian context, where uncertainty and information opacity continue to represent systemic characteristics of the financial market.

To better understand the dynamics of stock liquidity, it is crucial to examine the channels through which macroeconomic factors influence liquidity. Among these channels, information asymmetry is particularly significant, as it tends to intensify during periods of economic policy uncertainty (EPU). EPU not only heightens overall market ambiguity but also widens the informational gap between corporate insiders and external investors (Qian et al., 2025). This friction discourages trading activity

and consequently diminishes market liquidity. In this context, financial information disclosure can function as a moderating mechanism that alleviates the adverse effects of uncertainty by enhancing transparency and reducing information asymmetry (Fu et al., 2025). Accordingly, in this study, stock liquidity is conceptualized as the outcome variable, economic policy uncertainty as the shock-inducing condition, information asymmetry as the transmission mechanism, and voluntary disclosure as the mitigating factor.

Although numerous studies have examined the impact of uncertainty on stock liquidity, there is limited evidence regarding effective mechanisms through which firms can mitigate the adverse economic effects of exogenous uncertainty shocks in their operating environments (Wang et al., 2022). Accordingly, this study aims to address the research gap by highlighting the importance of stock liquidity for firm outcomes and the role of information disclosure as a mechanism to mitigate the negative impact of heightened economic policy uncertainty on stock liquidity. The central argument of this research is that economic policy uncertainty (EPU) negatively influences stock liquidity through the information channel. Elevated EPU intensifies information asymmetry in capital markets and impairs trading efficiency in securities markets (Pastor & Veronesi, 2012), thereby reducing investors' willingness to trade. High levels of EPU heighten uncertainty regarding firm value, prompting traders to withdraw from the capital market and, consequently, reducing stock liquidity (Debata & Mahakud, 2018). Drawing on prior empirical evidence and established economic theories, the effects of elevated economic policy uncertainty (EPU) on stock liquidity are expected to be more pronounced among firms operating within weak informational environments. Consequently, it is assumed that managers—responding to information asymmetry shocks induced by policy uncertainty—are likely to increase the level of information disclosure to narrow the informational gap between insiders and market participants. According to information disclosure theory, when information asymmetry in the market intensifies between firms (informed traders) and potential investors (uninformed traders), managers become more inclined to voluntarily disclose information to reduce informational frictions (Verrecchia, 1980) and mitigate investment uncertainty (Pastor & Veronesi, 2012). Investors tend to be highly averse to uncertainty shocks; hence, their demand for reliable and timely financial information increases as environmental uncertainty rises (Drechsler, 2013). Therefore, information disclosure is expected to be particularly beneficial for firms during periods of heightened economic policy uncertainty (EPU) (Nagar et al., 2019). In response to exogenous increases in EPU, managers may disclose more information to reduce informational asymmetry and alleviate investor uncertainty in capital markets. However, elevated EPU can also exacerbate information asymmetry by discouraging corporate disclosure. Under high uncertainty, firms often become more cautious about what information to reveal, balancing the potential benefits of transparency against the risks of unfavorable market reactions. Voluntary disclosure is inherently costly (Verrecchia, 1980), and these costs are magnified when the disclosed information is negative (Rogers et al., 2009). Consequently, managers may be less inclined to release additional information when the news is unfavorable (Chen et al., 2011). The incentive to withhold negative information, therefore, increases during periods of high policy uncertainty (Luo & Zhang, 2020). Similarly, firms are less likely to issue earnings forecasts in uncertain markets (Kim et al., 2016), and they tend to disclose such forecasts only when performance expectations are more predictable (Chen et al., 2011). Taken together, whether firms disclose more or less information during times of heightened economic policy uncertainty remains an empirical question requiring further investigation. Prior research generally suggests that greater information disclosure enhances a firm's information environment and improves stock liquidity (Healy & Palepu, 2001; Diamond & Verrecchia, 1991). However, it remains empirically unclear whether enhanced information disclosure can mitigate the adverse effects of rising economic policy uncertainty (EPU) on stock liquidity. This question is critical because market

participants rely heavily on firm-specific information to make optimal investment decisions. Theoretically, greater information transparency enhances stock valuation, whereas elevated uncertainty reduces the intrinsic value of securities (Wang et al., 2022). In periods of heightened uncertainty, investors face greater difficulty in assessing firm quality. Consequently, transparent firms are expected to maintain higher valuations and exhibit greater stock liquidity during times of elevated EPU (Lang et al., 2012; Schoenfeld, 2017). Moreover, extensive information disclosure can influence trading behavior by affecting bid–ask spreads and trading volumes (Leuz & Verrecchia, 2000). Accordingly, the quality of a firm's information disclosure is expected to reduce information asymmetry caused by economic policy uncertainty and thereby mitigate its negative impact on stock liquidity. Based on the foregoing discussion, this study contributes to the literature by proposing a novel framework that integrates economic policy uncertainty, information disclosure quality, and stock liquidity and empirically investigates the moderating role of disclosure in this relationship.

First, this study contributes to two interrelated streams of literature: (1) the nexus between economic policy uncertainty and information asymmetry, and (2) the relationship between information asymmetry and information disclosure. Specifically, it extends prior research by examining how heightened economic policy uncertainty influences stock liquidity and the quality of corporate information disclosure. A distinctive aspect of this study is its focus on a setting where both the demand for information and the costs of disclosure are elevated under conditions of economic policy uncertainty. Despite the theoretical importance of this issue, there is limited evidence regarding whether—and how—managers adjust their disclosure behavior in such circumstances. Accordingly, this study contributes to the literature by demonstrating how economic policy uncertainty affects stock liquidity and shapes managerial disclosure decisions.

Second, this study contributes to a growing body of literature investigating the real effects of economic policy uncertainty (EPU) on economic and financial outcomes. Prior research has documented that increased EPU can trigger economic and market recessions, leading to reduced corporate investment (Gulen & Ion, 2016; Jens, 2017), lower innovation activity (Wang et al., 2022), slower banking credit growth (Nguyen et al., 2020), lower stock returns (Chen & Chiang, 2020), higher stock price volatility (Baker et al., 2016), weaker financial stability (Fan et al., 2020), and a greater risk of stock price crashes (Luo & Zhang, 2020). While these studies primarily focus on the negative consequences of policy uncertainty, they offer limited insights into how firms can effectively cope with such uncertainty, which has an adverse impact on financial markets. In contrast, the present study extends this literature by proposing a mitigating mechanism—high-quality information disclosure—that can reduce the adverse effect of economic policy uncertainty on stock liquidity. This research also complements previous studies, which suggest that political connections, corporate social responsibility, board networks, and family ownership can help firms buffer against uncertainty (Akey & Lewellen, 2017). Unlike those perspectives, this study reveals an additional, previously overlooked benefit of information disclosure: its capacity to mitigate the negative effects of heightened economic policy uncertainty on stock liquidity.

Third, this study adds to the existing literature by providing empirical evidence that investors react more strongly to earnings announcements of firms with higher levels of information disclosure during periods of heightened uncertainty.

Fourth, the study extends the finance literature related to emerging economies and developing markets. Prior research on the relationship between information disclosure, stock liquidity, and economic policy uncertainty has predominantly focused on firms in the United States and other developed markets, where financial systems operate with relatively fewer frictions.

Therefore, the findings of prior studies may not be fully generalizable to firms operating in the financial markets of emerging economies such as Iran, where market frictions are considerably

higher. The effects of policy uncertainty are more pronounced in unstable economies with substantial government intervention—a characteristic that accurately describes the Iranian economy, where industrial policies are predominantly government-driven and publicly funded (Arianpoor et al., 2023). Consequently, compared to firms in more market-oriented countries, Iranian companies are likely to experience greater adverse effects from policy uncertainty (Ahmadi et al., 2025). Moreover, prior research suggests that high-quality information disclosure is particularly valuable in environments with weak investor protection and fragile institutional frameworks. In such settings, firms tend to complement limited national regulations through voluntary disclosures and more frequent updates at the firm level (Zahedi et al., 2023). Hence, examining the effects of corporate transparency in highly developed markets—such as the United States, with its robust financial systems and strong disclosure standards—may yield limited insights for countries with weaker regulatory environments, such as Iran. Iran represents an emerging market with a relatively small capital market, weak investor protection, and an underdeveloped information environment (Mousavi et al., 2022). In emerging markets characterized by fragile institutions, liquidity costs tend to be higher (Salehi et al., 2023). Accordingly, this study addresses an existing gap in the literature by analyzing the impact of economic policy uncertainty on stock liquidity, with an emphasis on the moderating role of financial information disclosure in an emerging economy with weak institutional frameworks. The findings can also be extended to other markets with similar institutional characteristics, such as those of other Middle Eastern countries, offering valuable insights for both managers and policymakers.

The remainder of this paper is organized as follows. Section 2 reviews the theoretical foundations and develops the research hypotheses. Section 3 describes the research methodology, including the econometric models, data collection procedures, and variable definitions. Section 4 presents the empirical analysis, encompassing diagnostic tests and regression results. Finally, Section 5 discusses the findings in the context of existing literature and concludes with practical implications and suggestions for future research.

2. Theoretical foundations and hypothesis development

2.1. Economic policy uncertainty and stock liquidity

An escalation in economic policy uncertainty (EPU) increases investor apprehension regarding firms' investment prospects (Pastor & Veronesi, 2012). According to options theory, firms tend to delay or reduce irreversible investments during periods of heightened uncertainty until ambiguity is resolved (Dixit & Pindyck, 1994; Gulen & Ion, 2016). Under such conditions, self-interested managers may refrain from disclosing their investment decisions to the market to avoid potential declines in stock prices. Rising economic policy uncertainty also amplifies information asymmetry in capital markets (Ghosh & Olsen, 2009). Nagar et al. (2019), examining U.S. corporations, find that EPU increases informational frictions within financial markets. Greater information asymmetry, in turn, reduces investors' willingness to trade and negatively affects stock liquidity (Schoenfeld, 2017). Consistent with information asymmetry theory, prior studies demonstrate that higher levels of asymmetry in capital markets negatively impact stock liquidity (Glosten & Milgrom, 1985; Kelly & Ljungqvist, 2012; Ellul & Panayides, 2018).

Several studies suggest that economic policy uncertainty (EPU) is associated with increased stock price volatility (Baker et al., 2016; Pastor & Veronesi, 2012; Li et al., 2021). Greater volatility in stock prices and returns makes price forecasting more difficult for investors, thereby discouraging trading activity (Armstrong et al., 2011; Chordia et al., 2008; Hameed et al., 2010). Evidence from emerging markets further supports the notion that EPU exacerbates liquidity constraints. In Iran, fluctuations in monetary policy and exchange rate regimes have contributed to substantial capital

market volatility and reduced market depth (Loni et al., 2021). Similarly, increased policy-related uncertainty in Iran has been linked to lower trading volumes, wider bid–ask spreads, and decreased investor participation (Taheri Bazkhaneh & Sadrara, 2025). Moreover, higher levels of policy uncertainty have been shown to depress stock prices (Pastor & Veronesi, 2012). Overall, prior evidence suggests that economic policy uncertainty negatively impacts stock market performance in multiple ways. Duong et al. (2018) documented a negative impact of EPU on stock liquidity, while Wang et al. (2022) similarly found that greater policy uncertainty leads to a decline in liquidity. Based on these arguments, the first research hypothesis is formulated as follows:

H1: Economic policy uncertainty negatively affects stock liquidity;

2.2. Economic policy uncertainty, information disclosure, and stock liquidity

When information asymmetry arises as a result of economic policy uncertainty (EPU), managers may increase the level of corporate disclosure to mitigate its adverse impact on stock liquidity (Verrecchia, 1980). Enhancing corporate transparency through greater information disclosure enables potential investors to better assess the quality of a company's securities, reduce agency costs, and increase the attractiveness of its shares in the capital market. Higher disclosure quality and transparency help firms counteract the negative effects of information asymmetry (Lang & Maffett, 2011) and lessen stock mispricing. Frequent and high-quality disclosures reduce the cost of capital and attract a broader investor base (Balakrishnan et al., 2014; Lambert et al., 2007). In the Iranian context, however, the effectiveness of voluntary disclosure is often constrained by underdeveloped regulatory institutions, elevated political risk, and the dominance of state-owned enterprises. Setayesh et al. (2011) found that the moderating effect of disclosure weakens in firms with concentrated government ownership. Nonetheless, emerging evidence suggests that Iranian firms with higher-quality voluntary reporting—particularly during periods of heightened policy uncertainty—experience superior stock liquidity and narrower bid–ask spreads. Further evidence from Lang et al. (2012) shows that transparent firms tend to exhibit higher valuations and more liquid stocks. Similarly, Cho and Kim (2021) demonstrate that the positive effect of increased disclosure on stock liquidity is more pronounced for firms disclosing favorable news than for those disclosing unfavorable news.

Additionally, the effects of negative disclosures may evolve. While such disclosures often lead to lower liquidity in the short term—owing to increased investor caution and wider bid–ask spreads—they can, in the long run, foster greater investor trust, enhance a firm's reputation for transparency, and ultimately improve stock liquidity. This dynamic effect has been particularly observed in markets characterized by low institutional trust and volatile policy environments (Md Zaini et al., 2018).

The Investor Recognition Hypothesis posits that potential investors prefer to trade or invest in stocks with transparent and easily assessable information at lower costs (Merton, 1987). Firm-specific disclosures enable investors to distinguish between high-quality and low-quality firms with minimal information costs. Consequently, investors tend to exhibit risk-averse behavior during periods of uncertainty, shifting from risky securities to safer and more predictable assets (Brunnermeier & Pedersen, 2009; Hameed et al., 2010). Given that increased transparency enhances stock liquidity (Campbell et al., 2014; Schoenfeld, 2017; Diamond & Verrecchia, 1991; Lang et al., 2012; Elshandidy & Neri, 2015), it is expected that the disclosure of negative information moderates the relationship between economic policy uncertainty and stock liquidity. Based on these arguments, the second research hypothesis is formulated as follows:

H2: Increased information disclosure significantly moderates the negative relationship between economic policy uncertainty and stock liquidity.

Although prior studies have extensively highlighted the positive role of information disclosure in

enhancing stock liquidity (e.g., Mbanyele, 2023; Muzaffar & Malik, 2024), relatively few have directly examined its moderating effect on the relationship between economic policy uncertainty (EPU) and stock liquidity. Recent empirical evidence, however, provides strong support for this moderating role. For instance, Lang et al. (2012) found that firms with higher levels of voluntary disclosure exhibit a significantly weaker negative association between EPU and stock liquidity. Their study, based on a comprehensive panel of Chinese listed firms, suggests that financial transparency mitigates the adverse market reactions triggered by policy uncertainty through reducing information asymmetry. Similarly, Zhang et al. (2023) demonstrated that voluntary disclosure serves as a buffer against the detrimental effects of economic uncertainty on stock market frictions, particularly those related to liquidity and investor responsiveness. Collectively, these studies reinforce the notion that information disclosure functions not only as a determinant of stock liquidity but also as a contextual moderator within uncertainty-driven capital markets.

Moreover, it is essential to distinguish between voluntary and mandatory disclosures, as their effects on stock liquidity differ substantially. Voluntary disclosure—primarily driven by managerial discretion—has been shown to exert a more substantial moderating influence under conditions of uncertainty, particularly in markets characterized by weaker regulatory oversight. In contrast, while mandatory disclosure establishes a baseline of transparency, it may not effectively mitigate information asymmetry unless supported by strong enforcement mechanisms. Recent evidence suggests that voluntary disclosure is especially valuable in enhancing investor confidence and improving market liquidity in emerging economies (Haddad et al., 2009).

Aslam and Brooks (2024) emphasize that emerging markets have become key contributors to global economic growth, accounting for nearly two-thirds of global output in the past year. Strengthened macroeconomic fundamentals—such as higher foreign reserves and improved policy frameworks—have increased the resilience of these markets to external shocks and policy uncertainty, making them highly relevant contexts for examining stock liquidity under uncertainty.

Tran et al. (2024) analyze the causal relationships among economic policy uncertainty, economic growth, and stock liquidity in ASEAN markets. Their results reveal no direct causal effect of policy uncertainty on either growth or liquidity; however, they confirm that economic growth has a significant influence on stock liquidity. The study underscores the resilience of emerging markets and recommends adopting broader indicators and strategic policy designs to indirectly promote liquidity.

Wagdi (2025) investigates the effects of economic policy uncertainty (EPU) and information asymmetry on stock price crash risk in the Egyptian Exchange. Using data from 21 firms over the period 2014–2023, the study finds that EPU significantly increases crash risk, and this effect is amplified under higher levels of information asymmetry. EPU alone accounts for approximately 30–47% of crash risk, whereas incorporating information asymmetry increases explanatory power to over 50–71%. The findings highlight the crucial role of transparent financial disclosures in mitigating crash risk during periods of heightened policy uncertainty.

Similarly, Shirmardi et al. (2024) examine the influence of systematic and unsystematic risk factors—including financial uncertainty, economic policy uncertainty, and the Fama–French five-factor components—on stock returns in the U.S. capital market using quarterly SVAR analysis. Their results indicate that in the short term, negative shocks from stock returns, profitability, SMB, and momentum dominate, while EPU exerts a positive short-term effect. In the long term, however, both economic policy uncertainty and broader economic uncertainty have pronounced negative impacts, whereas factors such as SMB, HML, and profitability generate positive shocks. These findings suggest that different types of uncertainty exert distinct effects on stock performance across varying time horizons.

Darabi and Naseri Nasab (2023) investigate the moderating role of information disclosure quality

in the relationship between economic policy uncertainty (EPU) and stock liquidity on the Tehran Stock Exchange. Using panel data from 146 firms over the nine years from 2013 to 2021, their causal analysis reveals a significant negative association between EPU and stock liquidity. However, higher-quality information disclosure mitigates this adverse effect by enabling more informed trading and reducing information asymmetry in the market.

3. Methodology

Given that this study examines the impact of economic policy uncertainty (EPU) on stock liquidity, with a particular focus on the role of financial information disclosure, its primary objective is fundamental, aiming to contribute to the development of theory aligned with the Iranian capital market context. Based on the data collection approach, the research is retrospective and descriptive, as the data used to test the hypotheses were obtained from existing sources, including firms' financial statements, Tehran Stock Exchange (TSE) reports (ordinary general meeting decisions and audited financial statements published by the Securities and Exchange Organization), and annual board reports. Data analysis is conducted using panel data techniques and multivariate regression models.

The statistical population consists of all non-financial firms listed on the TSE between 2007 and 2021. Companies in the financial sector were excluded due to differences in disclosure requirements and economic structure. The final sample comprises 64 firms that meet the selection criteria, resulting in a total of 660 firm-year observations.

3.1. Population and accessible statistical population

According to Table 1, the statistical population of this study comprises all companies listed on the Tehran Stock Exchange (TSE). The accessible population comprises firms that were actively operating between 2007 and 2021. No random sampling was performed; instead, firms meeting the following criteria were selected for inclusion in the final dataset:

1. Companies operating in financial intermediary sectors—such as investment firms, holding companies, leasing companies, insurance companies, and banks—were excluded due to differences in their economic nature, disclosure practices, and applicable accounting standards. These firms also exhibit distinct financial reporting and corporate governance structures compared to other industries.
2. Firms for which relevant financial or market data were unavailable were excluded from the sample.
3. Firms were required to have a fiscal year ending in March to ensure consistency and eliminate potential seasonal effects on the dependent variable.
4. Companies inactive in the TSE during the 2007–2021 period were excluded.
5. Firms whose stock trading symbols experienced long-term suspension (exceeding three months) were also excluded.

Table 1. Method of selecting the accessible statistical population

Description	Number	Number
Total number of listed companies on the Tehran Stock Exchange (2007–2021)		558
Companies that belong to banks, insurance companies, investment firms, and similar sectors	134	
Companies with impossible access to information	87	
Companies whose fiscal year ends in March aim to eliminate the effects of market anomalies on the dependent variable	79	
Companies that were not active in the Tehran Stock Exchange during the study period	52	
Companies that changed their activity or fiscal year	48	
Companies whose stock symbol experienced a long-term suspension (more than three months)	94	

Remaining companies (Accessible Statistical Population)	64

Models

The following regression models are employed to test the hypotheses in this study.

Model (1) is utilized to test the first hypothesis.

Model (1)

$$ILLIQ_{i,t} = \alpha_0 + \alpha_1 EPU_{i,t} + \alpha_2 SEN_{i,t} + \alpha_3 INS_{i,t} + \alpha_4 Pvol_{i,t} + \alpha_5 Rvol_{i,t} + \alpha_6 IndBoard_{i,t} + \alpha_7 MS_{i,t} + \alpha_8 MO_{i,t} + \alpha_9 SG_{i,t} + \alpha_{10} Size_{i,t} + \alpha_{11} AGE_{i,t} + \alpha_{12} LEV_{i,t} + \alpha_{13} ROA_{i,t} + \varepsilon_{i,t}$$

Model (2) is applied to test the second hypothesis.

$$ILLIQ_{i,t} = \alpha_0 + \alpha_1 EPU_{i,t} + \alpha_2 Disclosure_{i,t} + \alpha_3 EPU * Disclosure_{i,t} + \alpha_4 SEN_{i,t} + \alpha_5 INS_{i,t} + \alpha_6 Pvol_{i,t} + \alpha_7 Rvol_{i,t} + \alpha_8 IndBoard_{i,t} + \alpha_9 MS_{i,t} + \alpha_{10} MO_{i,t} + \alpha_{11} SG_{i,t} + \alpha_{12} Size_{i,t} + \alpha_{13} AGE_{i,t} + \alpha_{14} LEV_{i,t} + \alpha_{15} ROA_{i,t} + \varepsilon_{i,t}$$

3.2. Research variables

3.2.1. Independent variable: economic policy uncertainty (EPU):

This study examines the relationship between economic policy uncertainty (EPU) and stock liquidity by first constructing an Economic Policy Uncertainty Index for Iran based on the methodology developed by Baker et al. (2016). The evolution of this index was analyzed from Farvardin 2006 (March 2007) through the end of the research period. The index was developed using seven Persian-language national newspapers classified as categories A and B according to the Ministry of Culture and Islamic Guidance's ranking issued in February 2018, which represented the most recent classification available at the time of the study. The selected newspapers include Donya-e-Eqtesad, Iran, Shargh, Resalat, Kayhan, Etemad, and Jame Jam. Relevant articles were retrieved from the digital archives of these newspapers via the National Information and Publications Bank website, encompassing all news items and reports published by these outlets. To construct the EPU Index, three groups of keywords were employed: Economic Terms (E), Uncertainty or Risk Terms (U), and Policy Terms (P).

After identifying the relevant keywords, the number of news articles and reports containing at least one term from each of the three categories was counted for each month. The value of $X_{i,t}$ was then calculated by dividing the number of uncertainty-related articles by the total number of articles published in the same month by newspaper i. The standard deviation of uncertainty-related articles over the entire study period (2006–2021) for each newspaper was denoted as δ_i. Each monthly observation was standardized by dividing $X_{i,t}$ by δi, resulting in Yi,t. Subsequently, the average of $Y_{i,t}$ across all newspapers in a given month was computed as z_t. Next, the average of all economic policy uncertainty news articles over the research period is calculated as M. Finally, the Economic Policy Uncertainty Index (EPU) for month t was derived using the following equation:

$$EPU_t = \frac{Z_t}{M} * 100$$

3.2.2. Dependent variable: stock liquidity (ILLIQ):

In this study, stock liquidity is measured using the Amihud Illiquidity Ratio (2018), which is among the most widely used and reliable proxies for stock liquidity in the finance literature and interpreted as the daily stock price response to trading volume.

$$ILLIQ_{i,m} = \frac{1}{D_{i,m}} \sum_{d=1}^{d_{i,m}} \frac{|R_{i,d,m}|}{P_{i,d,m} V_{i,d,m}}$$

Where:

$D_{i,m}$: The number of trading days for firm i's stock in month m.

$R_{i,d,m}$: The return on company i's stock in month m.

The daily return on firm i's stock in period t is calculated as follows (Asgarinejad, 2018):

$$R_{i,t} = \frac{(P_t - P_{t-1}) + D_t + \frac{(P_t - P_n) * N_c}{N} + \frac{N_e * P_{t-1}}{N}}{P_{t-1}}$$

$P_{i,d,m}$: Closing price of company i's stock in month m.

$V_{i,d,m}$: Trading volume of company i's stock in month m. Accordingly, a liquid stock is a stock that is traded in a relatively large volume without a significant impact on the price. Therefore, a lower value of this measure indicates higher asset liquidity.

3.2.3. Moderating variable: information disclosure (Disclosure):

In this study, information disclosure is measured using the indicators proposed by Botosan (1997), which were initially developed based on the recommendations of the Jenkins Committee. In the Botosan model, disclosure indicators were derived from corporate governance reports and the ranking figures of U.S. companies. However, due to the absence of such data sources in Iran—and given that the Iranian Audit Organization has issued a sample reporting format booklet that companies commonly use for preparing and disclosing information—the scope for voluntary disclosure within financial statements is considerably restricted. Consequently, this study employs the board of directors' activity reports as the primary source for extracting voluntary disclosure indicators. After verifying the non-mandatory nature of these indicators based on accounting standards and legal requirements, six main categories (comprising 71 indicators) were identified: (1) background information, (2) a summary of key historical results, (3) segment information, (4) key non-financial statistics, (5) forecast information, and (6) management discussion and analysis. The components and scoring procedures for each category are described below. The voluntary disclosure score for each firm is calculated by dividing the total score obtained across the six categories by the maximum possible score (134).

Voluntary Disclosure Indicators

Background Information: This category includes a summary of the company's activities, statements of goals or strategic plans, an overall description of corporate strategy, actions taken during the year to achieve stated objectives, and planned initiatives for future periods. It also covers timelines for achieving goals, the competitive environment, the effects of competition on current and future profitability, a general company overview, the main products or services and their distinguishing features, primary markets and their characteristics, inventory details, and the organizational structure, including the management hierarchy or organizational chart.

Summary of Key Historical Results: This category comprises indicators such as profitability ratios, financial structure ratios, liquidity ratios, and other key financial ratios. It also includes earnings per share forecasts, sales performance metrics, operating profit measures, and net profit results.

Key Non-financial Indicators: This category includes non-financial performance indicators such as average employee salary, average age of key personnel, market share of main products or services, units sold for primary products or services, selling price per unit, growth rate in units sold, break-even sales, production or delivery time, descriptions of production methods or techniques, and information about the company's primary customer base.

Sector Information: Description of assets, Liabilities or financing, Depreciation, Operating profit,

Investment, and Research and development.

Forecasting Information: This category covers forward-looking disclosures that provide insights into the company's future performance. It includes comparisons of previous profit and sales forecasts with actual results, assessments of how current opportunities and risk coverage influence future sales or profits, estimates of market share, cash flow, capital expenditures, and research and development expenditures, as well as projections of future profits and sales.

Management Discussion and Analysis: This category consists of narrative explanations provided by management regarding changes in key financial metrics. It encompasses discussions about changes in sales, operating income, cost of goods sold, gross profit, administrative and organizational expenses, interest expense or income, and net profit. It also includes explanations related to changes in inventory, accounts receivable, capital expenditures, research and development expenses, and market share. Furthermore, it covers the interpretation of liquidity ratios, other financial ratios, and earnings per share forecasts.

Summary of the Weighting System

Background Information: Each disclosed item is assigned one point. An additional point is granted in cases where the disclosed information is scarce or limited.

Summary of Historical Performance: One point is awarded for ratios and earnings per share (EPS) forecasts referring to the most recent period (X). If the information pertains to the previous period (X–1), an additional point is granted. A further point is awarded for references to period X–2. For sales, operating income, and net profit, one point is also assigned if the disclosure refers to period X–2.

Sector Information: One point is assigned for each item of sector-related information disclosed.

Core Non-Financial Information: Two points are granted for each reported item.

Forecast Information: Qualitative items 1 and 2 each receive one point, while items 3 through 10 receive two points each. Quantitative forecast items are awarded one point each. Items 9 and 10, when referring to the main business sectors, receive an additional point each.

Management Discussion and Analysis: Qualitative items 1–14 each receive one point, which also applies to the corresponding quantitative items, except for sales and operating income. For the main sections, two items receive one point each; if the disclosure is based on aggregate totals, half a point is awarded. For items 15–19, one point is granted when ratios for period X are disclosed, and an additional point is assigned if trends are also analyzed.

3.2.4. Control variables

In the present study, and consistent with Balakrishnan et al. (2014) and Nagar et al. (2019), several control variables are employed to capture the effects of business risk, informational environment, corporate governance, and the firm's financial conditions. The control variables are defined as follows:

Investor Sentiment (SEN):

Consistent with Riedl et al. (2021), investor sentiment is measured using the indices developed by Baker and Wurgler (2006). The relevant indices are presented in Table 2. The natural logarithm of the average value of these five indicators is calculated to represent investor sentiment. Accordingly, the variable SEN denotes the investor sentiment index in the stock market.

$SEN = Ln (TURN + PDND + S + R_f + CPI)$

Table 2. Investor sentiment indicators and their measurement methods

Variable	Measurement Method
TURN	The natural logarithm of the average annual trading volume was obtained from the Rahavard Novin database.
PDND	Excess dividend, defined as the natural logarithm of the difference between distributed and undistributed dividends, was also extracted from the Rahavard Novin database.
S	The ownership ratio and total financial activity were calculated by dividing shareholders' equity by the sum of total equity and long-term debt, and the resulting value was converted into a percentage (multiplied by 100).
Rf	The risk-free interest rate, based on the one-year deposit rate, was obtained from the Central Bank of Iran's official website.
CPI	The Consumer Price Index (CPI), used as a measure of inflation, was also collected from the Central Bank's website.

Institutional Ownership (INS):

According to Bushee (1998), institutional investors comprise banks, insurance companies, investment firms, pension funds, and other similar entities. Operationally, institutional ownership is defined as the percentage of shares held by institutional investors. Institutional ownership affects both the extent of corporate information disclosure and stock liquidity (Ellul & Panayides, 2018). Institutional shareholders enhance stock liquidity by improving the firm's information environment and exerting pressure on management to increase the level of disclosure.

Stock Price Volatility (PVOL):

The standard deviation of the monthly price over the year.

$$PVOL = \sigma P_{i,t}$$

Where:

σ: Standard deviation

P: Stock price[1]

Stock Return Volatility (RVOL):

The standard deviation of the monthly return over the year.

$RVOL = \sigma R_{i,t}$

The stock return of company i in period t is derived from the following relationship (Asgarinejad, 2018):

$$R_{i,t} = \frac{(P_t - P_{t-1}) + D_t + \frac{(P_t - P_n) * N_c}{N} + \frac{N_e * P_{t-1}}{N}}{P_{t-1}}$$

P_t: The closing price of the stock at the end of the period;

P_{t-1}: The stock price at the beginning of the period (end of the previous period);

Pn: The nominal value of each share;

D_t: The gross cash dividend per share;

N_e: The number of shares increased through reserves or retained earnings;

N_c: The number of shares increased through cash contributions;

N: The number of shares before the capital increase.

This study employs the return variable calculated using the formula mentioned above in the

[1] The stock price is the price at which each company share is bought and sold on the stock market. This price reflects the current value that investors place on that share.

Rahavard Novin software. Increased volatility in stock returns and prices heightens uncertainty and information asymmetry, which in turn adversely affects stock liquidity. In addition, consistent with prior studies, this research incorporates corporate governance variables, as corporate governance has been shown to influence stock liquidity (Prommin et al., 2014; Ali et al., 2017).

Independent Directors (IndBoard): The percentage of non-executive directors divided by the total number of directors.

Government Ownership (MS): The percentage of shares held by the government and state-owned companies.

Managerial Ownership (MO): The percentage of shares held by managers (Wang *et al*., 2022).

Sales Growth (SG): The current year's sales minus the previous year's sales divided by the previous year's sales.

$Sales_{it}$: The total sales of the company i in the current year;

$Sales_{it-1}$: The total sales of the company i in the previous year.

Firm Size (SIZE): The natural logarithm of the company's assets.

Firm Age (AGE): The natural logarithm of the years the company has been listed on the stock exchange since its inception.

Financial Leverage (LEV): The ratio of total liabilities (current and non-current) to total assets.

Return on Assets (ROA): The operating profit ratio to total assets.

3.3. Econometric Approach and Estimation Methods

To empirically test the research hypotheses, this study employs panel data econometric techniques, given that the dataset comprises both cross-sectional (firms) and time-series (years) dimensions. The following econometric models and diagnostic tests were applied:

- Multivariate regression analysis was applied to examine the main and interaction effects among the study variables.
- Augmented Dickey–Fuller (ADF) tests were conducted to assess the stationarity of the variables.
- Variance Inflation Factor (VIF) values were calculated to detect potential multicollinearity among the independent variables.
- The Jarque–Bera test was performed to verify the normality of the regression residuals.
- Breusch–Pagan (for heteroscedasticity) and Durbin–Watson (for autocorrelation) tests were used to evaluate the validity of key regression assumptions.
- Given the presence of both heteroscedasticity and autocorrelation, the study adopted the Estimated Generalized Least Squares (EGLS) method to obtain robust coefficient estimates.
- Model selection between pooled OLS, fixed effects, and random effects specifications was carried out using the F-Limer and Hausman tests. The results confirmed that the random effects model was appropriate for both hypotheses.

3.4. Regression Models

Two regression models were developed to test the study's hypotheses:

- **Model 1** examines the direct effect of economic policy uncertainty (EPU) on stock liquidity (ILLIQ).
- **Model 2** tests the moderating effect of voluntary disclosure (DISCLO) on the relationship between EPU and stock liquidity through the interaction term (EPU × DISCLO).

The empirical models are as follows:

Model 1:

$$ILLIQ_{i,t} = a_0 + a_1 EPU_{i,t} + \sum_{k=2}^{13} X_k + \beta_{i,t,k} + \varepsilon_{i,t}$$

Model 1:

$$ILLIQ_{i,t} = (\beta_0 + \beta_1 EPU_{i,t} + \beta_2 DISCLO_{i,t} + EPU) \times \beta_3 DISCLO_{i,t} + a_{i,t} + \sum_{k=4}^{15} X_k + \beta_{i,t,k} + \varepsilon_{i,t}$$

Where:

ILLIQ: denotes Amihud's stock illiquidity measure.

EPU: represents the Economic Policy Uncertainty index.

DISCLO: captures the voluntary financial disclosure score.

X_k: stands for a vector of control variables, including investor sentiment, institutional ownership, return volatility, board independence, government and managerial ownership, sales growth, firm size, firm age, leverage, and return on assets.

4. Data analysis

4.1. Descriptive statistics of the variables

Table 3. Descriptive statistics of the variables

Variable	Symbol	Mean	Maximum	Minimum	Standard Deviation	Skewness	Kurtosis
Liquidity	ILLQ	0.001	0.044	-0.003	0.005	3.928	23.576
Information Disclosure	DISCLO	0.257	0.443	0.120	0.061	0.403	2.895
Economic Policy Uncertainty	EPU	89.400	201.926	0.974	50.095	0.212	3.291
Investor Sentiment	SEN	13.988	21.179	9.311	2.101	0.279	2.786
Institutional Ownership	INS	70.412	99.580	0.000	27.751	-1.391	3.867
Return Volatility	Rvol	0.088	36.192	-3.420	3.537	5.737	44.184
Board Independence	INDBO	0.663	1.000	0.000	0.191	-0.335	3.021
Managerial Ownership	MS	6.969	87.550	0.000	15.686	2.398	7.869
Sales Growth	SG	0.318	9.114	-0.996	0.669	8.753	62.954
Firm Size	SIZE	6.325	8.887	4.620	0.840	0.420	2.762
Firm Age	AGE	1.508	1.903	0.954	0.221	-0.634	2.319
Leverage	LEV	0.490	0.987	0.019	0.242	-0.108	2.109
Return on Assets	ROA	0.174	0.956	-0.404	0.201	0.673	0.867

The descriptive statistics presented in Table 3, based on 660 firm-year observations, show that the average stock liquidity of the sample firms is 0.0016, indicating a relatively low level of liquidity. The maximum and minimum liquidity values are 0.0446 and –0.0032, respectively. The skewness and kurtosis statistics suggest that the distribution of stock liquidity is more peaked and asymmetric compared to a normal distribution, reflecting the non-normal nature of the data.

4.2. Unit root test for the variables

The Augmented Dickey-Fuller (ADF) test examines the presence of unit roots in the variables (Ryan and Giles, 1999).

Table 4 presents the results of the unit root tests, indicating that all variables are stationary, as their significance values are below the 5% threshold. The economic uncertainty variable, which is based

on matrix-type data, also exhibits stationarity and therefore does not require additional testing.

4.3. Multicollinearity diagnostic test

Table 5 presents the results of the multicollinearity diagnostic test for the study variables.

Table 4. Augmented Dickey-Fuller (ADF) Unit Root Test

Variable	Symbol	Test Statistic	Significance	Result
Liquidity	ILLQ	-6.618	0.000	Stationary
Information Disclosure	DISCLO	-6.441	0.000	Stationary
Investor Sentiment	SEN	-9.734	0.000	Stationary
Institutional Ownership	INS	-6.710	0.000	Stationary
Return Volatility	Rvol	-20.565	0.000	Stationary
Board Independence	INDBO	-9.369	0.000	Stationary
Managerial Ownership	MS	-6.230	0.000	Stationary
Government Ownership	MO	-6.337	0.000	Stationary
Sales Growth	SG	-23.626	0.000	Stationary
Firm Size	SIZE	-5.299	0.000	Stationary
Firm Age	AGE	-5.683	0.000	Stationary
Leverage	LEV	-9.270	0.000	Stationary
Return on Assets	ROA	-9.917	0.000	Stationary

Table 5. Multicollinearity Diagnostic Test

Variable	Symbol	VIF	1/VIF	Result
Economic Policy Uncertainty	EPU	1.465	0.682	No Multicollinearity
Investor Sentiment	SEN	1.593	0.627	Weak Multicollinearity
Institutional Ownership	INS	2.100	0.476	Weak Multicollinearity
Return Volatility	Rvol	1.112	0.899	No Multicollinearity
Board Independence	INDBO	1.201	0.832	No Multicollinearity
Managerial Ownership	MS	1.225	0.816	No Multicollinearity
Government Ownership	MO	1.354	0.738	No Multicollinearity
Sales Growth	SG	1.311	0.762	No Multicollinearity
Firm Size	SIZE	1.834	0.545	Weak Multicollinearity
Firm Age	AGE	1.074	0.930	No Multicollinearity
Leverage	LEV	1.359	0.735	No Multicollinearity
Return on Assets	ROA	1.093	0.914	No Multicollinearity
Mean VIF	-	1.390	-	No Multicollinearity

The results of the VIF test indicate that the values for all variables, as well as for the model's mean errors, are below the threshold of 10. Therefore, multicollinearity is not a concern, and the independent variables can be considered orthogonal, ensuring the reliability of the regression estimates.

4.4. Normality test of residuals

The Jarque–Bera test was employed to assess the normality of the regression residuals. Figure 1 presents the descriptive statistics of the residuals along with the corresponding Jarque–Bera statistic for the sample data.

4.5. Heteroscedasticity and autocorrelation test

The results of the heteroscedasticity and autocorrelation tests for Model 1, as presented in Table 6, indicate the presence of both heteroscedasticity and serial autocorrelation in the residuals. The significance level of the test is below the 5% threshold, suggesting that the Ordinary Least Squares (OLS) estimator is inefficient. To correct this issue, the Generalized Least Squares (EGLS) method was employed. Similarly, for Model 2, the test results confirm the presence of heteroscedasticity and

autocorrelation, indicating that the OLS technique is also inappropriate for this model. Consequently, the EGLS estimator was applied to obtain consistent and efficient coefficient estimates.

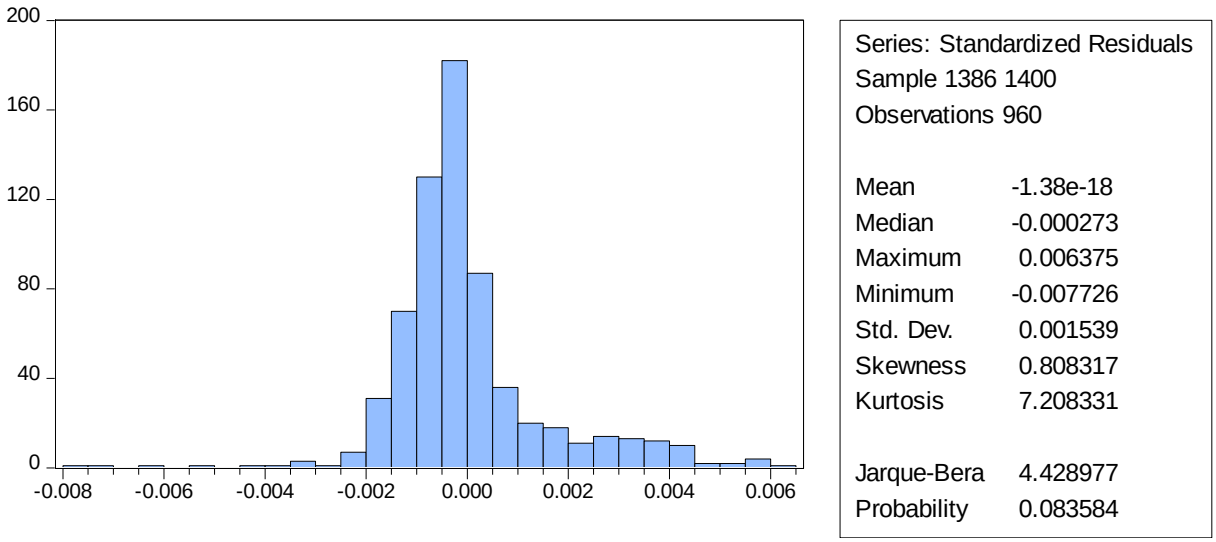

Figure 1. Distribution of residuals based on the Jarek-Bara method

Table 6. Heteroscedasticity and Autocorrelation Test

Model	Test Type	F-Statistic	P-Value	Obs*R-squared	Result
Model 1	Heteroscedasticity Test	13.930	0.000	452.218	Presence of heteroscedasticity
	Autocorrelation Test	3.407	0.033	6.899	Presence of autocorrelation
Model 3	Heteroscedasticity Test	10.499	0.000	457.947	Presence of heteroscedasticity
	Autocorrelation Test	3.224	0.040	6.554	Presence of autocorrelation

4.6. Selection of the appropriate model for hypothesis testing

The results presented in Table 7 indicate that, except for Model 1, which is estimated using pooled data, hypothesis testing for the remaining models should be conducted using panel data under the random effects specification.

Table 7. F-Limer and Hausman Test

Model	F-Limer Statistic	Significance	Result	Hausman Statistic	Significance	Result
Model 1	1.489	0.000	Pooled	1.740	0.835	Random Effects
Model 2	18.090	0.001	Pooled	1.394	0.824	Random Effects

4.7. Hypothesis testing in the research

This study tests two hypotheses using the random effects statistical model. Based on the diagnostic tests conducted on the data collected through library research methods, it was determined that the Generalized Least Squares (EGLS) regression model is the most appropriate approach for model estimation.

4.7.1. Testing the First Hypothesis of the Research

H1. Economic policy uncertainty negatively affects stock liquidity.

The results of testing the first hypothesis, presented in Table 8, indicate that the estimated coefficient for the economic uncertainty variable is –0.0915, suggesting a negative relationship between economic uncertainty and stock liquidity. This implies that stock liquidity decreases as economic uncertainty increases. The t-statistic for this variable is –4.2597, which exceeds the critical

value in absolute terms, confirming the statistical significance of the coefficient at the 5% level. Therefore, it can be concluded with 95% confidence that economic policy uncertainty has a significant negative impact on stock liquidity, supporting the first hypothesis. Among the control variables, investor sensitivity (coefficient = 1.4599), board independence (0.0756), sales growth (0.0349), and firm size (0.0901) all exhibit positive and statistically significant effects on stock liquidity, as their p-values are below the 0.05 threshold. In contrast, stock return volatility (–0.6014) and financial leverage (–0.1805) have significant negative effects on stock liquidity. Other control variables—including institutional ownership, government ownership, managerial ownership, firm age, and return on assets—do not have statistically significant effects on stock liquidity, as their p-values exceed 0.05.

Table 8. Testing the First Hypothesis of the Research

Variable	Symbol	Coefficient	Standard Error	t-Statistic	p-Value
Intercept	C	-0.051	0.004	-2.786	0.044
Economic Uncertainty	EPU	-0.091	0.017	-4.259	0.000
Investor Sentiment	SEN	1.459	0.074	5.486	0.000
Institutional Ownership	INS	-0.001	0.000	-0.918	0.358
Return Volatility	RVOL	-0.060	0.024	-7.375	0.000
Board Independence	INDBO	0.075	0.016	3.438	0.000
Government Ownership	MS	-0.000	0.000	-0.778	0.436
Managerial Ownership	MO	-0.000	0.000	-0.044	0.964
Sales Growth	SG	0.034	0.008	2.408	0.016
Firm Size	SIZE	0.090	0.006	3.175	0.000
Firm Age	AGE	0.000	0.000	0.085	0.993
Leverage	LEV	-0.180	0.079	-6.644	0.000
Return on Assets	ROA	0.001	0.000	1.335	0.150
R-squared: 0.619			Durbin-Watson Statistic: 1.930		
F-statistic: 66.713			F-statistic p-value: 0.000		

Table 9. Testing the second hypothesis of the research

Variable	Symbol	Coefficient	Standard Error	t-statistic	Probability
Intercept	C	-0.301	0.067	-4.343	0.000
Economic Uncertainty	EPU	-0.141	0.057	-2.190	0.041
Information Disclosure	DISCLO	0.073	0.002	2.996	0.015
Economic Uncertainty × Disclosure	EPUDIS	-0.091	0.004	-3.432	0.001
Investor Sensitivity	SEN	1.194	0.086	4.661	0.000
Institutional Ownership	INS	-0.001	0.001	-0.488	0.625
Stock Return Volatility	RVOL	-0.731	0.275	-6.702	0.000
Board Independence	INDBO	0.066	0.013	3.157	0.002
Government Ownership	MS	-0.000	0.000	-1.177	0.239
Managerial Ownership	MO	0.001	0.001	0.703	0.597
Sales Growth	SG	0.056	0.006	2.471	0.029
Firm Size	SIZE	1.225	0.0428	6.579	0.000
Firm Age	AGE	0.024	0.018	1.317	0.886
Leverage	LEV	-0.106	0.026	-5.652	0.000
Return on Assets	ROA	0.001	0.000	1.276	0.141
R-squared: 0.5831			Durbin-Watson Statistic: 1.97		
F-statistic: 22.6816			F-statistic p-value: 0.0000		

The results of the R-squared statistic for Model 1 indicate that the explanatory variables account for 61.9% of the variation in stock liquidity. The Durbin–Watson statistic equals 1.93, which is close to 2, suggesting that the residuals are approximately uncorrelated and randomly distributed—hence, there is no evidence of serial autocorrelation. Furthermore, the p-value of the F-statistic is 0.0000, which is below the 5% significance level. Therefore, the null hypothesis is rejected at the 95%

confidence level, confirming that the overall regression model is statistically significant.

4.7.2. Hypothesis testing for the second hypothesis

H2. The increase in information disclosure significantly moderates the negative relationship between economic policy uncertainty and stock liquidity.

According to Table 9, the estimation results for Model 2 reveal that economic policy uncertainty has a significant negative effect on stock liquidity, with a coefficient of –0.1411, a t-statistic of –2.1905, and a p-value of 0.0416. Information disclosure has a positive effect on stock liquidity, as evidenced by its coefficient of 0.0730 and a t-statistic of 2.9961, which exceeds the critical value at the 5% significance level. The interaction term Economic Uncertainty × Information Disclosure has a coefficient of –0.0913 and a t-statistic of –3.4329, both of which are significant at the 95% confidence level. This finding suggests that information disclosure mitigates the adverse impact of economic policy uncertainty on stock liquidity, resulting in a reduction of the negative coefficient from –0.1411 to –0.0913. Therefore, information disclosure serves as a moderating variable that weakens the negative relationship between economic policy uncertainty and stock liquidity, supporting the study's second hypothesis. Among the control variables, investor sensitivity (coefficient = 1.1948; t-statistic = 4.6615) and firm size (coefficient = 1.2254; t-statistic = 6.0579) exhibit the strongest positive influence on stock liquidity. Conversely, stock return volatility (coefficient = –0.7314; t-statistic = –6.7025) and financial leverage (coefficient = –0.1065; t-statistic = –5.6522) exert the strongest negative effects. Additionally, board independence and sales growth both have positive and statistically significant impacts on stock liquidity at the 5% level. The R-squared value (0.5831) indicates that the independent, moderating, and control variables collectively explain 58.31% of the variation in stock liquidity. The Durbin–Watson statistic (1.97) suggests that the residuals are approximately uncorrelated and randomly distributed, indicating no significant autocorrelation. Finally, the F-statistic (22.68) with a p-value of 0.0000 confirms that the estimated model is statistically significant overall.

5. Discussion and conclusion

Economic policy uncertainty exerts detrimental effects on the stock market, primarily through two transmission channels. The first channel involves the disruption of firms' business operations and market activity, as uncertainty shocks tend to destabilize macroeconomic conditions and private investment (Ahmadi et al., 2025). The second channel operates through investor expectations: heightened uncertainty intensifies market pessimism and amplifies perceived risks. The empirical findings confirm that economic policy uncertainty has a significant negative impact on stock liquidity. This relationship can be interpreted from several perspectives. Under uncertain economic conditions, managers may be reluctant to disclose investment or operational decisions, fearing they will trigger negative market reactions. Consequently, firms facing high uncertainty often delay or withhold information, thereby exacerbating the information asymmetry between insiders and investors. Increased information asymmetry hinders potential investors' ability to evaluate a firm's quality, leading to reduced trading activity and lower bid prices. As a result, stocks become less liquid, especially among firms with weak disclosure practices. Therefore, in uncertain policy environments, limited corporate transparency restricts the flow of information and contributes to thinner markets through the informational channel, ultimately reducing stock liquidity. These findings are consistent with Mbanyele (2023), who reported that higher economic policy uncertainty raises firms' cost of capital due to a greater risk premium demanded by investors. As uncertainty rises, investors' negative sentiment widens the bid–ask spread in compensation for elevated liquidity risk. Similarly, Zhang et al. (2023) found that higher levels of economic policy uncertainty are associated with lower stock

liquidity, particularly among firms operating in environments with ambiguous information, where investor attention and risk tolerance are reduced. Overall, uncertainty surrounding government economic policies fosters cautious trading behavior and diminished market participation, resulting in lower stock liquidity.

The findings of this study provide several important implications for different stakeholder groups. Corporate managers are encouraged to implement more transparent and consistent disclosure practices, particularly during periods of heightened economic policy uncertainty. Such practices can reduce information asymmetry, strengthen investor confidence, and ultimately enhance stock liquidity. Investors, on the other hand, should view the quality of firm-level disclosure as a strategic signal of resilience under uncertain conditions and adjust their portfolio allocations accordingly. Policymakers and regulators are advised to strengthen and enforce disclosure frameworks that ensure the timeliness, accuracy, and comprehensiveness of financial reporting. Moreover, improving the institutional environment and maintaining consistent macroeconomic communication can help mitigate the adverse effects of policy uncertainty on capital market performance. Future research could further refine these recommendations by examining industry-specific characteristics and behavioral responses among stakeholders, providing more tailored policy and managerial insights.

The results of the hypothesis tests demonstrate that increased information disclosure moderates the negative relationship between economic policy uncertainty and stock liquidity. Higher levels of policy uncertainty intensify information asymmetry in the capital market, thereby reducing the efficiency of securities trading. When economic policy uncertainty rises, ambiguity surrounding firm valuation increases, prompting traders to withdraw from the market and leading to lower liquidity. In such circumstances, enhanced information disclosure mitigates information asymmetry by providing market participants with more timely and reliable information. As investors gain access to higher-quality disclosures, they can better assess stock valuations, which narrows the bid–ask spread and consequently improves stock liquidity. Thus, the interaction between information disclosure and economic policy uncertainty enhances stock liquidity by facilitating informed trading and improving market transparency. Investors' aversion to uncertainty shocks can theoretically explain this finding. As uncertainty increases, investors' demand for accurate and comprehensive financial information intensifies. Consistent with Nagar et al. (2019), increased disclosure during periods of high policy uncertainty enables managers to respond to exogenous shocks by supplying more information to the market, thereby reducing both information asymmetry and investor uncertainty. Similarly, Wang et al. (2022) found that greater transparency improves the informational efficiency of stock prices, reduces ambiguity regarding intrinsic value, and encourages informed trading. Overall, in periods of heightened economic policy uncertainty, transparent firms are valued more highly by investors and tend to exhibit greater stock liquidity. This outcome arises because enhanced information disclosure reduces asymmetry among traders, increases trading willingness and efficiency, and lowers transaction costs—ultimately resulting in narrower bid–ask spreads and more liquid markets. Considering the demonstrated negative impact of economic policy uncertainty on stock liquidity, as evidenced in this and previous studies, effective governance mechanisms should aim to eliminate barriers to market liquidity by promoting transparency in decision-making, ensuring timely communication, and avoiding abrupt regulatory interventions. Given the adverse effect of policy uncertainty on information disclosure, it is plausible that, under conditions of elevated uncertainty, managers may attempt to portray the firm's financial position more favorably to reassure investors, analysts, creditors, and other external stakeholders. This behavior increases the risk of financial reporting manipulation and biased disclosure. Accordingly, market regulators should strengthen oversight mechanisms and require more comprehensive and timely disclosure from firms. It is also worth noting that the quality and availability of data used in such analyses may be limited. Measures

of policy uncertainty often contain noise or measurement error and may not fully capture all dimensions of the concept. Furthermore, the time period chosen for the study can influence the results, as specific political and economic events during the observed years may affect the relationships among the variables examined.

Moreover, the heightened potential for earnings management and manipulated disclosure during periods of elevated economic policy uncertainty warrants careful consideration. When managers intentionally withhold or distort financial information to present a more favorable image of the firm's performance, investors may be misled about the company's true risk profile and underlying value. Such practices compromise the integrity of capital markets, erode investor confidence, and heighten perceived investment risk. Over time, these distortions can lead to market inefficiencies, the misallocation of capital, and increased financing costs for firms due to higher uncertainty premiums demanded by investors. Accordingly, both regulators and investors must remain vigilant and emphasize the need for transparency, especially in volatile macroeconomic environments, to safeguard market credibility and ensure efficient capital allocation.

While this study provides empirical evidence on the moderating role of information disclosure in the relationship between economic policy uncertainty and stock liquidity, it does not account for several other key determinants of market liquidity. Factors such as aggregate market liquidity conditions, the stance of monetary policy, and the behavior of institutional investors may also influence stock liquidity—either directly or through their interaction with policy uncertainty. Future research is encouraged to integrate these broader macro-financial variables to develop a more comprehensive framework for understanding stock liquidity dynamics under uncertainty. Expanding the analytical scope in this direction could also yield more robust policy insights aimed at enhancing capital market resilience, particularly in emerging economies.

References

1. Ahmadi, Z., Salehi, M. and Rahmani, M. (2025). The relationship between economic complexity and green economy with earnings management. *Journal of Facilities Management*, 23(1), pp. 160-180. https://doi.org/10.1108/JFM-04-2023-0045
2. Akey, P. and Lewellen, S. (2017). Policy uncertainty, political capital, and firm risk-taking. *Political Capital, and Firm Risk-Taking*. University of Toronto, Toronto, Canada.
3. Ali, S., Liu, B. and Su, J. J. (2017). Corporate governance and stock liquidity dimensions: Panel evidence from pure order-driven Australian market. *International Review of Economics & Finance*, 50, pp. 275-304. https://doi.org/10.1016/j.iref.2017.03.005
4. Amihud, Y. (2018). Illiquidity and stock returns: a revisit. critical finance review, forthcoming. New York University, New York. *Available at SSRN*: https://ssrn.com/abstract=3257038
5. Arianpoor, A., Salehi, M. and Daroudi, F. (2023). Nonfinancial sustainability reporting, management legitimate authority and enterprise value. *Social Responsibility Journal*, 19(10), pp. 1900-1916. https://doi.org/10.1108/SRJ-09-2022-0374
6. Armstrong, C. S., Core, J. E., Taylor, D. J. and Verrecchia, R. E. (2011). When does information asymmetry affect the cost of capital?. *Journal of Accounting Research*, 49(1), pp. 1-40. https://doi.org/10.1111/j.1475-679X.2010.00391.x
7. Aslam, A. and Brooks, P. K. (2024). Emerging markets on the global stage. *Finance & Development*, 61(003), pp. 1-22.
8. Baker, M. and Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, 61(4), pp. 1645-1680. https://doi.org/10.1111/j.1540-6261.2006.00885.x
9. Baker, S. R., Bloom, N. and Davis, S. J. (2016). Measuring economic policy uncertainty. *The*

Quarterly Journal of Economics, 131(4), pp. 1593-1636. https://doi.org/10.1111/j.1540-6261.2006.00885.x

10. Balakrishnan, K., Core, J. E. and Verdi, R. S. (2014). The relation between reporting quality and financing and investment: Evidence from changes in financing capacity. *Journal of Accounting Research*, 52(1), pp. 1-36. https://doi.org/10.1111/1475-679X.12031
11. Bonaime, A., Gulen, H. and Ion, M. (2018). Does policy uncertainty affect mergers and acquisitions? *Journal of Financial Economics*, 129(3), pp. 531-558. https://doi.org/10.1016/j.jfineco.2018.05.007
12. Botosan, C. A. (1997). Disclosure level and the cost of equity capital. *Accounting Review*, 72(3), pp. 323-349.
13. Brunnermeier, M. K. and Pedersen, L. H. (2009). Market liquidity and funding liquidity. *The Review of Financial Studies*, 22(6), pp. 2201-2238. https://doi.org/10.1093/rfs/hhn098
14. Bushee, B. J. (1998). The influence of institutional investors on myopic R&D investment behavior. *Accounting Review*, 73(3), pp. 305-333.
15. Campbell, J. L., Chen, H., Dhaliwal, D. S., Lu, H. M. and Steele, L. B. (2014). The information content of mandatory risk factor disclosures in corporate filings. *Review of Accounting Studies*, 19(1), pp. 396-455. https://doi.org/10.1007/s11142-013-9258-3
16. Chen, S., Matsumoto, D. and Rajgopal, S. (2011). Is silence golden? an empirical analysis of firms that stop giving quarterly earnings guidance. *Journal of Accounting and Economics*, 51(1-2), pp. 134-150. https://doi.org/10.1016/j.jacceco.2010.10.006
17. Chen, X. and Chiang, T. C. (2020). Empirical investigation of changes in policy uncertainty on stock returns—evidence from China's market. *Research in International Business and Finance*, 53(1), 101183. https://doi.org/10.1016/j.ribaf.2020.101183
18. Cho, H. and Kim, R. (2021). Asymmetric effects of voluntary disclosure on stock liquidity: evidence from 8-K filings. *Accounting & Finance*, 61(1), pp. 803-846. https://doi.org/10.1111/acfi.12594
19. Chordia, T., Roll, R. and Subrahmanyam, A. (2008). Liquidity and market efficiency. *Journal of financial Economics*, 87(2), pp. 249-268. https://doi.org/10.1016/j.jfineco.2007.03.005
20. Dang, V. D. and Nguyen, K. Q. B. (2021). Monetary policy, bank leverage and liquidity. *International Journal of Managerial Finance*, 17(4), pp. 619-639. https://doi.org/10.1108/IJMF-06-2020-0284
21. Darabi, R. and Naseri Nasab, S. (2023). The role of information disclosure quality on the relationship between economic policy uncertainty and stock liquidity. *Accounting and Corporate Governance Researches*, 2(5), pp. 1-16 (In Persian) https://doi.org/10.71600/JACGR.2024.977451
22. Dash, S. R., Maitra, D., Debata, B. and Mahakud, J. (2021). Economic policy uncertainty and stock market liquidity: Evidence from G7 countries. *International Review of Finance*, 21(2), pp. 611-626. https://doi.org/10.1111/irfi.12277
23. Debata, B. and Mahakud, J. (2018). Economic policy uncertainty and stock market liquidity: does financial crisis make any difference?. *Journal of Financial Economic Policy*, 10(1), pp. 112-135. https://doi.org/10.1108/JFEP-09-2017-0088
24. Diamond, D. W. and Verrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. *The Journal of Finance*, 46(4), pp. 1325-1359. https://doi.org/10.1111/j.1540-6261.1991.tb04620.x
25. Dixit, A. K. and Pindyck, R. S. (1994). *Investment under uncertainty*. *Princeton University Press*. New Jersey, United States
26. Drechsler, I. (2013). Uncertainty, time-varying fear, and asset prices. *The Journal of Finance*,

68(5), pp. 1843-1889. https://doi.org/10.1111/jofi.12068
27. Duong, H. N., Krishnamurti, C., Nguyen, J. H., Nguyen, M. and Rhee, S. G. (2018). The impact of economic policy uncertainty on stock liquidity: cross-sectional effects and economic channels. Monash University, Melbourne, Australia. *Available at SSRN 3088922*. https://dx.doi.org/10.2139/ssrn.3088922
28. Ellul, A. and Panayides, M. (2018). Do financial analysts restrain insiders' informational advantage?. *Journal of Financial and Quantitative Analysis*, 53(1), pp. 203-241. https://doi.org/10.1017/S0022109017000990
29. Elshandidy, T. and Neri, L. (2015). Corporate governance, risk disclosure practices, and market liquidity: Comparative evidence from the UK and I taly. *Corporate Governance: An International Review*, 23(4), pp. 331-356. https://doi.org/10.1111/corg.12095
30. Fan, Y., Huang, Y., Jiang, Y. and Liu, F. H. (2020). Watch out for bailout: TARP and bank earnings management. *Journal of Financial Stability*, 51(1), 100785. https://doi.org/10.1016/j.jfs.2020.100785
31. Fu, H., Cai, J., Xia, S. and Zhou, L. (2025). Investor network attention, information disclosure quality, and stock liquidity in enterprises. *Finance Research Letters*, 79, 107246. https://doi.org/10.1016/j.frl.2025.107246
32. Ghosh, D. and Olsen, L. (2009). Environmental uncertainty and managers' use of discretionary accruals. *Accounting, Organizations and Society*, 34(2), pp. 188-205. https://doi.org/10.1016/j.aos.2008.07.001
33. Glosten, L. R. and Milgrom, P. R. (1985). Bid, ask and transaction prices in a specialist market with heterogeneously informed traders. *Journal of Financial Economics*, 14(1), pp. 71-100. https://doi.org/10.1016/0304-405X(85)90044-3
34. Goodell, J. W. (2020). COVID-19 and finance: agendas for future research. *Finance Research Letters*, 35, 101512. https://doi.org/10.1016/j.frl.2020.101512
35. Gulen, H. and Ion, M. (2016). Policy uncertainty and corporate investment. *The Review of Financial Studies*, 29(3), pp. 523-564. https://doi.org/10.1093/rfs/hhv050
36. Haddad, A. E., AlShattarat, W. K. and Nobanee, H. (2009). Voluntary disclosure and stock market liquidity: evidence from the Jordanian capital market. *International Journal of Accounting, Auditing and Performance Evaluation*, 5(3), pp. 285-309.
37. Hameed, A., Kang, W. and Viswanathan, S. (2010). Stock market declines and liquidity. *The Journal of Finance*, 65(1), pp. 257-293. https://doi.org/10.1111/j.1540-6261.2009.01529.x
38. Healy, P. M. and Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1-3), pp. 405-440. https://doi.org/10.1016/S0165-4101(01)00018-0
39. Jens, C. E. (2017). Political uncertainty and investment: causal evidence from US gubernatorial elections. *Journal of Financial Economics*, 124(3), pp. 563-579. https://doi.org/10.1016/j.jfineco.2016.01.034
40. Julio, B. and Yook, Y. (2012). Political uncertainty and corporate investment cycles. *The Journal of Finance*, 67(1), pp. 45-83. https://doi.org/10.1111/j.1540-6261.2011.01707.x
41. Kelly, B. and Ljungqvist, A. (2012). Testing asymmetric-information asset pricing models. *The Review of Financial Studies*, 25(5), pp. 1366-1413. https://doi.org/10.1093/rfs/hhr134
42. Khajavi, S., Weysihesar, S. and Nasirifar, H. (2022). Effect of shareholders' structure on stock liquidity with an emphasis on the role of financial constraints. *Financial Accounting Research*, 13(4), pp. 67-92. (In Persian). https://doi.org/10.22108/far.2022.133883.1892
43. Kim, K., Pandit, S. and Wasley, C. E. (2016). Macroeconomic uncertainty and management earnings forecasts. *Accounting Horizons*, 30(1), pp. 157-172. https://doi.org/10.2308/acch-51311

44. Kubick, T. R., Lynch, D. P., Mayberry, M. A. and Omer, T. C. (2015). Product market power and tax avoidance: Market leaders, mimicking strategies, and stock returns. *The Accounting Review*, 90(2), pp. 675-702. https://doi.org/10.2308/accr-50883
45. Lambert, R., Leuz, C. and Verrecchia, R. E. (2007). Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research*, 45(2), pp. 385-420. https://doi.org/10.1111/j.1475-679X.2007.00238.x
46. Lang, M. and Maffett, M. (2011). Economic effects of transparency in international equity markets: A review and suggestions for future research. *Foundations and Trends® in Accounting*, 5(3), pp. 175-241. http://dx.doi.org/10.1561/1400000016
47. Lang, M., Lins, K. V. and Maffett, M. (2012). Transparency, liquidity, and valuation: International evidence on when transparency matters most. *Journal of Accounting Research*, 50(3), pp. 729-774. https://doi.org/10.1111/j.1475-679X.2012.00442.x
48. Leuz, C. and Verrecchia, R. E. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research*, 38(2), pp. 91-124. https://doi.org/10.2307/2672910
49. Li, K., Xia, B., Chen, Y., Ding, N. and Wang, J. (2021). Environmental uncertainty, financing constraints and corporate investment: Evidence from China. *Pacific-Basin Finance Journal*, 70(1), pp. 101665. https://doi.org/10.1016/j.pacfin.2021.101665
50. Loni, S., Abbasian, E. and Haji, G. (2021). The effect of economic policy uncertainty on corporate investment: evidence from companies listed on the Tehran Stock Exchange. *Financial Research Journal*, 23(2), pp. 249-268 (In Persian). https://doi.org/10.22059/frj.2021.310437.1007069
51. Luo, Y. and Zhang, C. (2020). Economic policy uncertainty and stock price crash risk. *Research in International Business and Finance*, 51(1), 101112. https://doi.org/10.1016/j.ribaf.2019.101112
52. Mbanyele, W. (2023). Economic policy uncertainty and stock liquidity: the role of board networks in an emerging market. *International Journal of Emerging Markets*, 18(1), pp. 122-147. https://doi.org/10.1108/IJOEM-05-2020-0492
53. Md Zaini, S., Samkin, G., Sharma, U. and Davey, H. (2018). Voluntary disclosure in emerging countries: a literature review. *Journal of Accounting in Emerging Economies*, 8(1), pp. 29-65. https://doi.org/10.1108/JAEE-08-2016-0069
54. Merton, R. C. (1987). *A simple model of capital market equilibrium with incomplete information*. Working Paper, New Orleans, Louisiana
55. Moradi, B., Bahri Sales, J., Jabbarzadeh Kangarlooi, S. and Ashtab, A. (2022). Explaining and proposing a market liquidity prediction model in Tehran Stock Exchange. *Financial Research Journal*, 24(1), pp. 134-156 (In Persian) https://doi.org/10.22059/frj.2021.323611.1007184
56. Mousavi, M., Zimon, G., Salehi, M. and Stępnicka, N. (2022). The effect of corporate governance structure on fraud and money laundering. *Risks*, 10(9). https://doi.org/10.3390/risks10090176
57. Muzaffar, Z. and Malik, I. R. (2024). Market liquidity and volatility: does economic policy uncertainty matter? evidence from Asian emerging economies. *Plos one*, 19(6), e0301597. https://doi.org/10.1371/journal.pone.0301597
58. Nagar, V., Schoenfeld, J. and Wellman, L. (2019). The effect of economic policy uncertainty on investor information asymmetry and management disclosures. *Journal of Accounting and Economics*, 67(1), pp. 36-57. https://doi.org/10.1016/j.jacceco.2018.08.011
59. Nguyen, C. P., Le, T. H. and Su, T. D. (2020). Economic policy uncertainty and credit growth: Evidence from a global sample. *Research in International Business and Finance*, 51(1), 101118. https://doi.org/10.1016/j.ribaf.2019.101118
60. Pastor, L. and Veronesi, P. (2012). Uncertainty about government policy and stock prices. *The*

journal of Finance, 67(4), pp. 1219-1264. https://doi.org/10.1111/j.1540-6261.2012.01746.x
61. Phan, D. H. B., Iyke, B. N., Sharma, S. S. and Affandi, Y. (2021). Economic policy uncertainty and financial stability–Is there a relation? *Economic Modelling*, 94, pp. 1018-1029. https://doi.org/10.1016/j.econmod.2020.02.042
62. Prommin, P., Jumreornvong, S. and Jiraporn, P. (2014). The effect of corporate governance on stock liquidity: The case of Thailand. *International Review of Economics & Finance*, 32, pp. 132-142. https://doi.org/10.1016/j.iref.2014.01.011
63. Qian, B., Tan, Y., Power, G. and Mandal, A. (2025). Economic policy uncertainty, information production, and transparency. *International Review of Financial Analysis*, 103, 104203. https://doi.org/10.1016/j.irfa.2025.104203
64. Riedl, E. J., Sun, E. Y. and Wang, G. (2021). Sentiment, loss firms, and investor expectations of future earnings. *Contemporary Accounting Research*, 38(1), pp. 518-544. https://doi.org/10.1111/1911-3846.12618
65. Rogers, J. L., Skinner, D. J. and Van Buskirk, A. (2009). Earnings guidance and market uncertainty. *Journal of Accounting and Economics*, 48(1), pp. 90-109. https://doi.org/10.1016/j.jacceco.2009.07.001
66. Ryan, K.F. and Giles, D.E.A. (1999). Testing for unit roots in economic time-series with missing observations. *Advances in Econometrics*, Vol. 13, pp. 203-242. https://doi.org/10.1108/S0731-9053(1999)0000013010
67. Salehi, M., Ammar Ajel, R. and Zimon, G. (2023). The relationship between corporate governance and financial reporting transparency. *Journal of Financial Reporting and Accounting*, 21(5), pp. 1049-1072. https://doi.org/10.1108/JFRA-04-2021-0102
68. Schoenfeld, J. (2017). The effect of voluntary disclosure on stock liquidity: new evidence from index funds. *Journal of Accounting and Economics*, 63(1), pp. 51-74. https://doi.org/10.1016/j.jacceco.2016.10.007
69. Setayesh, M. H., Kazemnejad, M. and Zolfaghari, M. (2011). Investigating the effects of disclosure quality on stock liquidity and cost of capital of the companies listed in Tehran Stock Exchange. *Financial Accounting Research*, 3(3), pp. 55-74 (In Persian) https://far.ui.ac.ir/article_16921.html
70. Shirmardi, S. N., Sameti, M. and Sharifi Renan, H. (2024). The role of financial uncertainty shocks, Fama French five factor model and momentum in the capital market and its effects on stock returns. *Financial Accounting and Auditing Research*, 16(61), pp. 1-50 (In Persian) https://doi.org/10.30495/faar.2024.709442
71. Taheri Bazkhaneh, S. and Sadrara, M. (2025). Economic policy uncertainty and stock market returns in Iran: New Evidence Based on Wavelet Transform and Time-Frequency Analysis. *Economic Policies and Research*, 3(4), pp. 1-30. (In Persian) https://doi.org/10.22034/jepr.2024.142461.1201
72. Tran, P., Tam, P. H. and Hong, T. P. (2024). Causality between economic policy uncertainty, economic growth and stock liquidity: Evidence from ASEAN markets. *WSB Journal of Business and Finance*, 58(1), pp. 133-150. http://dx.doi.org/10.2478/wsbjbf-2024-0013
73. Verrecchia, R. E. (1980). The rapidity of price adjustments to information. *Journal of Accounting and Economics*, 2(1), pp. 63-92. https://doi.org/10.1016/0165-4101(80)90015-4
74. Wagdi, O. (2025). The impact of economic policy uncertainty on stock price crash risk with information asymmetry as a moderating variable: evidence from Egyptian Exchange. *MSA-Management Sciences Journal*, 4(1), pp. 1-44. https://dx.doi.org/10.21608/msamsj.2024.317379.1076
75. Wang, F., Mbanyele, W. and Muchenje, L. (2022). Economic policy uncertainty and stock

liquidity: the mitigating effect of information disclosure. *Research in International Business and Finance*, 59, 101553. https://doi.org/10.1016/j.ribaf.2021.101553

76. Yang, Z., Yu, Y., Zhang, Y. and Zhou, S. (2019). Policy uncertainty exposure and market value: Evidence from China. *Pacific-Basin Finance Journal*, 57(1), 101178. https://doi.org/10.1016/j.pacfin.2019.101178
77. Zahedi, J., Salehi, M. and Moradi, M. (2023). Identifying and classifying the financial resilience measurement indices using intuitive fuzzy DEMATEL. *Benchmarking: An International Journal*, 30(4), pp. 1300-1321. https://doi.org/10.1108/BIJ-07-2021-0395
78. Zhang, L., Chen, W. and Hu, N. (2023). Economic policy uncertainty and stock liquidity: evidence from China. *International Journal of Emerging Markets*, 18(1), pp. 22-44. https://doi.org/10.1108/IJOEM-06-2020-0625

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Analysis of Indexed Scientific Productions Related to the Subject Area of Investor Sentiment in Web Of Science Database and Construction of A Scientific Map

Mohammad Javad Zare Bahnamiri *, Reza Roumiani Kar, Mohammadreza Nasiri

Department of Accounting, Faculty of Economic Sciences and Administration, Qom University, Qom, Iran

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Abstract

This study provides an in-depth analysis of the development and intellectual structure of investor sentiment, a field that has emerged as a central topic in behavioral finance. Given its broad influence on financial and economic variables, identifying key research trends, intellectual contributions, and emerging themes is essential. A systematic search of the Web of Science (WoS) database was conducted in March 2025 using selected keywords, yielding 4,546 relevant publications. Due to the 500-record-per-batch export limit, the data were downloaded in multiple batches in Plain Text format and analyzed using the Bibliometrix package in R. The results indicate substantial growth in research on investor sentiment since the early 2000s. The keyword "investor sentiment" appeared 1,147 times across the dataset. The *International Review of Financial Analysis* leads the field with 158 related publications. Moreover, China and extensive international collaborations have played a significant role in shaping the intellectual landscape of this domain. Overall, investor sentiment is a dynamic, rapidly evolving area of behavioral finance that continues to attract growing global academic attention.

Keywords:
Behavioral Finance, Investor Sentiment, Scientometrics

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*Corresponding Author:
Mohammad Javad Zare Bahnamiri
Email: Mj.zare@qom.ac.ir
Tel: 09111179607
ORCID: 0000-0003-3992-8810

1. Introduction

Over the past few decades, financial theories have evolved along two distinct perspectives (Hosseini & Morshedi, 2019). The first perspective, rooted in the neoclassical approach, emerged from the Capital Asset Pricing Model (CAPM) and the Efficient Market Hypothesis (EMH) in the 1960s, followed by the Arbitrage Pricing Theory (APT) in the 1970s (Borji Dolatabad, 2008). This view assumes that investors are rational and that their demand for risky assets is determined solely by fundamental information. Consequently, the trades of irrational investors do not, on average, generate significant pricing errors (Kim & Ha, 2010; Liston & Huerta, 2012). However, over time, numerous studies have shown that the EMH cannot adequately explain specific market movements and anomalies. This led to a behavioral revolution in financial theory (Borji Dolatabad, 2008). The second perspective—behavioral finance—emphasizes the influence of emotions, personality traits, and cognitive judgments on investment decisions. It demonstrates that investors' emotional and psychological biases play a crucial role in price formation, suggesting that some price changes in securities are not driven by fundamental factors (Hosseini & Morshedi, 2019). Behavioral finance has attracted increasing scholarly attention in recent years. The nature of decision-making and the factors influencing investors' choices during the investment process are critical. Contemporary financial research emphasizes investors' psychological characteristics and overall market psychology. Consequently, the focus of financial studies has gradually shifted from purely econometric analyses of prices and returns toward understanding human behavior and cognition, thereby challenging traditional rational frameworks (Rahnamay Roodposhti & Yazdani, 2010; Hosseini & Morshedi, 2019). Behavioral finance investigates how psychological mechanisms influence financial decision-making (Ángeles López-Cabarcos et al., 2020; Taghavi et al., 2023). The impact of emotions on individuals' decisions, judgments, and assessments of future events is well established in psychology (Taghavi et al., 2023). Within this context, investor sentiment represents a key subfield of behavioral finance that examines how investors' emotions affect stock market dynamics (Ángeles López-Cabarcos et al., 2020). It is generally argued that individuals tend to make more optimistic decisions when experiencing positive emotions than when experiencing negative ones. Accordingly, investors' emotional biases reflect varying degrees of optimism and pessimism toward specific stocks (Taghavi et al., 2023). In recent years, investor sentiment has garnered growing academic attention, with researchers approaching the topic from diverse perspectives. Science and technology are recognized as the primary drivers of economic development and societal progress. Consequently, national and international institutions continuously evaluate scientific advancement using various analytical methodologies. Over time, these assessments have evolved into established disciplines such as bibliometrics, webometrics, informetrics, and scientometrics. Scientometrics serves as a fundamental approach for evaluating scientific activities and measuring the advancement of knowledge. Originating in the former USSR, it later gained prominence in Eastern European countries—particularly Hungary—as a means of assessing scientific progress at individual, institutional, national, and international levels. Dobrov and Karennoi were among the first scholars to introduce the term scientometrics, defining it as the quantitative study of the processes underlying scientific information (Sengupta, 1992). Scientometric studies provide valuable insights for researchers and policymakers by mapping the flow of scientific production, dissemination, and utilization, thereby supporting informed decision-making (Mansourian, 2010; Nobakht & Nobakht, 2023).

Although the number of studies on investor sentiment has been steadily increasing, no scientometric research has yet been conducted in Iran to examine the knowledge structure, scientific growth trends, or research collaborations in this field. This absence highlights a significant gap in the existing body of literature. Moreover, a significant challenge is the lack of clear identification of the

most influential authors, countries, institutions, and journals in this domain. Such limitations can impede scientific synergy, international collaboration, and the strategic direction of future research. For instance, co-citation analysis is one of the most widely used techniques for evaluating scientific output and mapping the intellectual structure of a research field (Ebadollah Amoughin et al., 2019). Hart (2000) also emphasized that scientific collaboration contributes to higher-quality publications. Furthermore, without keyword network analysis and conceptual mapping, identifying emerging topics and research trends becomes challenging. Co-word analysis, by quantifying the frequency and co-occurrence of terms, reveals the most prominent themes within a given field (Ebadollah Amoughin et al., 2019). Given the growing importance of investor sentiment in financial and behavioral research, and its critical role in both emerging and developed markets, a scientometric investigation of this area can provide researchers, policymakers, and practitioners with a comprehensive understanding of knowledge development, historical trends, and future opportunities. This underscores the necessity and relevance of conducting the present study, which, to the best of our knowledge, is the first scientometric analysis in Iran to explore the intellectual structure of investor sentiment research.

Given these developments, investor sentiment has emerged as a vital and rapidly evolving field within behavioral finance, influencing research across a wide range of domains. Therefore, a deeper examination of its intellectual foundations and knowledge structure is essential. Accordingly, this study seeks to address the following key research questions: What is the growth trajectory of scientific publications on investor sentiment? Which articles, authors, countries, journals, and universities have been the most influential in shaping this field? What insights can be derived from the co-occurrence network of keywords? What are the emerging research themes and future directions in investor sentiment studies?

2. Theoretical background and literature review

The growing influence of scientometric research on science and technology policymaking is a key driver of this field's expansion (Nobakht, 2020). Scientometric studies play several critical roles in advancing science. The first role involves formulating scientific and research policies and strategies. These studies enable research managers at various levels to gain a comprehensive understanding of the flow of scientific production and, based on that understanding, to develop more effective research plans. The second role concerns the analysis of scientific communication and citation networks. Citation analysis is based on the concept of citation, in which each reference within a scientific publication serves as a link connecting the study to prior research, thereby reflecting its intellectual lineage. The third major role of scientometric research is the quantitative and qualitative evaluation of scientific resources and publications across various fields. This evaluation provides a reliable basis for assessing the accuracy, validity, and credibility of research findings. The fourth role pertains to the measurement and estimation of scientific output, efficiency, and impact. Scientific output is a quantitative measure of the research productivity of individuals, institutions, or countries, independent of other influencing factors (Mansourian, 2010). Collectively, these scientometric functions provide a foundation for strategic planning in large-scale research and policy development (Nobakht & Nobakht, 2022). Meanwhile, behavioral finance examines investors' decision-making from a psychological perspective (Ángeles López-Cabarcos et al., 2020; Taghavi et al., 2023), emphasizing that investors' emotions and mental states significantly influence their financial judgments and choices (Lucey & Dowling, 2005; Blajer-Gołębiewska et al., 2018). Emotions and rationality are fundamental factors influencing investors' decision-making, with individuals often tending toward either emotional or rational choices. The shift from rational to emotional (optimistic or pessimistic) decision-making—commonly referred to as emotional bias—drives emotion-based

investment behavior (Taghavi et al., 2023). Investor emotions have been defined in various ways: as speculative bias or excessive optimism/pessimism (Brown & Cliff, 2004); as general optimism or pessimism toward the stock market (Baker & Wurgler, 2006); as the degree of optimism or pessimism among shareholders regarding a specific stock (Kim & Ha, 2010); and as investors' expectations concerning future cash flows and related risks (Taghavi et al., 2023; Shahab Lavasani et al., 2023). Investor emotions may also stem from trading behavior and irrational beliefs, leading to market overreactions, heightened volatility, and mispricing (Kamath et al., 2022). According to the market personality view within the behavioral finance framework, investors are not perfectly rational but rather "normal," exhibiting systematic biases in their beliefs that cause them to trade based on non-fundamental information—essentially, emotions (Zouaoui et al., 2011). Numerous theoretical and empirical studies have sought to measure investor emotions, with several proposing models that describe the relationship between investor sentiment and asset prices (Black, 1986; De Long et al., 1990). These models categorize investors into two main groups: informed (rational) traders and uninformed (irrational) traders. Informed investors rationally assess asset values based on available information, whereas waves of irrational optimism or pessimism influence noise traders. While rational investors, unaffected by emotional biases, evaluate securities based on their intrinsic value, excessive sentiment among noise traders often leads to persistent mispricing. Within these frameworks, informed and noise traders compete in the marketplace. Informed investors—who aim to align prices with the rational present value of expected future cash flows—face abnormal trading costs and random emotional shocks originating from noise traders. These frictions prevent them from fully arbitrage away the mispricing generated by sentiment-driven traders. Consequently, as long as emotions continue to affect valuation, opposing prevailing market sentiment remains both costly and risky. Mispricing, therefore, can be attributed to the interaction between fluctuations in noise traders' emotions and constraints on arbitrage (Zouaoui et al., 2011). Empirical studies have also sought to quantify investor sentiment (Lee et al., 1991; Brown & Cliff, 2004). These studies classify sentiment indicators into two categories: direct and indirect measures. Direct measures rely on survey-based data to capture investors' attitudes and expectations, whereas indirect measures use observable market variables correlated with investor sentiment. The findings reveal that emotional biases significantly influence individual investors, and that sentiment indicators enhance the explanatory power of traditional asset-pricing models—particularly for stocks that are more difficult to value or arbitrage (Zouaoui et al., 2011). Based on prior empirical studies, sentiment measurement approaches can be broadly classified into three categories. The first category includes survey-based measures that directly capture market sentiment and behavioral tendencies. One of the most widely recognized indices in this group is the Michigan Consumer Sentiment Index (MCSI). The second category comprises indirect measures that utilize financial market data to infer investor sentiment and behavioral patterns. Examples include the buy–sell imbalance and Barron's Confidence Index. The third category integrates multiple approaches, with the composite sentiment index developed by Baker and Wurgler (2006) among the most prominent measures in this class (Asghari et al., 2020; Taghavi et al., 2023). In recent years, a new sentiment measure—microblogging sentiment—has gained considerable attention. This approach leverages data from online communication platforms (Ángeles López-Cabarcos et al., 2020). Several studies have analyzed investor sentiment extracted from social media platforms such as Twitter (Sprenger et al., 2014; Zhang et al., 2016), StockTwits (Piñeiro- Chousa et al., 2017; Renault, 2017), Facebook (Siganos et al., 2017), Yahoo Finance message boards (Kim & Kim, 2014), and even Google search trends (Da et al., 2011). As previously discussed, investor emotions arise from psychological biases that cause individuals to deviate from rational decision-making. However, such irrational behavior is not permanent in financial markets and tends to become more evident when emotions intensify. Investor sentiment and emotional trends

influence numerous aspects of financial behavior, including stock prices (Shekarkhah & Hazrati, 2018), trading dynamics (Hosseini & Morshedi, 2019), stock price crash risk (Assadi & Morshedi, 2019), market liquidity (Asghari et al., 2020), the value relevance of accounting information (Hasanzadeh Diva & Blue, 2021), audit quality (NikKar et al., 2022), financial decisions, stock returns, and economic volatility (Mohamadi et al., 2022). Investor sentiment also interacts with contextual factors such as corporate governance (Hashemi & Moshashaei, 2018), historical events (Mohammadzadeh et al., 2020), religious periods (Mohammadzadeh et al., 2022), and macroeconomic variables (Khedri Gharibvand & Sinaei, 2023). Collectively, these empirical findings demonstrate that investor sentiment represents a dynamic and expanding domain within behavioral finance—one that influences multiple facets of financial decision-making and market behavior. Therefore, conducting a deeper analysis of its theoretical foundations and intellectual structure remains essential.

For the literature review of this study, a systematic search was conducted in the Web of Science (WoS) database using the following keywords: Investor Sentiment, Investors Sentiment, Investor Sentiments, Investors' Emotional Behavior, Investors' Emotional Tendencies, Investor Sentiment Index, Investor Sentiment Measure, Measuring Investor Sentiment, Market Sentiment, and Market Sentiment Index. The retrieved records were reviewed to identify relevant studies and research patterns within the field. Based on this review, no prior scientometric or bibliometric research has been conducted in Iran that focuses explicitly on investor sentiment. This indicates a notable gap in the existing literature. The following section presents a selection of studies that, while not directly examining investor sentiment in the Iranian context, are conceptually or methodologically related to the present research.

Shayan Majd (2013), in a study titled "*Study of Research Trends in Scientometrics in Iran and Examination of the Scientific Behavior Patterns of Researchers in this Field*," analyzed the citation patterns of Persian-language articles in scientometrics to identify the scientific behavior of Iranian researchers in utilizing scholarly resources. The study examined articles published between 2009 and 2013 in the field of scientometrics, retrieved from the Normags, Magiran, Civilica, Ensani, and SID databases. The results indicated that, out of 156 analyzed articles, 3,045 citations were extracted, averaging 19.5 citations per article. The language distribution showed that 68% of the citations were from Latin sources, while 37% were from 2010, reflecting the growing attention of Iranian organizations and researchers to this research domain.

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Nobakht (2018), in a study titled "Scientometric Study of Behavioral Accounting Research in Iran," conducted a scientometric analysis of behavioral accounting publications in Iran from the inception of academic accounting journals up to early 2018 using content analysis. Data were collected using a checklist and analyzed in Excel. The findings revealed that 225 articles in this field were published during the study period, involving 531 contributing authors. Among these authors, 33.9% were assistant professors and 30.5% were senior experts. Approximately 7% of the articles were single-authored, while 93% were collaborative. Among universities and research institutions,

the Islamic Azad University (Science and Research Branch) ranked first with 39 publications, followed by Allameh Tabataba'i University with 19. In terms of subject orientation, more than 30% of the published works focused on financial accounting, followed by auditing (27.1%) and management accounting (13.8%). Of the 6,156 cited sources, about 70% were in English and 30% in Persian.

Nobakht (2020), in a study titled "Scientometric Study of Scientific Production of the Journal of Accounting and Auditing Review" conducted a scientometric analysis of the scientific productions in the Accounting and Auditing Review Quarterly of the University of Tehran, the oldest scientific journal in the field of accounting knowledge in Iran, from its inception (1992) to the end of 2019. The results indicate that 563 articles were published during these years, involving 1222 authors, of whom 1039 were men and 183 were women. 8% of the articles were single-authored, and 92% were group work. In terms of educational level and academic rank, assistant professors (41%) and associate professors (16%) were the leading authors. Among universities and educational institutions, the University of Tehran ranked first with 114 articles, followed by Shiraz University with 34. In terms of subject orientation, 72% of the published works were in financial accounting, followed by auditing (13%). Out of 12698 sources cited in the articles, 74% were in English and 26% in Persian.

Ángeles López-Cabarcos et al. (2020), in a study titled "*Investor Sentiment in the Theoretical Field of Behavioural Finance*," analyzed 709 studies on investor sentiment published between 1987 and 2017, using data retrieved from the Web of Science database. The authors employed co-citation, bibliographic coupling, and keyword co-occurrence analyses to map the intellectual structure of the investor sentiment field. The results revealed that investor sentiment is closely associated with the Efficient Market Hypothesis and behavioral finance theories. Moreover, the findings indicated that investor sentiment has evolved into a significant research area within behavioral finance, particularly since 2014. The authors further suggested that advancements in computer science and the application of theories derived from physics and mathematics could enhance the understanding of investor sentiment's impact on stock markets.

Kamath et al. (2022), in a study titled "*An Overview of Investor Sentiment: Identifying Themes, Trends, and Future Directions through Bibliometric Analysis*," conducted a comprehensive bibliometric review of all publications in the field of investor sentiment. A total of 1,919 articles published in the Scopus database between 1979 and 2022 were analyzed. The review identified key themes, influential authors, seminal studies, frequently explored topics, and the top contributing countries and institutions. The findings revealed that research on investor sentiment has grown exponentially, with an average annual growth rate of 15.88%. In 2020, the year with the highest scientific output, 252 publications were published, representing 13.68% of the total. The United States and China were found to be the leading contributors in terms of research volume and author productivity. Moreover, the analysis showed that the dominant research themes include market efficiency, asset pricing, stock returns, sentiment analysis, IPO underpricing, overreaction, and volatility. At the same time, COVID-19 and Bitcoin have recently emerged as new areas of focus.

Dianati Deilami et al. (2023) conducted a scientometric analysis of the scientific output of Iranian accounting faculty members, indexed in Scopus, between 2006 and 2021. Using tools such as Excel, VOSviewer, and the R programming language, they examined collaboration networks among authors, universities, countries, and key terms. The results showed that collaboration among Iranian authors was relatively weak, whereas universities exhibited stronger inter-institutional collaboration. However, international collaboration remained limited. Despite the relatively small number of accounting publications from Iran indexed in Scopus, the overall publication trend has been increasing. Additionally, "corporate governance" was identified as the most frequently studied topic in this field.

Ghannad (2023), in a study titled "Analysis of Scientific Collaboration Networks and Visualization of Audit Fee Research in Iran," analyzed collaboration networks and mapped the scientific landscape of articles on independent audit fees published in journals accredited by Iran's Ministry of Science, Research, and Technology. The findings revealed a sharp rise in audit fee research between 2019 and 2021, during which 108 articles—representing 44% of the total—were published. The Professional Auditing Research journal had the highest concentration of publications in this area, accounting for 23% of related studies. The study also identified inconsistencies in terminology and Persian usage, reporting 49 different lexical and semantic equivalents for the term "audit fee," underscoring the need for standardization across academic journals and research outputs. Co-word analysis revealed a total of 998 distinct keywords, with "audit fee" appearing most frequently (193 occurrences), followed by "audit quality" (34), "audit risk" (21), and "abnormal audit fee" (21). Moreover, "audit quality" and "audit risk" exhibited the strongest co-occurrence with "audit fee," appearing together 24 and 20 times, respectively. The co-authorship analysis identified 643 co-authorship instances in audit-fee-related articles. Among the most prolific contributors were Seyed Ali Vaezz and Vali Khodadadi, with 11 and 10 articles, respectively. Shahid Chamran University of Ahvaz and Ferdowsi University of Mashhad recorded the highest institutional participation, with 68 and 44 affiliations, respectively, positioning them as key research centers in this field. The most frequent co-authorship was between Mostafa Abdi and Mehdi Kazemi-Oloom, who collaborated on five publications.

Zhang et al. (2023), in a study titled "*A Comparative Scientometric Analysis of Investor Sentiment and Trading Behavior Research*," conducted a comparative scientometric assessment of two related domains: investor sentiment and trading behavior. The study analyzed 1,955 articles on investor sentiment, 719 on trading behavior, and 64 that addressed both topics, all indexed in the Science Citation Index Expanded (SCIE) and Social Sciences Citation Index (SSCI) of the Web of Science Core Collection from 1900 to 2022. The analysis revealed that publications on investor sentiment have grown exponentially, whereas research activity in trading behavior has declined in recent years. Despite its relatively late emergence, investor sentiment research has attracted greater scholarly attention and produced a higher volume of publications. The United States and China were identified as the leading contributors in both research areas. Furthermore, the two fields exhibit a convergence trend, with several emerging research hotspots in common, including COVID-19, Bitcoin, and machine learning.

Arabmazar Yazdi and Joudaki Chegeni (2024), in a bibliometric analysis aimed at mapping the intellectual structure and bibliographic relationships within the field of social responsibility accounting, found that this area had received limited attention before 2013. However, since then, research activity has exhibited a steady upward trend, reflecting the growing importance of the topic. The study identified nine thematic clusters, with "social responsibility accounting" positioned at the core. Closely related clusters included sustainable development, sustainability reporting, decision-making, environmental, social, and governance (ESG) accounting, ESG measurement, green accounting, and the measurement of social responsibility. The United States led the field in publication volume with 271 documents, while the Bucharest University of Economic Studies in Romania ranked first among institutions with 16 publications. The field of Business, Management, and Accounting accounted for 31.8% of all studies, and among individual researchers, Cho was the most prolific, with nine publications.

Eskorouchi et al. (2024), in a study titled "Exploring the Evolution of Robust Portfolio Optimization: A Scientometric Analysis," conducted a systematic scientometric review of research developments in the field of robust portfolio optimization (RPO). Using scientometric techniques and visual mapping tools, the authors analyzed 1,085 articles published between 2000 and 2023 to identify

significant trends, conceptual advancements, and scientific linkages among articles, authors, countries, sources, and keywords. The findings revealed that RPO has attracted growing academic attention in recent years, in response to uncertainties in asset returns and covariances within financial markets. The study provides valuable insights to guide future research and assist investors in making informed decisions under conditions of risk and uncertainty.

Luong et al. (2024), in a study titled "*The Development of Research on Investor Sentiment in Emerging and Frontier Markets with the Bibliometric Method*," examined the evolution of investor sentiment research in emerging and frontier markets. Using bibliometric techniques, they analyzed 508 studies published between 1999 and 2020 and indexed in the Scopus database. The findings indicate that publications on investor sentiment in these markets have shown steady growth throughout the 21st century. Herding behavior emerged as the most prominent research theme in this field. In subsequent years, topics such as return predictability, fundamental component analysis, investor attention, and asymmetric effects of economic policy uncertainty have become dominant themes shaping the development of investor sentiment research in emerging and frontier markets.

The review of prior research indicates that recent studies in this area have predominantly employed a common analytical framework. Within this framework, publications are typically classified according to several bibliometric indicators, including the contributions of each academic rank and institution, the most-cited articles, influential authors, keyword co-occurrence networks, research collaboration patterns, thematic trends, citation languages, leading journals, contributing countries, and gender participation ratios. This study adopts a similar approach in analyzing the content of relevant articles. Based on the preceding discussion, the research seeks to address the following questions:

1. What is the growth trajectory of scientific publications on investor sentiment?
2. Which articles, authors, countries, journals, and universities have been most influential in this field?
3. What insights can be drawn from the keyword co-occurrence network?
4. What are the emerging themes in investor sentiment research?

3. Research methodology

This study is applied in nature and aims to support researchers interested in the field of investor sentiment by identifying research gaps and highlighting emerging and trending topics. These insights can help scholars design future studies that build upon current developments in the field. In addition, this research can serve as a valuable reference for students of accounting and finance conducting studies on investor sentiment. By familiarizing themselves with the most highly cited and influential articles, they can strengthen the literature review sections of their work. Furthermore, a clearer understanding of the key concepts and keywords associated with investor sentiment will enable them to identify new and relevant publications that can enrich the theoretical foundations of their research.

Figure 1 presents the two main stages of this research: Identification and Analysis, each comprising several subcomponents. These stages were conducted sequentially to address the research questions.

In the first stage, keywords related to investor sentiment were identified from reputable academic sources. These keywords were then searched in the Web of Science (WoS) database for the period 1987–2025, yielding 4,546 relevant publications. Due to the database limitation allowing only 500 records per export, the results were retrieved in multiple batches in Plain Text (Full Record and Cited References) format and subsequently merged. The combined dataset was imported into the

Bibliometrix package in R. In RStudio, the package was run, and the merged file was uploaded for analysis. The research questions were addressed sequentially through functions and tools provided by the Bibliometrix package. The detailed search strategy is presented in Table 1.

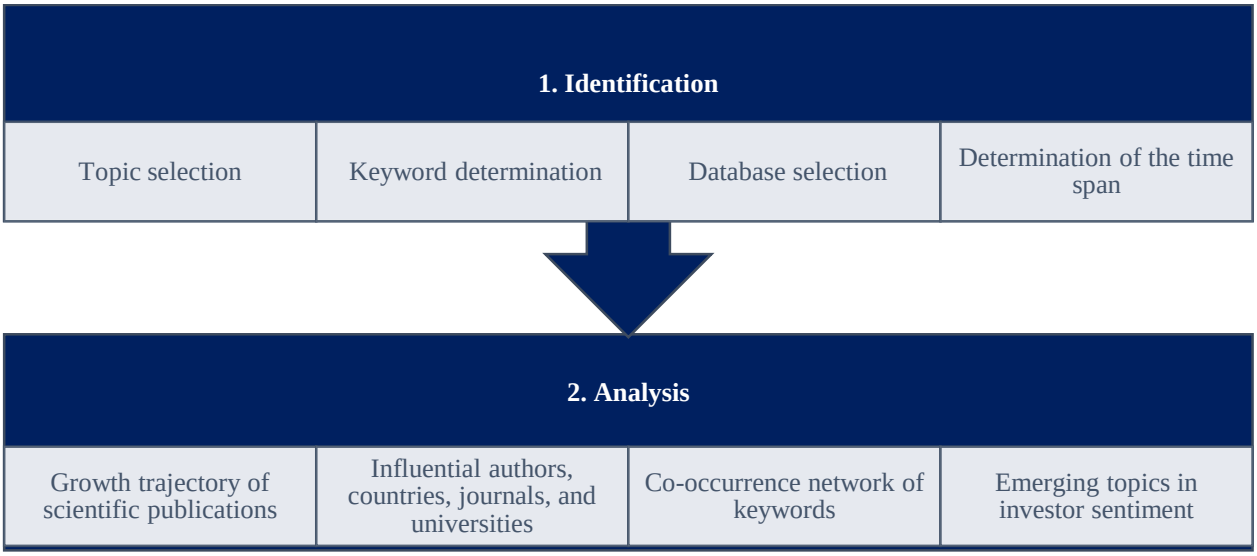

Figure 1. The two main steps of research

Table 1. Search method

Database	The searching method in the Web of Science database	Time span	Export format	Number of results
Web of Science	TS= (“Investor Sentiment” OR “Investors Sentiment” OR “Investor Sentiments” OR “Investors Sentiments” OR “Investors Emotional Behavior” OR “Investors Emotional Tendencies” OR “Investor Sentiment Index” OR “Investor Sentiment Measure” OR “Measuring Investor Sentiment” OR “Market sentiment” OR “Market Sentiment Index”)	1987-2025	Plain Text	4546 Articles

4. Findings

4.1. What is the growth trajectory of scientific publications on investor sentiment?

Figure 1 shows the trend in scientific publications on investor sentiment.

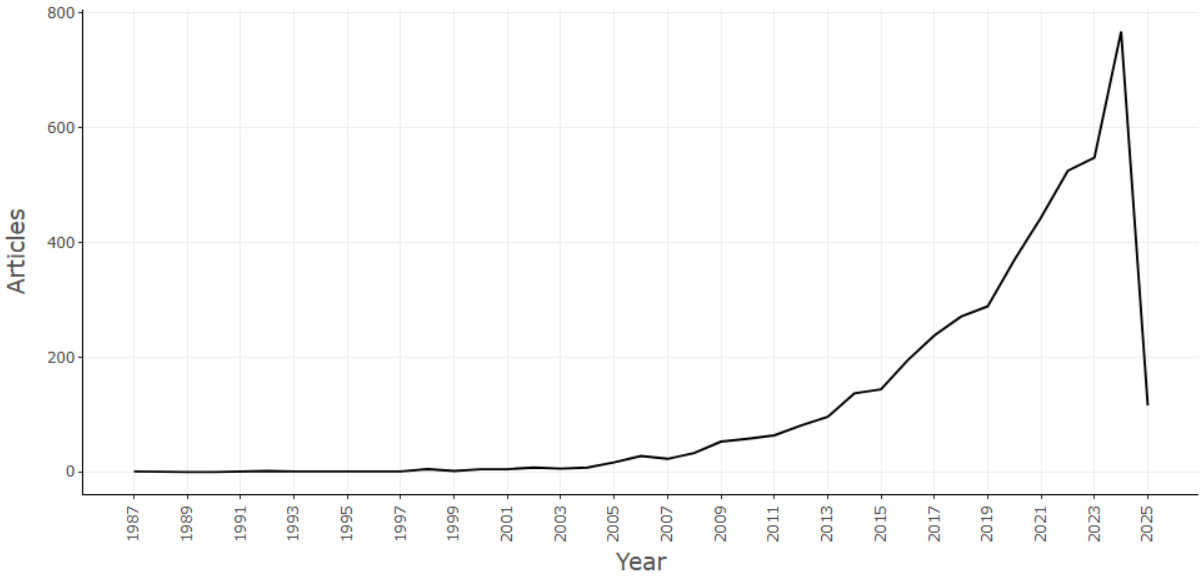

Figure 2. The trend of scientific productions in the field of investor sentiment

Figure 2 illustrates the annual publication trend in investor sentiment from 1987 to 2025. Overall, the number of studies in this area has shown a consistent upward trajectory, with a calculated annual growth rate of 13.3%.

Slow Start and Gradual Growth: During the 1980s and 1990s, the volume of research was minimal and remained nearly constant, with some years showing no publications at all—reflecting a slow start and limited scholarly attention to the topic.

Moderate Increase in the 2000s: A moderate increase began in the early 2000s, accelerating between 2005 and 2008 as interest in behavioral finance and sentiment-based analysis expanded.

Explosive Growth from 2010 Onward: From 2010 onward, publication activity grew exponentially. This surge reflects broader recognition of investor sentiment as a key determinant of financial market dynamics.

Record-Breaking in Recent Years: Since 2020, the number of publications has exceeded 500 per year, peaking at a record 768 articles in 2024.

These results clearly indicate that investor sentiment has become an increasingly important and rapidly expanding research area within behavioral finance, attracting growing scholarly attention in recent years.

4.2. Which articles, authors, countries, journals, and universities have been most influential in this field?

Table 2 lists the 10 most-cited articles in the field of investor sentiment.

Table 2. The most cited articles in the field of investor sentiment

Number of citations	Author and year	Title
3032	Baker and Wurgler (2006)	Investor sentiment and the cross-section of stock returns
2190	Barberis (1998)	A model of investor sentiment
2160	Tetlock (2007)	Giving content to investor sentiment: The role of media in the stock market
1854	Baker and Wurgler (2006)	Investor sentiment in the stock market
1615	Da et al. (۲۰۱۱)	In Search of Attention
1003	Fang & Peress (2009)	Media Coverage and the Cross-section of Stock Returns
969	Stambaugh et al. (2012)	The short of it: Investor sentiment and anomalies

801	Lee et al. (1991)	INVESTOR SENTIMENT AND THE CLOSED-END FUND PUZZLE
768	DA et al. (2015)	The Sum of All FEARS Investor Sentiment and Asset Prices
713	Kumar & Lee (2006)	Retail investor sentiment and return comovements

One of the most influential studies in this field is "Investor Sentiment and the Cross-Section of Stock Returns" by Baker and Wurgler (2006), which has received 3,032 citations and examines the relationship between investor sentiment and stock returns. Other seminal works include "A Model of Investor Sentiment" by Barberis (1998), with 2,190 citations, and "Giving Content to Investor Sentiment: The Role of Media in the Stock Market" by Tetlock (2007), with 2,160 citations, which emphasizes the media's role in shaping investor sentiment. Additional influential contributions, such as "Investor Sentiment in the Stock Market" by Baker and Wurgler (2006) and "In Search of Attention" by Da et al. (2011), further investigate the mechanisms through which investor sentiment affects market behavior. Collectively, these studies form the theoretical and empirical foundation of investor behavior and sentiment analysis in modern financial research.

Figure 3 shows the authors with the most publications in the field of investor sentiment.

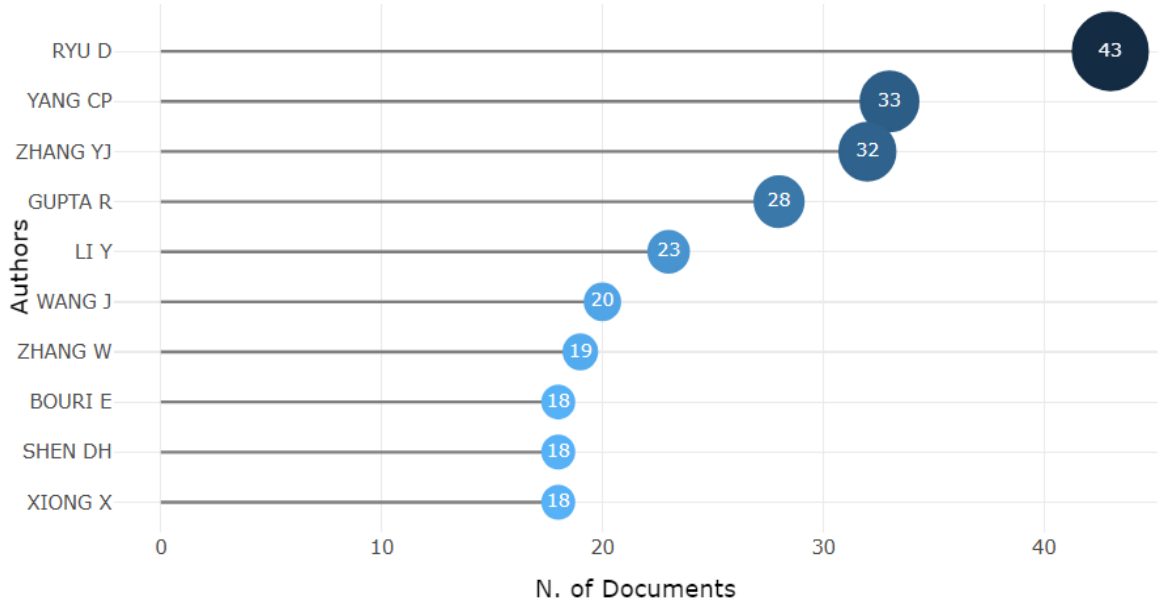

Figure 3. Prolific authors in the field of investor sentiment

It is observed that the top three authors on this list are:

1. ***RYU D*** with 43 articles.
2. ***YANG CP*** with 33 articles.
3. ***ZHANG YJ*** with 32 articles.

These authors are the most active contributors and are recognized as leading scholars in investor sentiment research.

Figure 4 illustrates the distribution of published papers on investor sentiment across different countries. The chart distinguishes between two types of research collaboration—domestic and international—using different colors to visualize their respective contributions.

1. ***MCP*** (Multinational Collaboration Papers) refers to papers co-authored by researchers from multiple countries, represented in red.
2. ***SCP*** (Single-Country Papers) refers to papers authored solely within a single country,

represented in blue.

The countries with the highest number of publications on investor sentiment are China, the United States, the United Kingdom, India, and Australia. In contrast, countries such as Pakistan, Israel, and South Africa have produced comparatively fewer studies.

A notable observation is that China leads this field by a considerable margin, particularly in publications co-authored with researchers from other countries, reflecting strong international collaboration.

Figure 5 presents the distribution of publications across major journals focusing on investor sentiment research.

Here, the journals are ranked by the number of articles published in them:

1. ***International Review of Financial Analysis***: With the highest number of articles (158 articles).
2. ***Finance Research Letters***: With 151 articles.
3. ***North American Journal of Economics and Finance***: With 97 articles.
4. ***Journal of Banking & Finance***: With 96 articles.
5. ***International Review of Economics & Finance:*** With 93 articles.

In addition, the other journals shown in this figure publish fewer papers but remain important and influential sources in investor sentiment research.

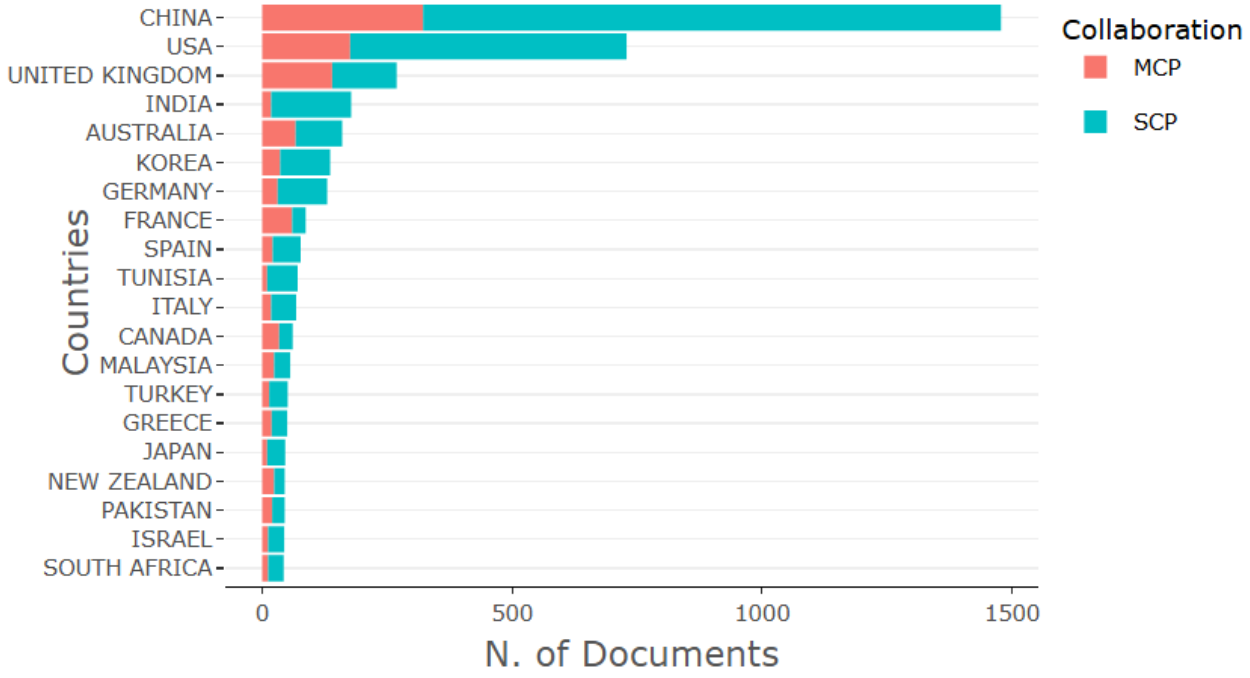

Figure 4. Leading countries in the field of investor sentiment

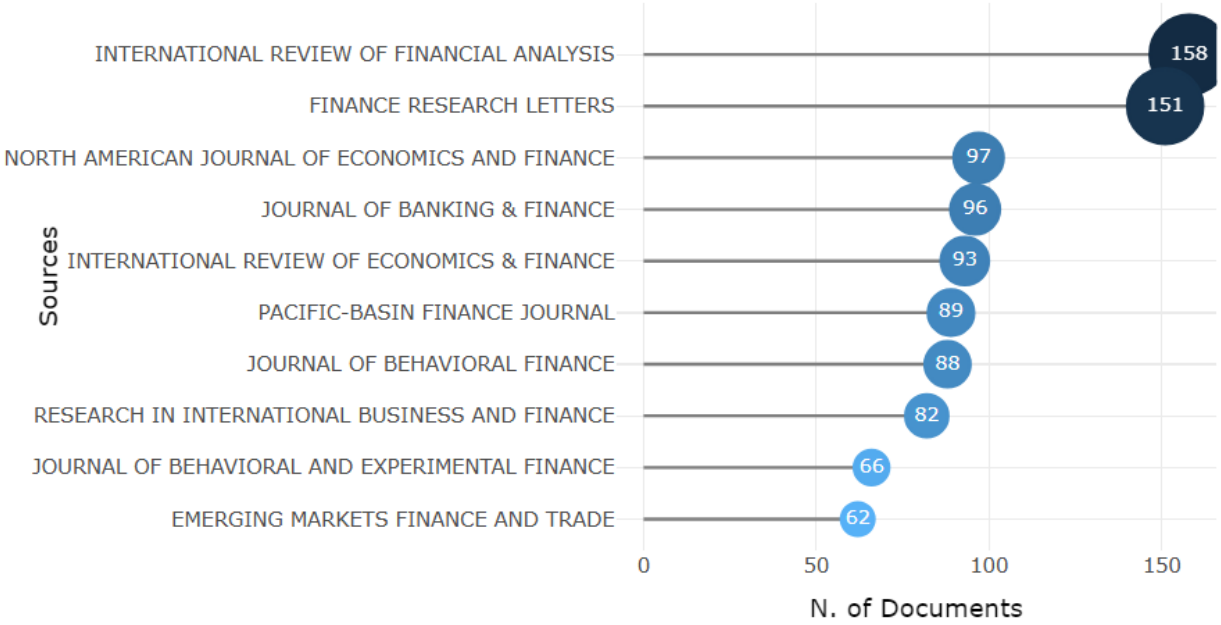

Figure 5. Prolific journals in the field of investor sentiment

A noteworthy observation is that journals such as the International Review of Financial Analysis and Finance Research Letters have published the most articles, underscoring their prominence and influence in investor sentiment research.

Figure 6 presents the distribution of publications across universities and research institutions in this field.

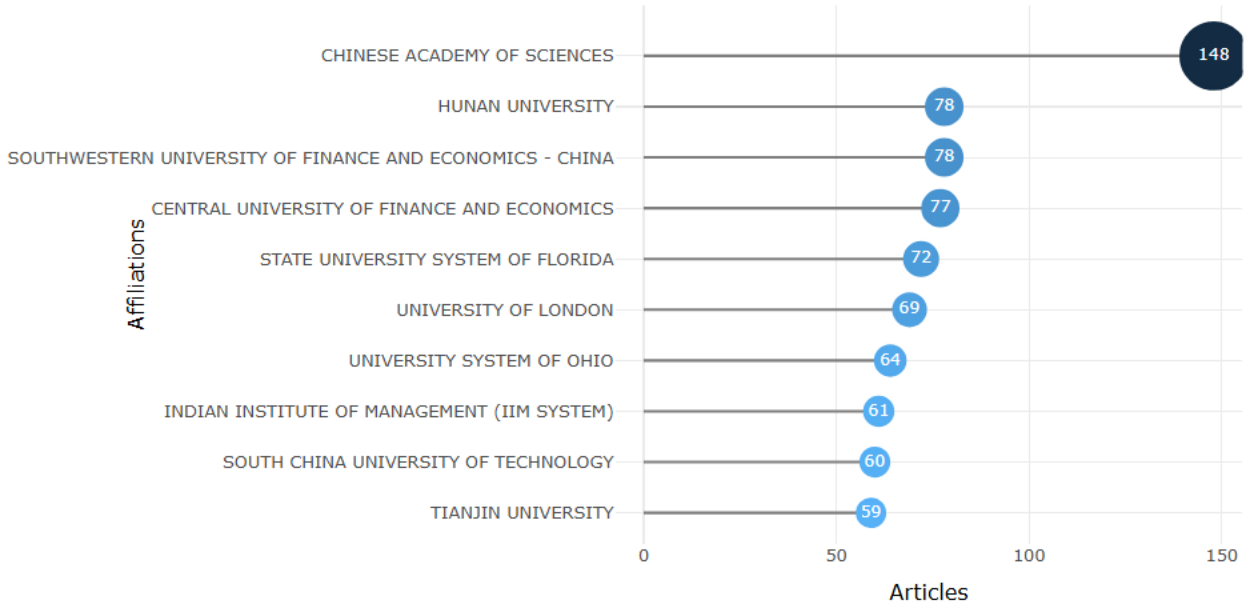

Figure 6. Prolific organizations and universities in the field of investor sentiment

Here, the institutions are displayed in order of the number of articles published:

1. ***Chinese Academy of Sciences****:* With the highest number of articles (148 articles).
2. ***Hunan University***: With 78 articles.

3. ***Southwestern University of Finance and Economics – China***: With 78 articles.
4. ***Central University of Finance and Economics***: With 77 articles.
5. ***State University System of Florida***: With 72 articles.

Other institutions, including the University of London and the University System of Ohio, have also contributed a notable number of publications to this field.

The chart further indicates that Chinese institutions—particularly the Chinese Academy of Sciences—have made the most substantial contributions to investor sentiment research.

4.3. What does the co-occurrence network of keywords reveal?

Figure 7 presents the keywords most frequently used by authors in publications related to investor sentiment. The frequency of occurrence for each keyword is summarized below.

1. ***Investor sentiment,*** with 1147 mentions, is the most frequently used keyword.
2. ***Sentiment*** with 242 mentions.
3. ***Behavioral finance*** with 189 mentions.
4. ***Sentiment analysis*** with 169 mentions.
5. ***Covid-19*** with 165 mentions.

Keywords such as stock market, stock returns, and market sentiment are among the most frequently used terms. These keywords reflect the central themes of research in this domain, including analyses of investor sentiment, behavioral finance, and the impact of market dynamics on sentiment formation.

Figure 8 depicts the keyword co-occurrence network in the field of investor sentiment. In this visualization, each node represents a keyword, and connections indicate the degree of correlation and co-occurrence across published studies.

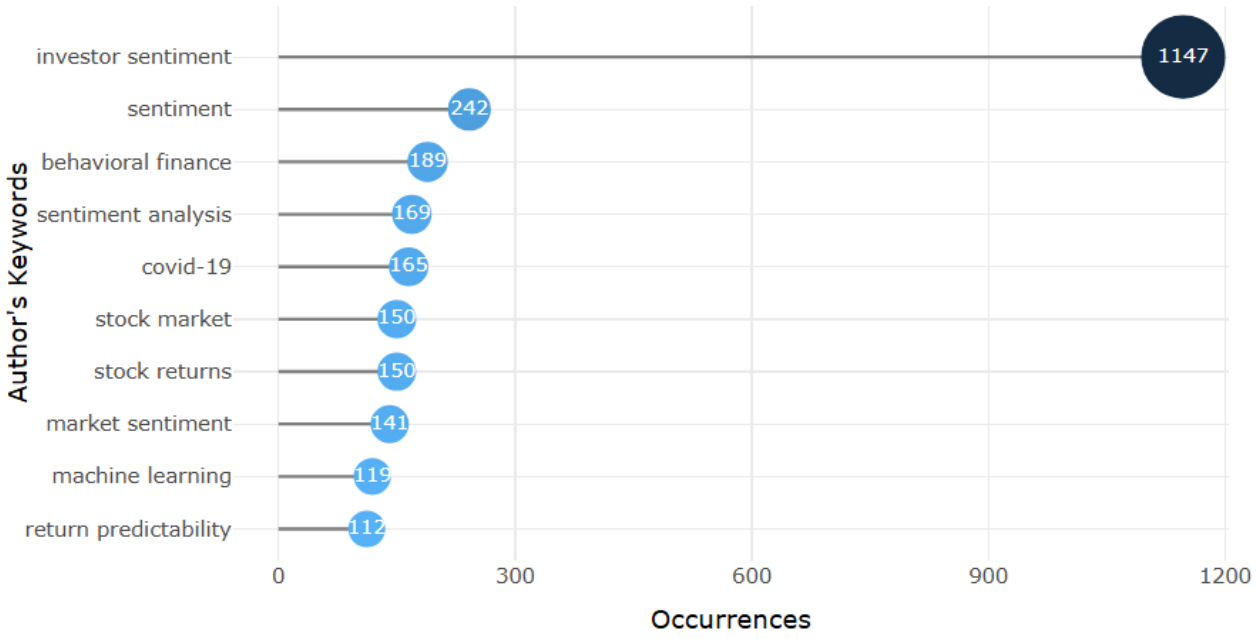

Figure 7. Keywords in the field of investor sentiment

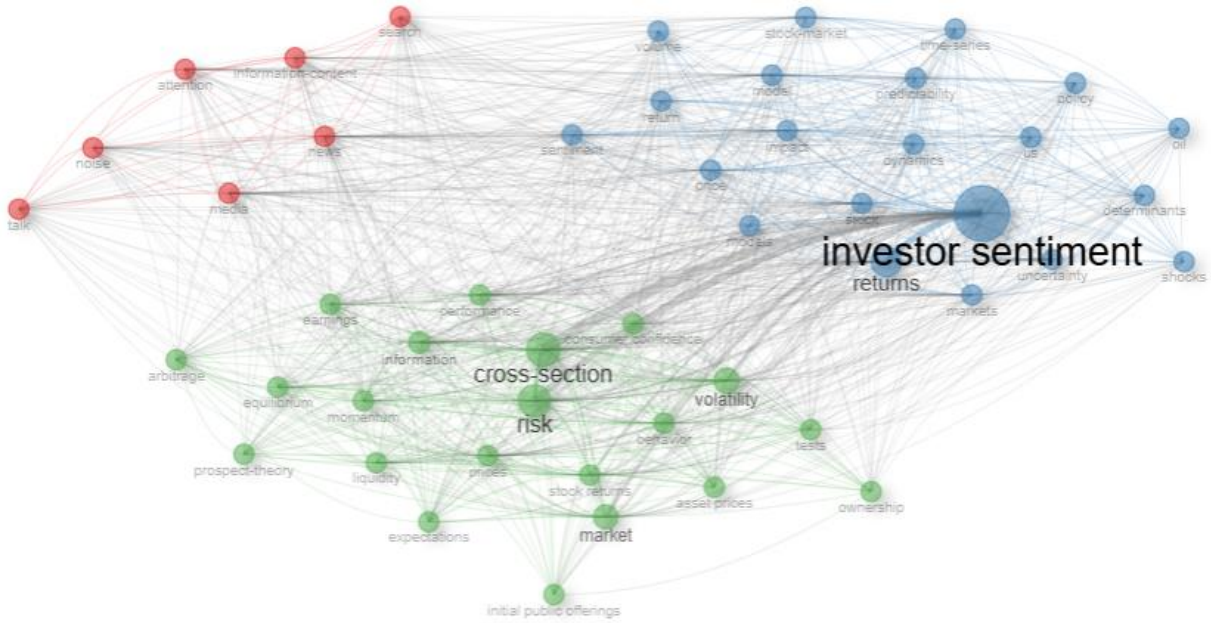

Figure 8. Keyword network in the field of investor sentiment

The keyword co-occurrence network reveals three major thematic clusters:

1. ***Words in Cluster 1 (Red):*** This group includes terms such as news, media, attention, information content, and noise (irrational traders). These keywords primarily relate to the role of information and media in shaping investor sentiment and behavior.
2. ***Words in Cluster 2 (Blue):*** This cluster contains keywords such as investor sentiment, returns, impact, model, stocks, and markets. It represents studies focused on analyzing and evaluating investor sentiment, stock returns, financial models, and market dynamics.
3. ***Words in Cluster 3 (Green):*** This group encompasses terms such as cross-section, risk, volatility, market, and performance, which are mainly associated with research on market analysis, risk, volatility, and financial behavior.

Overall, this network highlights the central importance of themes such as investor sentiment, stock returns, market volatility, and risk in the broader landscape of investor sentiment research.

4.4. What are the emerging topics in investor sentiment research?

Figure 9 illustrates the temporal trend in the emergence and usage of various keywords in investor sentiment research from 2008 to 2024. The length of each horizontal line represents the timespan during which a given keyword has appeared in publications, while the size of the circles reflects the intensity or frequency of its use at different points in time.

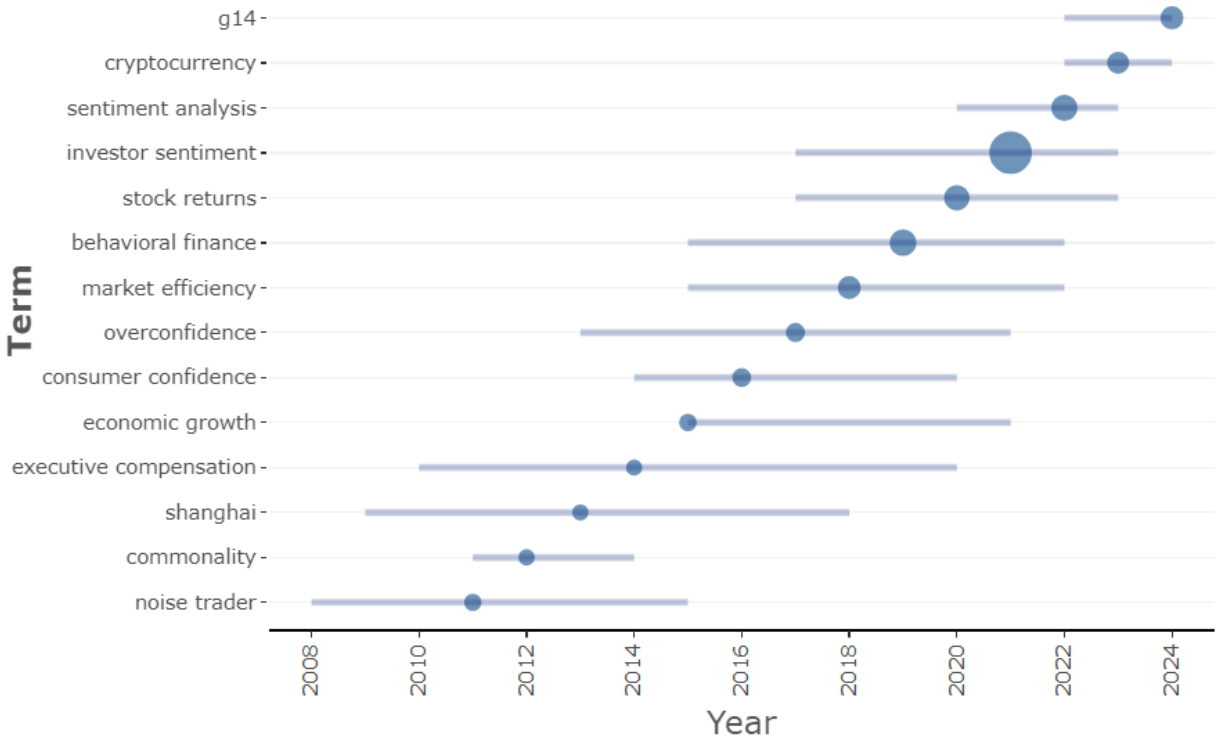

Figure 9. Trends of keywords in the field of investor sentiment

Highlights of this chart include:

1. ***Investor sentiment*** has shown continuous growth since 2015, with its usage significantly increasing in recent years.
2. ***Cryptocurrency*** *and* ***Sentiment Analysis*** have gained more attention since around 2018.
3. ***Behavioral Finance*** *and* ***Stocks Returns*** have also grown significantly in the 2010s.
4. Keywords such as G14 (Group of 14 major countries), economic growth, and executive compensation began to appear in publications in the early 2010s; however, their frequency of use has remained relatively low compared with other dominant keywords in the field.

The results indicate that research on investor sentiment and the factors influencing it has expanded rapidly in recent years. Emerging keywords such as cryptocurrency and sentiment analysis have gained increasing prominence, reflecting the evolving scope and interdisciplinary nature of this research area.

Figure 10 presents the positioning of various keywords in the field of investor sentiment based on two main dimensions:

1. *Development degree* or density, which indicates the growth and development of a topic.
2. *Relevance degree* or centrality, which shows the importance and connection of a topic with other topics in the existing research.

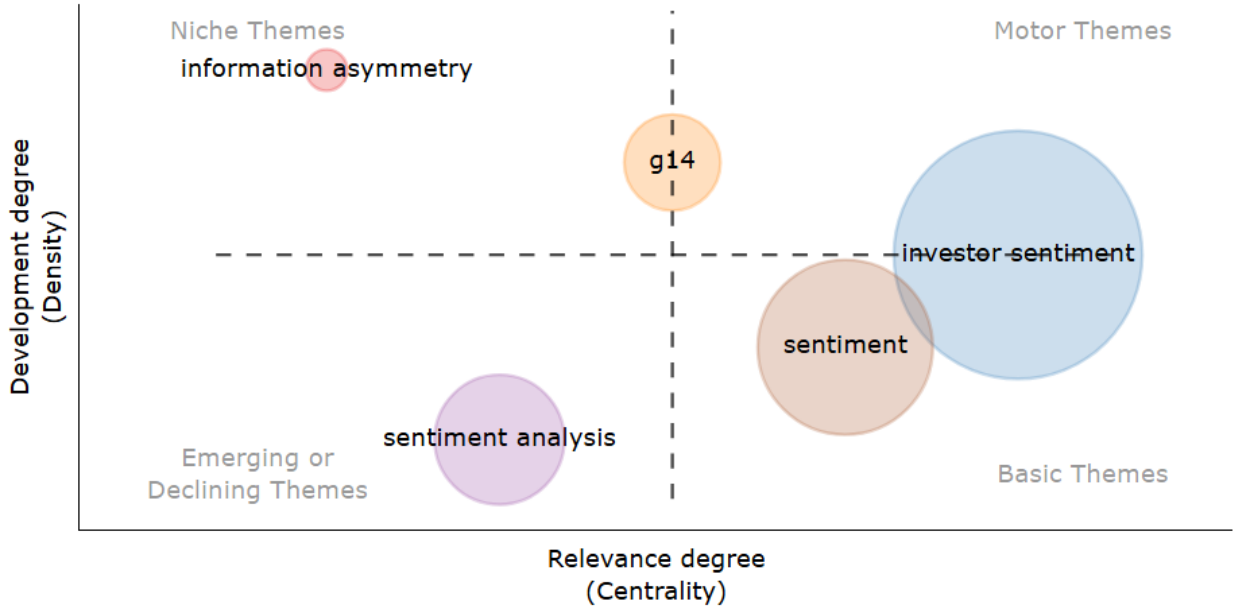

Figure 10. Strategic diagram of the field of investor sentiment

Figure 10 presents the thematic positioning of key concepts within the field of investor sentiment research. The analysis identifies four notable themes:

1. ***Investor sentiment****:* This keyword occupies a central and influential position within the thematic map, reflecting its strong connections with other research topics. It is categorized as a motor theme, representing the most developed and impactful area in this field.
2. ***Sentiments****:* This keyword falls within the basic themes category, signifying its foundational relevance to the domain, although its level of influence is somewhat lower than that of investor sentiment.
3. ***Sentiment analysis****:* Positioned within the emerging or declining themes quadrant, this topic has recently gained increasing scholarly attention and continues to develop as a growing research area.
4. ***Information Asymmetry****:* This keyword appears in the niche themes category, suggesting that relatively limited research has been conducted in this area thus far.

Overall, the thematic map highlights that *investor sentiment* and *sentiment analysis* currently represent two of the most dynamic and highly focused areas in the literature on investor sentiment.

5. Discussion and conclusion

The analysis of 4,546 articles on investor sentiment reveals that this topic has evolved over recent decades from a nascent and narrowly defined research area into a dynamic and rapidly expanding field. From 1987 to 2025, the number of publications has shown a strong upward trajectory, with an explosive increase after the 2010s. This sustained growth reflects not only the rising academic interest in investor sentiment but also its growing importance in explaining stock returns, market volatility, and financial behavior. An examination of the most cited articles, influential authors, countries, journals, and institutions indicates that seminal works by Baker and Wurgler (2006) and Barberis (1998) constitute the intellectual backbone of the field. The increasing contribution of countries—particularly China, which has gained visibility through international collaborations (MCP)—underscores the global significance of investor sentiment research. Furthermore, journals such as the

International Review of Financial Analysis and *Finance Research Letters* play a pivotal role in publishing and advancing knowledge in this domain. Keyword co-occurrence and trend analyses show that the dominant research themes revolve around "investor sentiment," "stock returns," and "sentiment analysis." Keyword clustering further highlights strong linkages among topics such as media coverage, market volatility, and risk. These results suggest that contemporary research increasingly focuses not only on the direct effects of investor sentiment on market performance but also on intermediary mechanisms such as the role of media and asymmetric information.

Moreover, the timeline analysis of keyword usage and the strategic positioning of the field reveal the emergence of rapidly growing themes such as *cryptocurrency* and *sentiment analysis*, identifying these as key emerging topics. These developments indicate that researchers are increasingly adopting innovative approaches in response to the fast-evolving nature of financial markets and the advent of new technologies for measuring investor sentiment.

Based on the research objectives and the findings obtained, the following conclusions can be drawn:

1. *Significant growth in research:* The steady increase in publications since the early 2000s—particularly in recent years—reflects the growing importance and influence of investor sentiment within financial research.
2. *Key references and resources:* Highly cited articles and influential authors represent key milestones in the evolution of this field. The active contribution of countries such as China, along with increasing international collaborations, has played a crucial role in advancing research on investor sentiment.
3. *Research focus on main topics:* Keyword analysis and co-occurrence networks indicate that studies primarily focus on the core concepts of investor sentiment, sentiment analysis, and stock returns, which together contribute to the exploration of behavioral and financial dimensions of the market.
4. *Emergence of new topics:* Recent attention to topics such as cryptocurrency and innovative sentiment analysis methods highlights emerging research frontiers and potential avenues for future exploration.
5. It is also suggested that future research should focus on the following areas:
6. *Encouragement of interdisciplinary research:* Given the complexity of investor sentiment, integrating insights from finance, psychology, and information technology could lead to more accurate and comprehensive analytical models.
7. *Development of predictive models:* With the exponential growth of financial and sentiment-related data, future studies are encouraged to employ artificial intelligence techniques and data-driven methods to better understand the effects of investor sentiment on market volatility.
8. *Increasing international collaborations:* Establishing global research networks—especially involving developing countries—can foster knowledge exchange, enhance methodological diversity, and improve the overall quality of research in this domain.

References

1. Ángeles López-Cabarcos, M., M Pérez-Pico, A. and López Perez, M. L. (2020). Investor sentiment in the theoretical field of behavioural finance. *Economic research-Ekonomska istraživanja*, 33(1), pp. 2101-2228. https://doi.org/10.1080/1331677X.2018.1559748
2. Arabmazar Yazdi, M., & Joudaki Chegeni, Z. (2024). Illustration Global trends in social responsibility accounting discourse researches: bibliometric analysis. *Financial Accounting Knowledge*, 11(3), pp. 1–25. https://doi.org/10.30479/jfak.2024.20483.3213 (In Persian)

3. Asghari, E., Abbasian Fredoni, M. M., & Naslmosavi, S. (2020). The impact of investor sentiments on stock market liquidity. *Journal of Accounting Advances*, 12(1), pp. 1–27. https://doi.org/10.22099/jaa.2020.35769.1966 (In Persian).
4. Assadi, G., & Morshedi, F. (2019). Investigating the effect of Investor sentiment on the stock price crash risk in Tehran Stock Exchange. *Financial Management Perspective*, 9(25), pp. 9–30. https://doi.org/10.52547/jfmp.9.25.9 (In Persian)
5. Baker, M. and Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *The Journal of Finance*, 61(4), pp. 1645-1680. https://doi.org/10.1111/j.1540-6261.2006.00885.x
6. Barberis, N., Shleifer, A., & Vishny, R. (1998). A model of investor sentiment. *Journal of Financial Economics*, 49(3), pp. 307-343. https://doi.org/10.1016/s0304-405x(98)00027-0
7. Black, F. (1986). Noise. *The Journal of Finance*, 41(3), pp. 528-543. https://doi.org/10.1111/j.1540-6261.1986.tb04513.x
8. Blajer-Gołębiewska, A., Wach, D. and Kos, M. (2018). Financial risk information avoidance. *Economic Research-Ekonomska Istraživanja*, 31(1), pp. 521-536. https://doi.org/10.1080/1331677X.2018.1439396
9. Borji Dolatabad, E. (2008). Financial behavior; the dominant paradigm in financial markets. *Tadbir*, 19(191), pp. 31-36 (In Persian).
10. Brown, G. W. and Cliff, M. T. (2004). Investor sentiment and the near-term stock market. *Journal of Empirical Finance*, 11(1), pp. 1-27. https://doi.org/10.1016/j.jempfin.2002.12.001
11. Da, Z., Engelberg, J. and Gao, P. (2011). In search of attention. *The Journal of Finance*, 66(5), pp. 1461-1499. https://doi.org/10.1111/j.1540-6261.2011.01679.x
12. Da, Z., Engelberg, J., & Gao, P. (2015). The sum of all FEARS investor sentiment and asset prices. *The Review of Financial Studies*, 28(1), pp. 1-32. https://doi.org/10.1093/rfs/hhu072
13. De Long, J. B., Shleifer, A., Summers, L. H. and Waldmann, R. J. (1990). Positive feedback investment strategies and destabilizing rational speculation. *The Journal of Finance*, 45(2), pp. 379-395. https://doi.org/10.1111/j.1540-6261.1990.tb03695.x
14. Dianati Deilami, Z., Haseli, D., & Maleki, A. (2023). Investigating the scientific production of Iranian accounting faculty members in scopus from 2006-2021 through a scientometric approach. *Empirical Research in Accounting*, *13*(2), 27–54 (In Persian). https://doi.org/10.22051/jera.2023.42176.3068
15. Ebadollah Amoughin, J., Sharif moghadam, H., & Ziaei, S. (2019). A review of important indicators in scientomerics (Co-Citation & Co-Word) and the necessity of using them in scientific products analysis. *Comparative Interpretation Research*, *4*(2), pp. 297–321 (In Persian). https://doi.org/10.22091/ptt.2018.3074.1446
16. Eskorouchi, A., Ghanbari, H., & Mohammadi, E. (2024). Exploring the evolution of robust portfolio optimization: a scientometric analysis. *Iranian Journal of Accounting, Auditing and Finance*, 8(3), pp. 75–92 (In Persian). https://doi.org/10.22067/ijaaf.2024.44518.1402
17. Fang, L., & Peress, J. (2009). Media coverage and the cross-section of stock returns. *The Journal of Finance*, 64(5), pp. 2023-2052. https://doi.org/10.1111/j.1540-6261.2009.01493.x
18. Ganji, H., Mashayekh, S., & Seddighi, Z. (2023). Examining the impact of investors' sentiment on their expectations of future earnings. *Empirical Studies in Financial Accounting*, *20*(78), pp. 155–190 (In Persian). https://doi.org/10.22054/qjma.2023.73514.2452
19. Ghannad, M. (2023). Analyzing scientific collaboration and visualization among Iranian audit fees papers. *Professional Auditing Research*, *3*(11), pp. 36–63 (In Persian). https://doi.org/10.22034/jpar.2023.1987968.1138
20. Hajannejad, A., Rahrovi Dastjerdi, A., & Alavizadeh, S. M. (2023). The effect of investor sentiment on the Likelihood of misstatement of financial statements and auditor conservatism.

Financial Accounting Research, *15*(1), pp. 1–20 (In Persian). https://doi.org/10.22108/far.2023.137522.1966
21. Hart, R. L. (2000). Co-authorship in the academic library literature: A survey of attitudes and behaviors. *The Journal of Academic Librarianship*, 26(5), pp. 339-345. https://doi.org/10.1016/S0099-1333(00)00140-3
22. Hasanzadeh Diva, S. M., & Blue, G. (2021). The effect of investor sentiment on value relevance of accounting information. *Journal of Accounting Advances*, *13*(2), pp. 97–122 (In Persian). https://doi.org/10.22099/jaa.2022.42620.2204
23. Hashemi, A, & Moshashae, M. (2018). Corporate governance and the relation between investor sentiment and corporate investment decisions. *Empirical Research in Accounting*, *8*(1), pp. 199–226 (In Persian). https://doi.org/10.22051/jera.2017.10751.1349
24. Hosseini, Seyed Ali, & Morshedi, Fatemeh. (2020). The effects of investor sentiments on trade dynamics in Tehran Stock Exchange. *The Financial Accounting and Auditing Researches*, 11(44), pp. 1-22 (In Persian). https://sid.ir/paper/198210/en
25. Kamath, A. N., Shenoy, S. S. and Subrahmanya, K. N. (2022). An overview of investor sentiment: Identifying themes, trends, and future direction through bibliometric analysis. *Investment Management & Financial Innovations*, 19(3), p. 229. http://dx.doi.org/10.21511/imfi.19(3).2022.19
26. Khedri Gharibvand, R, & Sinayi, H. A. (2023). The impact of investors' emotions on economic variables using the index of investors' emotional behavior in Tehran Stock Exchange. *Budget and Finance Strategic Research*, *4*(1), pp. 11–35 (In Persian). https://fbarj.ihu.ac.ir/article_208061.html
27. Kim, S. H. and Kim, D. (2014). Investor sentiment from internet message postings and the predictability of stock returns. *Journal of Economic Behavior & Organization*, 107, pp. 708-729. https://doi.org/10.1016/j.jebo.2014.04.015
28. Kim, T. and Ha, A. (2010). Investor sentiment and market anomalies. *23rd Australasian Finance and Banking Conference 2010 Paper*, Pusan National University, Busan, South Korea. https://dx.doi.org/10.2139/ssrn.1663649
29. Kumar, A., & Lee, C. M. (2006). Retail investor sentiment and return comovements. *The Journal of Finance*, 61(5), pp. 2451-2486. https://doi.org/10.1111/j.1540-6261.2006.01063.x
30. Lee, C. M., Shleifer, A. and Thaler, R. H. (1991). Investor sentiment and the closed-end fund puzzle. *The Journal of Finance*, 46(1), pp. 75-109. https://doi.org/10.1111/j.1540-6261.1991.tb03746.x
31. Liston, D. P. and Huerta, D. (2012). Does investor sentiment affect Mexican stock market returns and volatility? *The Global Journal of Finance and Economics*, 9(2), pp. 121-132.
32. Lucey, B. M. and Dowling, M. (2005). The role of feelings in investor decision-making. *Journal of Economic Surveys*, 19(2), pp. 211-237. https://doi.org/10.1111/j.0950-0804.2005.00245.x
33. Luong, A. T., Pham, H. H., Luong, H. D., Phung, H. T. T. and Le, T. T. (2024). The development of research on investor sentiment in emerging and frontier markets with the bibliometric method. *Journal of Scientometric Research*, 13(1), pp. 81-92. https://doi.org/10.5530/jscires.13.1.7
34. Mansourian, Y. (2010). Fifty research axes in scientometric studies. *Book of the Month (general)*, 10(154), pp. 64-71.
35. Mohamadi, M., Azimi Yancheshme, M., Fouladi, M., & Farhadi, M. (2022). Designing a model to explain the impact of investors' emotions on financial decisions, stock returns and economic volatility. *Financial Management Perspective*, *12*(40), pp. 145–171. https://doi.org/10.52547/jfmp.12.40.145 (In Persian)
36. Mohammadzadeh, A., Heirany, F., & Taftiyan, A. (2020). A study of the role of islamic events

in the relationship between investor sentiment and stock returns with an emphasis on the moderating variable of corporate governance. *Islamic Finance Researches (IFR)*, *9*(2), pp. 741–774 (In Persian). https://doi.org/10.30497/ifr.2020.75482
37. Mohammadzadeh, A., Heirany, F., & Taftiyan, A. (2022). A study of the role of religious months in the relationship between investor sentiment and the risk of crashing stock prices with an emphasis on the moderating role of corporate governance. *Journal of Securities Exchange*, *15*(59), pp. 1–24. https://doi.org/10.22034/jse.2020.11460.1611
38. Moradi, M., & Safikhani, R. (2017). Analysis of public sector accounting researches in Iran and future researches directions. *Accounting and Auditing Review*, *23*(4), pp. 547–574 (In Persian). https://doi.org/10.22059/acctgrev.2017.60859
39. Nikkar, J., Nilchi, M., & Ostovarnejad, F. (2022). The effect of investor sentiment on audit quality in companies listed on Tehran Stock Exchange. *Accounting and Auditing Research*, *14*(53), pp. 47–66. https://doi.org/10.22034/iaar.2022.151098
40. Nobakht, Y. (2018). Scientometric study of behavioral accounting research in Iran. *Journal of Management Accounting and Auditing Knowledge*, *7*(27), pp. 125–136 (In Persian). https://www.jmaak.ir/article_12905.html
41. Nobakht, Y. (2020). Scientometric study of scientific production of the journal of accounting and auditing review. *Journal of Accounting and Social Interests*, *10*(1), pp. 115–133 (In Persian). https://doi.org/10.22051/ijar.2019.24088.1480
42. Nobakht, Y. and Nobakht, M. (2022). Scientometric study of earnings management research in Iran. *Knowledge Retrieval and Semantic Systems*, 9(30), pp. 93-118 (In Persian). https://doi.org/10.22054/jks.2020.55723.1373
43. Piñeiro-Chousa, J., Vizcaíno-González, M. and Pérez-Pico, A. M. (2017). Influence of social media over the stock market. *Psychology & Marketing*, 34(1), pp. 101-108. https://doi.org/10.1002/mar.20976
44. Rahnamay Roodposhti, F. and Yazdani, S. (2010). The sage of psychology theories in accounting. *The Financial Accounting and Auditing Researches*, 1(4), pp. 1-26 (In Persian). https://sid.ir/paper/198132/en
45. Renault, T. (2017). Intraday online investor sentiment and return patterns in the US stock market. *Journal of Banking & Finance*, 84(1), pp. 25-40. https://doi.org/10.1016/j.jbankfin.2017.07.002
46. Sengupta, I. N. (1992). Bibliometrics, informetrics, scientometrics and librametrics: An overview. *Libri*, 42(2), pp. 75–98. https://doi.org/10.1515/libr.1992.42.2.75
47. Shahab Lavasani, k., Shabani Rezvani, L., & Samavi, M. E. (2023). Investigating the asymmetric relationship between investor sentiments and fluctuations in the overall index via the markov switching method. *Financial Research Journal*, *25*(4), pp. 661–687 (In Persian). https://doi.org/10.22059/frj.2023.356277.1007444
48. Shayan Majd, Majid. (2013). Study of research trends in scientometrics in Iran and examining the scientific behavior patterns of researchers in this field. *Shamsae: Electronic Journal of Libraries, Museums, and Documentation Center of Astan Quds Razavi*, 5(21), pp. 1-15 (In Persian).
49. Shekarkhah, J., & Hazrati, A. (2018). Corporate transparency and impact of investor sentiment on stock prices. *Empirical Research in Accounting*, *7*(4), pp. 1–31 (In Persian). https://doi.org/10.22051/jera.2017.12034.1458
50. Siganos, A., Vagenas-Nanos, E. and Verwijmeren, P. (2017). Divergence of sentiment and stock market trading. *Journal of Banking & Finance*, 78, pp. 130-141. https://doi.org/10.1016/j.jbankfin.2017.02.005
51. Sprenger, T. O., Tumasjan, A., Sandner, P. G. and Welpe, I. M. (2014). Tweets and trades: The

information content of stock microblogs. *European Financial Management*, 20(5), pp. 926-957. https://doi.org/10.1111/j.1468-036X.2013.12007.x

52. Stambaugh, R. F., Yu, J., & Yuan, Y. (2012). The short of it: Investor sentiment and anomalies. *Journal of Financial Economics*, 104(2), pp. 288-302. https://doi.org/10.1016/j.jfineco.2011.12.001
53. Taghavi, R., Dadashi, I., Zare Bahnamiri, M. and Gholamnia Roshan, H.R. (2023). Predicting emotional tendency of investors using financial ratios based on principal component analysis method. *Journal Of Financial Economics (Financial Economics and Development),* 16(4), pp. 157-173 (In Persian). https://doi.org/10.30495/fed.2023.1925371 2345
54. Tetlock, P. C. (2007). Giving content to investor sentiment: the role of media in the stock market. *The Journal of Finance*, 62(3), pp. 1139-1168. https://doi.org/10.1111/j.1540-6261.2007.01232.x
55. Zhang, K., Mohd Nor, N., & Selamat, A. I. (2023). A comparative scientometric analysis of investor sentiment and trading behaviour research. *International Journal of Applied Economics, Finance and Accounting*, *17*(2), pp. 529-552. https://doi.org/10.33094/ijaefa.v17i2.1232
56. Zhang, W., Li, X., Shen, D. and Teglio, A. (2016). Daily happiness and stock returns: Some international evidence. *Physica A: Statistical Mechanics and its Applications*, 460, pp. 201-209. https://doi.org/10.1016/j.physa.2016.05.026
57. Zouaoui, M., Nouyrigat, G. and Beer, F. (2011). How does investor sentiment affect stock market crises? Evidence from panel data. *Financial Review*, 46(4), pp. 723-747. https://doi.org/10.1111/j.1540-6288.2011.00318.x

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RESEARCH ARTICLE

Digital Accounting Legitimacy Perspectives Based on the Need for More Developed Software Services

Abolfazl Manafi, Seyyed Abbas Borhani
Department of Accounting, QO.C., Islamic Azad University, Qom, Iran
Mehdi Safari Gerayli*
Associate Professor, Department of Accounting, BG.C., Islamic Azad University, Bandargaz, Iran
Hossein Jahangirnia
Department of Accounting, QO.C., Islamic Azad University, Qom, Iran

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Abstract

The current study aims to outline the legitimacy perspectives of digital accounting in light of the increasing need for more advanced software services in Iran. A mixed-methods approach was employed, combining qualitative and quantitative analytical procedures to achieve the study's objectives. In the qualitative phase, grounded theory and Delphi analyses were conducted based on input from 14 experts and scholars familiar with the core phenomenon under investigation. In the quantitative phase, a futures studies approach was applied to identify potential scenarios that could define the legitimacy perspectives of digital accounting in the context of enhanced software service requirements in Iran. Based on the 14 interviews, the qualitative findings produced 282 open codes categorized into 33 conceptual themes, six core components, and three structural dimensions, forming the foundational framework for the legitimacy of digital accounting. Conversely, the quantitative results—through matrix analysis—identified four scenarios along two key axes: systemic mechanisms related to financial planning and those associated with the supply chain. According to the mathematical function matrix, the most probable scenario emerged at the intersection of high-impact systemic mechanisms associated with the supply chain and low-impact mechanisms related to financial planning. This scenario, termed the "Amadic Scenario," offers a more reliable justification for the legitimacy of digital accounting grounded in the advancement of software services in Iran's future. In interpreting these findings, it is important to note that achieving legitimacy for digital accounting—based on software service development requires logistical capabilities that enhance inventory and resource management within production systems, thereby ensuring higher computational capacity and operational efficiency.

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*Corresponding Author: Mehdi Safari Gerayli
Email: safari83@iau.ac.ir
Tel: 09111271577
ORCID: 0000-0003-4192-6582

1. Introduction

One of the most significant developments of the past decade has been the emergence of parallel-world platforms, which has fueled the rapid advancement of augmented reality technologies. These innovations have fundamentally reshaped key social functions (Santos, 2024). Consequently, the operation of social functions across diverse sectors such as healthcare, the economy, culture, and finance—has experienced substantial transformation within today's dynamic business environment (Liu et al., 2025). In other words, the digitalization of financial services has facilitated the creation of numerous tools derived from these transformations, enabling companies to enhance their capabilities in meeting stakeholder needs (Osuma, 2025). Therefore, earlier generations of financial technologies based solely on traditional accounting software may no longer be sufficient in light of advancements driven by artificial intelligence (Huy & Phuc, 2024).

Many commercial firms offering financial services through digital accounting startups increasingly strive to provide more advanced technological systems driven by artificial intelligence capabilities. These systems encompass broader financial computations and facilitate strategic planning, enabling firms to compete more effectively in the marketplace (Agyei-Boapeah et al., 2022). In other words, the financial systems dominant in previous generations of commercial companies faced inherent limitations in meeting stakeholders' informational needs due to constraints in computational infrastructure and challenges in evaluating financial events. The emergence of new generations of financial technologies powered by artificial intelligence and represented by innovations such as the metaverse and operational chatbots has not only addressed these shortcomings but also enhanced the reliability and accessibility of financial information for report users. During crises such as the COVID-19 pandemic, these technologies have demonstrated greater effectiveness in reinforcing organizational legitimacy and enabling firms to attain higher competitive advantages (Berger & Boot, 2024). Therefore, the fundamental structural distinction between these modern financial systems and their predecessors lies in their expanded forecasting and computational capabilities, which help companies establish more strategic and forward-looking roadmaps (Carè et al., 2025).

Thus, compared with the third generation of technological networking, the integration between accounting services and digital systems appears to have undergone more substantial transformations in computational capabilities (Wu & Pambudi, 2025). The rationale behind these changes lies in the fact that the accounting environment, due to its sensitivity to external challenges, must continuously evolve in implementing financial procedures within firms to effectively meet the informational needs of users (Qatawneh & Makhlouf, 2023). Recognizing this, international providers of digital accounting software have increasingly focused on developing customer-centric financial technologies. Their objective is to advance business services by integrating financial systems into interconnected, cloud-based networks—thereby enhancing computational speed and capacity through improved accessibility to financial data (Cochoy et al., 2017).

As Naser (1993) predicted, accounting functions have undergone substantial transformation in recent years due to technological advancements. These changes aim to enhance the capacity of accounting systems to meet stakeholders' informational needs, positioning accounting as a social product. Consequently, a critical question arises regarding the precise impact of digital technologies on advanced accounting systems. Today, commercial firms operating in this domain are improving the speed of information exchange by incorporating new features into financial platforms. These developments enable the real-time reflection of financial data to stakeholders, supporting more informed and higher-quality financial decision-making. This gap evident in previous generations of technologies such as traditional information systems—has now been bridged through the capabilities offered by current-generation financial technologies, allowing companies to attain a higher degree of

legitimacy. Lombardi and Secundo (2021) argue that innovative technologies and data analytics can fundamentally transform corporate reporting processes, thereby improving stakeholders' decision-making capacity and fostering greater accountability and transparency. Moreover, the expansion of digital accounting services has endowed the accounting profession with a broader set of competencies—from forecasting and evaluation to financial estimation for investment decisions promoting greater integration among departments that depend on accounting functions (Yaftian et al., 2017). Additionally, these services, which include interactive modules and automated instructions designed to accelerate computational processes, enhance organizational decision-making efficiency within integrated information systems (Alsharari & Ikem, 2023). Consequently, the emergence of such software solutions has propelled digital accounting capabilities beyond the third generation. Whereas third-generation digital accounting primarily emphasized the output phase focusing on faster and more comprehensive financial disclosure—the emerging generations, developed by leading international firms, concentrate on building networked business services. These services function as strategic roadmaps for enhancing firms' competitive capabilities and ensuring long-term sustainability (Ayabei et al., 2023).

In addition to the current transformations taking place in financial markets, certain constraints such as the potential reduction in the confidentiality and security of financial systems can be identified as major challenges in developing accounting technology services, particularly in developing countries like Iran. These nations often face substantial gaps in adopting network-based financial business services due to various factors, including limited institutional oversight and the absence of effective scientific or technological cooperation with more developed economies. Emerging financial markets, given their limited preparedness to engage in new domains of financial transactions such as digital currencies, can no longer rely solely on the traditional functional boundaries of accounting systems. Instead, they increasingly require online services from international firms to ensure the security and reliability of financial exchanges. However, an issue overlooked in prior studies (e.g., Abikoye et al., 2024; Offiong et al., 2024; Nwoke, 2024), which primarily emphasized the efficiency of financial technologies, concerns the lack of adaptive alignment between the content of business software packages and the infrastructural functions of digital accounting systems. This misalignment has led to inconsistencies between firms' financial functions and the informational needs necessary to achieve greater legitimacy. Accounting systems, in disclosing financial performance, depend not only on institutional standards and regulatory frameworks but also on broader cultural, social, economic, and even political contexts. Therefore, achieving legitimacy for software-based accounting services—particularly in Iran—requires strategic attention to these operational and contextual factors. In light of these considerations and the theoretical gap identified, the following section presents the study's theoretical foundations, supported by relevant literature. Section Three explains the research methodology, Section Four provides the empirical analysis, and the final section offers an interpretive discussion and conclusion based on the study's findings.

2. Theoretical foundations

Owing to its long-standing role in information disclosure for users, accounting knowledge has undergone fundamental transitions from classical to neoclassical and, more recently, to postmodern approaches. Over the past few decades, the accounting profession has played a vital role in meeting the expectations of diverse stakeholders—including investors, managers, and shareholders—through its integration with information systems (Loo & Bots, 2018). In this context, Accounting Information Systems (AIS) have gathered data from external environments, processed it, and delivered reliable output information to stakeholders in the shortest possible time (Rakhshani et al., 2023). However,

these systems, including earlier generations of accounting information technologies, still rely on traditional, well-defined processes grounded in the power and capacity of data banks. They are primarily regarded as tools for disclosing financial functions to satisfy stakeholders' expectations rather than mechanisms for generating higher competitive capabilities (Soleimani et al., 2024).

Digital accounting, as one of the core process mechanisms, is no longer regarded merely as a tool for tracking business financial activities or monitoring numerical and financial data to inform stakeholders—functions traditionally associated with Accounting Information Systems (AIS) (Antonini, 2024). Leveraging the technological capacities embedded in software packages such as QuickBooks, digital accounting systems have incorporated additional specialized functions, including planning, budgeting, and forecasting future financial changes (Laili et al., 2023). In this regard, digital accounting should not be viewed solely as a facilitator of information provision. Supported by institutionalized computational and estimation services, it demonstrates a higher degree of proactivity in generating value for stakeholders (Sadri et al., 2023). Accordingly, Table 1 presents a comparative summary of these two generations of technology in the accounting field, based on prior studies such as Prasetianingrum and Sonjaya (2024).

Table 1. Differences between accounting information systems and digital accounting

Criteria of Difference	Information Systems	Digital Accounting
In terms of goal setting	Based on internal structures	Based on external structures
In terms of operations	Static and fixed	Dynamic and automated
In terms of execution	Systematic rotation	Networked and structured
In terms of development	Focused on current affairs	Forward-looking and simulation-based

Referring to these distinctions, it becomes evident that information systems can only achieve effective goal-setting based on internal capabilities when the functional infrastructure within the financial domain enables efficient data sharing. In contrast, digital accounting primarily focuses on external requirements, where boundary-expanding environmental systems facilitate the dual reflection of informational flows—both internally and externally. From an operational perspective, earlier generations of financial technology systems were static and rigid, with operators and processors merely supporting decision-making processes. In the new generation, however, artificial intelligence (AI) agents, robots, and avatars contribute to a dynamic and automated flow of information. From an execution standpoint, previous generations of information systems primarily circulated data to meet strategic objectives. Conversely, digital accounting operates through networked, star-shaped information structures in which data circulates according to organizational needs. In terms of development, prior systems were mainly focused on current affairs, while digital accounting systems function within networked and simulation-based environments. The advancement of simulation tools and software packages has positioned digital accounting as a decisive factor in enhancing financial flexibility and reducing costs (Thottoli, 2021). A key aspect of sustaining these systems lies in the infrastructural transformation of corporate technologies, particularly regarding information flow. Such transformation allows users to access data and performance information through defined system identifiers (e.g., electronic identification numbers, or eIDs) (Valentinetti & Rea, 2024). Therefore, depending on the technological infrastructure utilized, digital accounting should be recognized as an integrated and alternative approach to traditional accounting methods, enabling real-time monitoring of financial information via mobile devices and other electronic tools (Dethier et al., 2024). These software-based systems provide users with predefined interfaces and analytical modules to process or evaluate specific categories of accounting procedures, tailored to their informational needs (Napisah et al., 2024). Today, many international financial technology firms offer software packages that align with the structure and services of digital accounting systems, as

illustrated in Figure 1.

Figure 1. Features of commercial services in international software packages

By transforming traditional reporting methods and redefining input data flows, software packages aim to achieve rapid data processing and analysis while maintaining high levels of user security. These systems enable firms to request personalized financial disclosures from users, aligned with their operational strategies. Such capabilities enhance the uniqueness of financial computations, and with the support of online functionalities, companies can swiftly provide operational financial outputs to users. Consequently, the commercialization of digital accounting systems through international software providers has made it possible for businesses in various countries to enhance the transparency of their financial reporting. Despite this progress, however, the topic remains largely absent from contemporary financial reporting standards—particularly the International Financial Reporting Standards (IFRS). This omission can be attributed to several factors: the limited maturity and adoption of digital accounting norms within capital market systems, restricted access to financial technology infrastructure in many developing economies, insufficient investment flows in corporate technological initiatives, and the absence of dedicated evaluation committees or financial accelerators to support innovation. Collectively, these challenges have resulted in a notable gap within financial standards concerning this critical area of financial markets. At the same time, modern software packages increasingly emphasize the sustainable development of digital accounting across different regions (Lacy et al., 2019). In one such classification, Said and Aliu (2022) differentiated the operational processes of commercial financial software packages according to their functional scope and regional implementation contexts.

Figure 2. Operational processes of financial software business packages

As illustrated in Figure 2, digital accounting—facilitated through commercial software packages developed by international financial technology firms—enables the development of six operational phases across key areas, including cost management, inventory control, credit management, project costing, financial supply chain management, and investment project evaluation. These phases form the core foundations of supplementary reporting functions within financial statements, guiding them toward greater sustainability. By achieving higher levels of financial transparency, firms can gain substantial competitive advantages. Furthermore, the legitimacy of developing such technological mechanisms can be conceptualized through the framework proposed by Xiu et al. (2020), which identifies key dimensions of legitimacy that contribute to enhancing the effectiveness of corporate functions, as illustrated in Figure 3.

Moral Legitimacy **Adherence to stakeholder rights** **Adherence to individual rights**	**Practical Legitimacy** **Stakeholder promotion** **Management information systems**	**High**	**Stakeholder Value**
Selective Legitimacy **Organizational efficiency** **Resource management**	**Structural Legitimacy** **Social accountability** **Organizational transparency**	**Low**	
Exclusive	Competitive		
Social Norms			

Figure 3. General approaches to corporate legitimacy in the field of technology (Source: Xiu et al., 2020)

According to this matrix, and consistent with prior perspectives on the structure of legitimacy, stakeholder values (vertical axis) and social norms (horizontal axis) constitute the fundamental dimensions for establishing legitimacy in the new generation of digital technologies. The intersection of these two axes gives rise to four quadrants of organizational legitimacy—practical, moral, cognitive, and structural—each representing distinct functions and characteristics corresponding to its position within the matrix.

- *Practical Legitimacy*

Within this form of legitimacy, computational processes are oriented toward advancing stakeholders' interests. Information systems, grounded in shared values and social norms, provide meaning to the inter-organizational interactions between firms and their stakeholders. In essence, practical legitimacy represents the highest level of social benefit an organization can attain by internalizing societal values and transforming them into elements of organizational identity (Breakey, 2020).

- *Moral Legitimacy*

Within this form of legitimacy, the evaluation of positive social values forms the foundation for upholding stakeholders' social rights and the rights of human resources within organizations. Unlike practical legitimacy, moral legitimacy primarily represents adherence to resources and actions aligned with legal frameworks and established social norms. In this form of legitimacy, fewer innovative or emergent value norms are developed, as the emphasis remains on conformity and ethical compliance rather than innovation (Reinecke et al., 2017).

- *Structural Legitimacy*

Within this form of legitimacy, the direct emphasis on stakeholder values is relatively diminished, while social norms—grounded in an expanded framework of laws, accountability mechanisms, and transparency standards—become the primary basis for legitimacy creation. What matters most are the measurable values that can be assessed through specific performance metrics. In cognitive legitimacy, organizational values are shaped through competition and benchmarking among firms, with fewer benefits directly derived from stakeholders' subjective or perceptual evaluations (Lock and Schulz-Knappe, 2019).

- *Selective Legitimacy*

Within this form of legitimacy, only those values and norms that align with organizational interests are acknowledged. In other words, organizations, guided by the actionable expectations of their stakeholders, seek to enhance efficiency by emphasizing positive disclosures to their audiences. Owing to resource constraints, they attempt to minimize potential limitations and maximize access to emerging opportunities. Consequently, structural legitimacy reflects an approach of informational selectivity, whereby organizations communicate tailored information to stakeholders to build trust and maintain alignment with strategic objectives (Xiu et al., 2020).

Li et al. (2024), in their study on the design of an intelligent accounting system based on microcontrollers, emphasized that achieving digital legitimacy in accounting requires a higher degree of alignment between software functionality and hardware infrastructure. According to their findings, data-storage systems must be capable of creating central processing units within monitoring centers to facilitate the integration of input and output data analyses, thereby enabling the evaluation of larger volumes of information. Similarly, Gao (2024) investigated the development of startups among small and medium-sized enterprises (SMEs) in China to promote digital financial accounting. The study concluded that investment in digital accounting infrastructure significantly influences senior clients' intentions to adopt such systems. Moreover, the adoption of financial startups enables faster access to information, allowing users to make higher-quality and more legitimate financial decisions. In another related study, Pham and Vu (2022) examined the cost-effectiveness of digitalizing accounting information to enhance the added value of a sustainable innovation ecosystem within SMEs. Their

findings revealed that as digitalization in accounting expands, the added value and sustainability of the innovation ecosystem are expected to increase accordingly.

A review of prior research reveals that previous studies have largely overlooked the specific needs of digital accounting in relation to available software packages. Recognizing this gap highlights the contribution of the present study and clarifies its position within the broader field of accounting knowledge. Given that modern digital accounting systems are increasingly essential for establishing financial identity within operational functions—and for enabling firms to deliver more comprehensive services to users of financial information—adopting a legitimacy-based framework can facilitate the preparation of more reliable and process-oriented financial information. Depending on firms' strategic orientations and competitive positions across industries and markets, the pursuit of legitimacy may manifest differently, making its achievement a distinctive process. Accordingly, this study aims to explore the integration of software service requirements with the sustainable development of digital accounting among companies listed on Iran's capital market. In other words, it seeks to assess the level of financial needs embedded in digital accounting functions with respect to future market prospects, thereby addressing the evolving expectations of stakeholders and information users. Based on these objectives, the research questions are formulated as follows:

First Research Question: What are the system requirements for the legitimacy of digital accounting based on software services development in Iran?

Second Research Question: What are the future perspectives for the legitimacy of digital accounting based on software services development in Iran?

Given the foresight-oriented nature of this study, the first phase involves conducting interviews with experts to identify the system requirements that can enhance the legitimacy of digital accounting through the use of software services. The insights obtained from these interviews will inform the analytical matrix sequencing process employed in the foresight analysis. Subsequently, an uncertainty questionnaire will be administered to identify potential driving forces related to the core phenomenon. Based on these drivers, probable scenarios influencing the future legitimacy of digital accounting—rooted in the use of software services within the Iranian context—will be developed and analyzed.

2.1. Literature review

Li et al. (2024) examined the hardware components of software systems based on data-storage sources controlled by a central processing chip for input data analysis. Their proposed intelligent accounting system is capable of evaluating larger volumes of data using predefined parameters. The findings indicate that expanding data sources and databases, as well as increasing the speed of financial computations through this microcontroller-based system, can provide more reliable information for managerial decision-making. In a separate study, Gao (2024) employed a quantitative methodology using a researcher-designed questionnaire. The findings revealed that facilitating investment in digital financial accounting infrastructure significantly influences senior clients' intentions to adopt such systems. Furthermore, leveraging financial startups allows users to access information more rapidly and make higher-quality financial decisions. Gao also found that promoting digital accounting through startup mechanisms can ensure greater stability and accountability to customers. Customer trust, in turn, can be strengthened by guaranteeing data security, ease of access, continuous system updates, and reliable program content.

Pham and Vu (2022) employed a three-dimensional methodology comprising a literature review, expert interviews, and a survey. Qualitative data were collected through a series of semi-structured, in-depth interviews, while quantitative data were obtained from a questionnaire administered to 583 respondents. The data were analyzed using covariance-based structural equation modeling (CB-SEM) via AMOS 26.0 software. The findings indicated that, although the model structures demonstrated a

satisfactory fit, the digitization of accounting procedures can enhance the added value of sustainable innovation ecosystems within small and medium-sized enterprises (SMEs). Similarly, Sheikhi et al. (2023) identified three primary causal categories—individual, organizational, and environmental constructs—as well as three contextual categories: technology application, infrastructure enhancement, and improvement of accounting information systems. They also defined four strategic categories and two outcome categories, encompassing both positive and negative consequences related to the core phenomenon of the study. The results underscored the significance of adopting emerging technologies compatible with accounting information systems, alongside the necessity of regulatory oversight and managerial support during the implementation process. By emphasizing the positive implications of such technologies, organizations can better eliminate barriers and mitigate adverse outcomes. In a complementary study, Ghashghaei and Mashayekh (2019) proposed a five-level framework for process maturity within accounting units: (1) informal processes, (2) formalized processes, (3) integration and automation of core processes, (4) alignment of processes with strategic objectives while managing exceptions, and (5) continuous process improvement from good to excellent. They also outlined five levels of information technology (IT) maturity: (1) financial accounting or bookkeeping software, (2) financial, administrative, and commercial software solutions, (3) integrated software solutions, (4) Enterprise Resource Planning (ERP)-based systems, and (5) artificial intelligence (AI)-driven solutions.

A review of the existing literature reveals that prior studies have largely overlooked the assessment of digital accounting needs in relation to available software solutions. Recognizing this gap highlights the contribution of the present study, which seeks to advance accounting knowledge by providing a clearer understanding of digital accounting development and its legitimacy dimensions.

3. Methodology

In humanities-related research, methodology typically comprises three components: objective, outcome, and data type—each contributing to a clearer understanding of a scientific inquiry. First, in terms of the objective, this study is exploratory in nature, as it investigates an emerging phenomenon that, despite its significance for achieving sustainable development, has not been adequately examined within the national context. Accordingly, this section adopts the theoretical foundation of grounded theory to identify system-based needs for the effective development of digital accounting aligned with future software services. Second, regarding the outcome, the study is classified as developmental. From an epistemological standpoint, the focus on a single central phenomenon enables conceptual integration and contributes to the refinement of existing theoretical structures. Moreover, the study partially addresses the lack of conceptual coherence identified in previous research, thereby supporting the advancement of future studies in this area. Third, with respect to the data type, this research employs a mixed-methods approach, implementing both inductive and deductive reasoning to achieve the study's objectives. In the inductive phase, grounded theory and Delphi analyses are used to explore the systemic mechanisms underlying the central phenomenon, based on expert interviews and checklist-based evaluations. In the deductive phase, analytical matrices and uncertainty checklists are utilized to map prospective scenarios. An overview of this implementation process is illustrated in Figure 4.

In summary, following the expert interviews and Delphi analysis, linkage matrices were developed based on the mean values and consensus coefficients. These matrices were constructed using ordinal values of "1," "2," and "3," representing the strength and direction of impact relationships among the driving themes. By identifying the inputs and outputs, these relationships form the basis for constructing the MICMAC matrix. The MICMAC analysis classifies themes according to their

influence and dependence, with those positioned in the independent quadrant serving as the foundation for scenario analysis. Each theme in this quadrant is then characterized in three potential states—"positive," "neutral," and "critical"—to establish the uncertainty checklist. Subsequently, a cross-impact matrix is developed to identify the relationships among these themes and to distinguish desirable, stable, and critical scenarios. Finally, each scenario is articulated through a detailed descriptive statement that outlines its defining characteristics and implications.

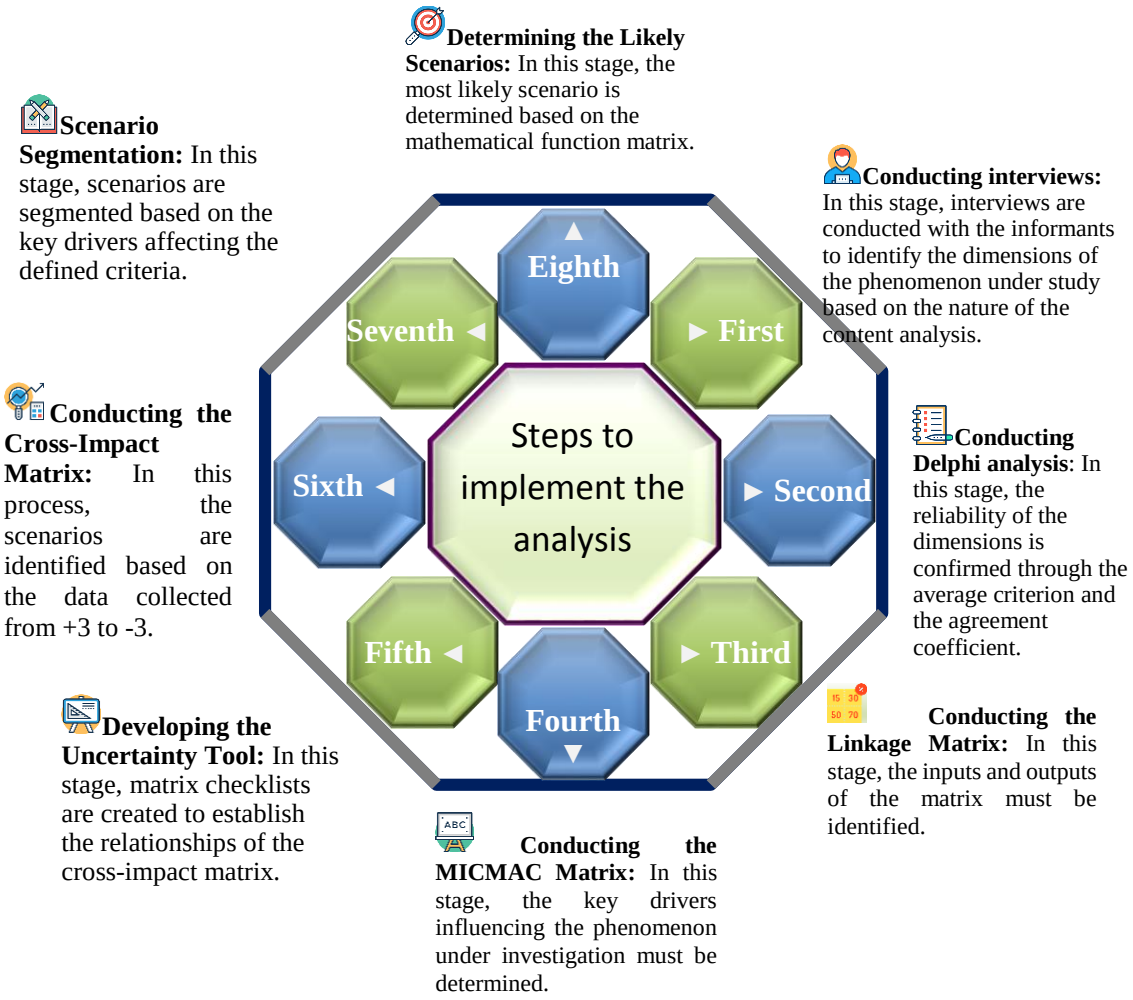

Figure 4. Overview of analytical implementation processes

3.1. Participants of the study

Given the mixed-methods design of this study, participants in the qualitative phase comprised experts in the field of accounting—particularly those with in-depth knowledge of systemic and software-related aspects of accounting practice. The sampling process combined purposive and snowball techniques. Data collection through interviews continued until theoretical saturation was achieved, meaning that no new concepts or relationships emerged from the data. During theoretical sampling, interviews were conducted iteratively to ensure that the primary themes were fully saturated. In the snowball sampling stage, additional participants were identified through referrals provided by initial interviewees. Expert selection was guided by the criteria of relevance, differentiation power, and contextual awareness, as well as interpretive understanding, following the

recommendations of Henwood and Pidgeon (1992). The objective was to recruit experts with substantial theoretical knowledge and prior research experience in domains related to the central phenomenon under investigation. Accordingly, 14 experts meeting these criteria were interviewed, each demonstrating a high level of interpretive and analytical capability.

In the quantitative section of the present study, 23 financial managers and accountants with experience in capital market companies, who had a solid understanding of accounting system software, were selected through purposive and convenience sampling methods. The limited number of participants in this section was determined based on the guidelines for conducting system representation analysis, which, due to the number and complexity of participation processes, recommend an optimal range of 15 to 30 participants according to studies by Northcutt and McCoy (2004), Davis (2019), and Behling et al. (2022).

3.2. Data collection process of the study

The section below describes the study's data collection tools and provides a separate interpretation of each aspect of the analytical implementation process.

a) Data collection method based on Grounded Theory

As outlined in the methodology of this study, due to the lack of coherent and integrated dimensions related to this phenomenon, grounded theory and expert interviews were employed. Glaser's (1992) emergent approach to grounded theory analysis was applied in this process. After each interview, open, axial, and selective coding were performed sequentially. In this approach, the theory emerges from within the phenomenon under study, and researchers do not begin with rigid assumptions about the issue being investigated. Instead, they conduct in-depth and semi-structured interviews based on fragmented theoretical literature until theoretical saturation is achieved. A key feature of the emergent grounded theory strategy is that data analysis and coding occur concurrently with the interview process (Kalalian Moghadam et al., 2020).

After the initial themes emerged from open coding, the interviews continued in both semi-structured and structured formats to differentiate components within broader categories until theoretical saturation was reached. It is important to note that during the interviews, the questions were continuously refined based on the interview conditions and the experts' responses, ensuring that the data coding process remained aligned with the main flow of the phenomenon under study. According to the interview protocol, open-ended questions were asked iteratively with the experts. At the end of each interview, efforts were made to categorize similar open codes within a single component in the first classification layer. Subsequently, through axial coding, similar components were grouped into higher-level categories. A critical point in this process was the scientific consideration of the timing for completing the interviews. For this purpose, the theoretical saturation procedure was applied—after each interview, open coding and, to some extent, axial coding were conducted to identify emerging concepts and overlaps, thereby clarifying the categorization of components and categories within a theoretical framework. By combining data collection methods, including unstructured and semi-structured interviews, theoretical notes were taken during and immediately after each interview to ensure the reliability of the identified themes. This approach helped minimize potential coding bias resulting from the interviewers' mental preparedness from prior sessions. Through this process, 14 interviews were conducted. Theoretical saturation was approximately achieved after the eighth interview due to the depth of responses. Subsequent interviews focused on balancing and validating the identified codes through additional semi-structured discussions. By the fourteenth interview, it became evident that no new or divergent concepts were emerging. Accordingly, data collection was concluded, and axial and selective coding

were initiated.

b) Implementation process of Delphi Analysis in determining reliability and consensus Thresholds for key themes

Once the main themes derived from the core phenomenon in the grounded theory analysis were identified, fuzzy Delphi analysis was employed to assess the reliability of the dimensions identified in the qualitative phase. Given the matrix-based nature of the quantitative analysis in this study, the use of fuzzy Delphi analysis provided a more practical approach for measuring reliability. Due to its reliance on fuzzy linguistic scales, this method offers strong validity for generalizing the identified criteria to the study context. Therefore, fuzzy analysis was applied to determine reliability, taking into account the potential dispersion of theoretical perceptions regarding the dimensions identified in the qualitative process. The Triangular Fuzzy Number (TFN) scale, which incorporates linguistic criteria, was utilized in this analysis.

c) Implementation process of scenario development

As a foresight-oriented research technique, scenario development commonly employs matrix-based methods to identify the key driving forces that emerge from the initial exploration of the studied phenomenon. Accordingly, the linkage matrix is applied to determine the principal drivers derived from the components identified in the qualitative phase of the study. During the pairwise comparison process—where each relationship between row i and column j is examined—the relative position and influence of each main theme are established. These relationships are then represented in the MICMAC matrix, as illustrated in Figure 5.

Indicating Output (Influence Power)	*Independent Quadrant**	Linkage Quadrant
	Autonomy Quadrant	Dependent Quadrant
	Indicating Input (Dependency Power)	

Figure 5. MICMAC reference matrix

As illustrated, the MICMAC matrix comprises four quadrants formed by the intersection of two indicators: output (influence power) and input (dependency power). Each key component is positioned within the matrix based on the pairwise comparison of row i and column j in the linkage matrix, which determines its relative level of influence and dependence. According to participants' scores in the matrix checklists, two key components located in the independent quadrant were identified as the primary drivers of the central phenomenon under investigation. Subsequently, an uncertainty questionnaire was developed using the values "+3," "0," and "–3," representing the "positive," "neutral/constant," and "negative" states, respectively. This instrument served as the foundation for constructing the uncertainty matrix, which facilitated the identification of potential scenarios for the future development of effective digital accounting services within Iran's software service industry.

3.3. Data validation process

Since the first phase of this study aims to identify the legitimacy mechanisms of digital accounting systems with an emphasis on the development of software services in Iran, it is essential to validate the collected data to ensure that the identified dimensions of the framework can be appropriately generalized to the study context. To achieve this, the triangulation method was employed in this phase

of the research. The validation process evaluated the robustness of the identified constructs across four dimensions: data source triangulation, researcher triangulation, methodological triangulation, and theoretical triangulation. Establishing these four forms of validation enhances the credibility and trustworthiness of the generated codes, thereby ensuring their suitability for expansion in the second phase of the study and minimizing potential interviewer bias. The results presented below illustrate the degree of data validity derived from the interview findings within the thematic analysis process.

Triangulation of data sources: The objective of this triangulation component was to engage knowledgeable individuals who possessed both theoretical and practical expertise related to the central phenomenon. At this stage, a multi-stage expert selection process was implemented to ensure the participation of individuals with higher levels of subject-matter awareness. Consequently, this triangulation dimension was confirmed in terms of content alignment, verifying that the selected participants were well-suited to contribute meaningfully to the study's objectives.

Triangulation of researcher collaborators: This triangulation dimension aimed to assess the credibility of the generated codes through peer evaluation. In this study, efforts were made to validate the analytical sequence of the data coding process by engaging other faculty members and doctoral students who had previously conducted, or were currently conducting, similar research. The feedback received from these peer reviewers confirmed the consistency and rigor of the coding procedures employed in this study.

Triangulation of methods: This triangulation dimension aimed to assess how theoretical saturation was achieved during the interview process. By comparing the coding procedures of this study with those reported in previous qualitative research, the methodological implementation was validated.

Triangulation of Theory: This triangulation dimension established the linkage between key components and structural categories, facilitating the transition from axial to selective coding. Adherence to grounded theory principles in defining justifiable titles during the selective coding phase ensured theoretical consistency. Consequently, the validity confirmed through this form of triangulation provided a solid foundation for content alignment and reinforced the conceptual integrity of the emerging framework.

4. Findings

In this study, the findings are presented separately according to the type of analysis employed in data collection and interpretation.

In the first part, grounded theory analysis was conducted in alignment with the data collection process and the methodological framework. To this end, three stages of coding—open, axial, and selective—were carried out to identify the dimensions of the phenomenon under investigation and to develop the corresponding theoretical framework. Based on the data obtained from the interviews, Table 2 presents the results of this three-stage coding process, illustrating the progression from initial concepts to core categories.

Table 2. Legitimacy mechanisms of digital accounting based on the development of software services

Main Codes			
Open Coding	**Axial Coding**	**Selective coding**	**Theoretical Codes**
Conceptual Themes	**Core Components**	**categories**	**Main class**
Estimation of Annual Human Resources Premiums Estimation of Fair Overtime Hours for Human Resources Estimation of Continuous and Non-continuous	Systemic mechanisms related to wages and salaries	The system needs within the accountin	The legitimacy of digital accountin g based on the

Benefits for Human Resources	Systemic mechanisms related to financial planning	Systemic needs of competitive strategies of the accounting unit
Estimation of Base Seniority for Human Resources		
Estimation of Legal Deductions for Human Resources		
Planning for Selecting an Investment Plan and Project		
Planning for Resource Budgeting and Avoiding Redundancy		
Planning for Securing Required Financial Resources		
Planning for Optimal Allocation of Financial Resources to Projects and Plans		
Planning for Determining the Capital Recovery Period		
Planning for Managing the Execution Costs of Projects and Plans		
Determining the Inventory Needed for the Production Line According to the Scheduled Program	Systemic mechanisms related to the supply chain	
Determining the Reserve of Raw Materials for Production		
Determining the Costs Related to Securing Inventory from Order to Warehouse Entry		
Determining the Inventory Turnover Based on Logistical Assessment		
Determining the Overhead Costs from the Supply Chain to the Production Line		
Determining the Relative Expiration of Inventory through Data Mining (DEA)		
Access to Customer Hierarchy from Wholesale to Retail in the Customer Tab	Systemic mechanisms related to customers	
Quick Access to Categorized Customer Invoices		
Access to Customer Categories Based on Type of Service and Product Requests		
Access to Customer Prepayments and Service Sequences for Customers		
Access to Customer Purchase Orders and Categorizing Customers Based on Service and Product Types		
Estimating Net Profit Margin in Company Financial Strategies	Systemic mechanisms related to profitability	Accounting unit infrastructure system needs
Estimating Operating Profit Margin in Company Financial Strategies		
Estimating Return on Equity in Company Financial Strategies		
Estimating Return on Assets in Company Financial Strategies		
Estimating Owner's Return on Company Financial Strategies		
Evaluating Tax Exemptions	Systemic mechanisms related to evaluation	
Evaluating Payable Taxes		
Evaluating the Progress of Investment Projects and Plans		
Evaluating the Revenues from the Implementation of Investment Projects and Plans		
Evaluating Market Conditions for Determining Competitive Strategies		
Evaluating Competitors in Terms of Financial Efficiency		

Through the three-stage coding process conducted via expert interviews, three main categories were identified. These categories were developed to ensure conceptual alignment with the fragmented theoretical foundations related to the studied phenomenon. The definitions and descriptions of each category are briefly summarized in Table 3, as presented below.

Table 3. Definitions of main categories

Identified Categories	Definition
Intra-structural Systemic Needs of the Accounting Unit	The first category encompasses a set of systemic processes embedded within the organizational structure of accounting units. Considering the potential of digital accounting systems to leverage business services offered by financial software providers, this category focuses on enhancing the integration and utilization of accounting software for functions such as payroll calculations and financial planning. Strengthening these processes contributes to the formulation of future corporate strategies related to financial policies and market positioning. On one hand, this category promotes dynamism and balance in payroll management—particularly in the estimation of insurance liabilities and other legally mandated benefits. On the other hand, it stabilizes corporate financial planning through the efficient allocation of resources, the selection of investment projects, and the determination of payback periods within a coherent systemic framework.
Strategic Systemic Needs of the Accounting Unit	The second category encompasses a set of systemic processes related to the competitive strategies of accounting units. Drawing on the needs assessment of digital accounting in utilizing business services offered by financial software vendors, this category assists companies in formulating operational strategies aimed at expanding market share—both in sourcing raw materials for production and in reaching a broader customer base. Within this systemic process, firms typically establish supply chain mechanisms to monitor inventory levels, safety stock, and turnover rates up to the production line. This continuous cycle within the digital accounting system helps prevent excessive holding costs and ensures efficient resource management. Furthermore, in the customer domain, the digital accounting needs assessment emphasizes developing analytical capabilities that distinguish between major and minor clients and identify discrepancies in sales invoices. These analytical functions can be further enhanced through advanced software tools integrated into future business service platforms.
Extra-structural Systemic Needs of the Accounting Unit	The third category encompasses a set of systemic processes related to the extra-structural functions of accounting units. This category addresses the informational needs of stakeholders—from institutional and investment perspectives—by providing insights into corporate profitability and financial performance evaluation. With respect to profitability mechanisms, digital accounting needs assessments seek to deliver comprehensive reports that incorporate key financial ratios as supplementary information for stakeholder decision-making, leveraging future advancements in financial software. Regarding performance evaluations, the findings highlight that business services offering digital accounting solutions should provide integrated reports—complementary to financial statements—that assess corporate performance from tax, investment, project, and market competitiveness perspectives. Such accessible reporting enhances the company's transparency and can improve its credit rating with regulatory authorities.

Based on the definitions presented in Table 3, the identification of the main themes derived from open coding, the components obtained through axial coding, and the categories identified in selective coding led to the development of a multidimensional framework describing the systemic legitimacy mechanisms of digital accounting in relation to the development of software services in Iran.

According to the theoretical framework of the study (Figure 6), this framework comprises three categories, six components, and 33 conceptual themes. As shown in Table 4, the distribution and frequency percentages associated with the three-stage coding process are specified.

After identifying the qualitative aspects of the study and determining the frequency distribution

for each dimension of the central phenomenon, the next step involved applying the fuzzy Delphi method to assess the reliability of the identified core components. The Delphi analysis served as a bridge connecting the qualitative and quantitative phases of the research. Evaluating the reliability of the dimensions within the developed model enabled the formulation of research instruments for the target population in the quantitative phase. In this study, the fuzzy Delphi analysis was employed to verify the reliability of the primary components of the proposed model. To conduct this analysis, triangular fuzzy numbers (TFN) were utilized, based on a five-point linguistic scale, as presented in Table 5.

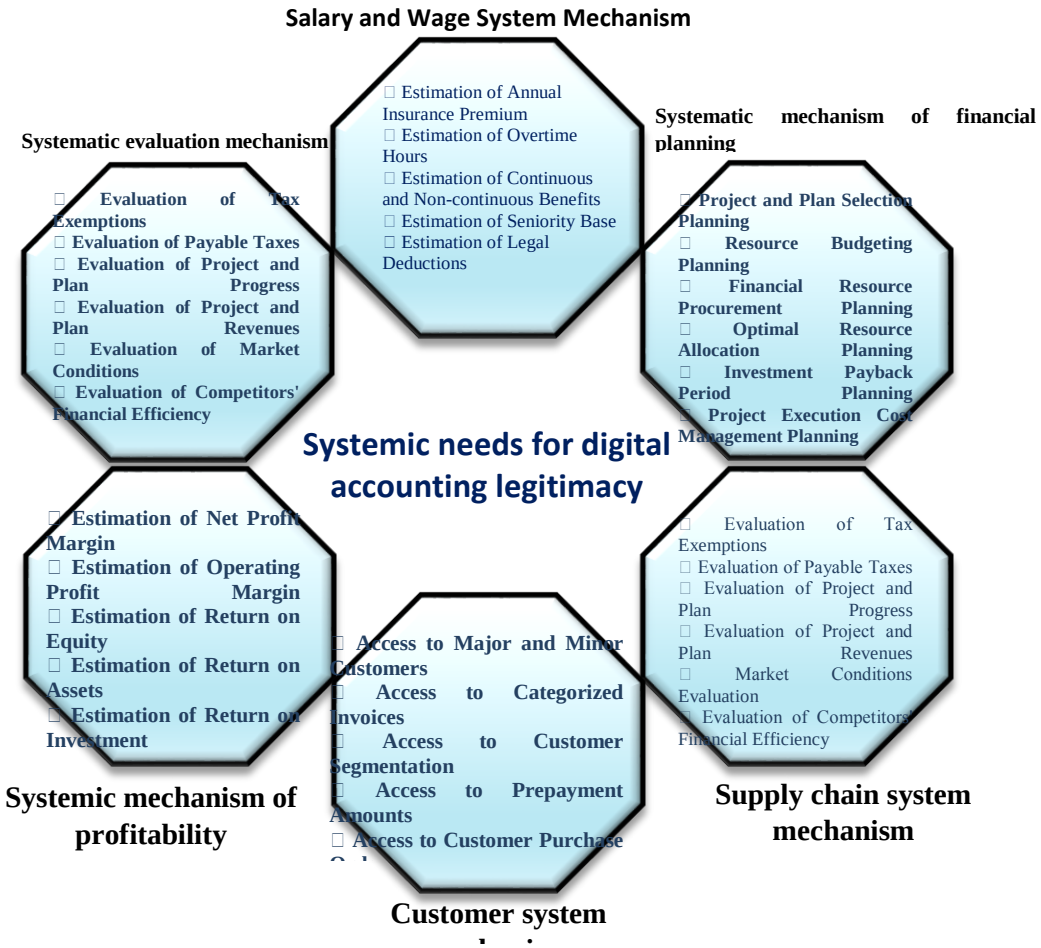

Figure 6. The framework of digital accounting legitimacy mechanisms based on software service development (Source: Research findings)

Table 4. Breakdown of codes generated from conducted interviews

Identified Categories	Identified Components	Identified Themes	Number of Open Codes	Frequency Percentage
Intra-structural Systemic Needs of the Accounting Unit	Systemic Mechanisms Related to Payroll	5	92	32.62%
	Systemic Mechanisms Related to Financial Planning	6		
Strategic Systemic Needs of the Accounting Unit	Systemic Mechanisms Related to the Supply Chain	6	103	36.52%

Extra-structural Systemic Needs of the Accounting Unit	Systemic Mechanisms Related to Customers	5	87	30.86%
	Systemic Mechanisms Related to Profitability	5		
	Systemic Mechanisms Related to Evaluation	6		
Column Total	Six Identified Components	33	282	100%

Table 5. Triangular fuzzy numbers scale

Linguistic Scale	Linguistic Expressions	Fuzzy Numbers		
		U	M	L
1	Very High	10	7	9
3	High	9	7	5
5	Medium	7	5	3
7	Low	5	3	1
9	Very Low	3	1	0

Subsequently, an appropriate fuzzy scale was developed to collect and evaluate experts' opinions, which were expressed and recorded in fuzzy linguistic terms. In this method, experts typically articulate their judgments using three parameters—the minimum value, the most likely value, and the maximum value—represented as triangular fuzzy numbers (TFNs). In the next step, the experts' opinions were aggregated using the fuzzy averaging method, which consolidates the individual assessments into a single representative value. The fuzzy average of n triangular fuzzy numbers—reflecting the aggregated opinions of n experts—is calculated according to Equation (1).

$$F_{AVE} = \left(\frac{\sum l}{n}, \frac{\sum m}{n}, \frac{\sum u}{n}\right) \quad \text{Equation (1)}$$

Following the fuzzy aggregation of experts' opinions, a defuzzification process was performed to obtain a crisp value for each indicator. In other words, this step converts the aggregated fuzzy values into definitive numerical representations that reflect the collective judgment of the experts. To achieve this, the defuzzification formula presented in Equation (2) was applied.

$$DF_{ij} = \frac{\left|(u_{ij}-l_{ij})+(m_{ij}-l_{ij})\right|}{3} l_{ij} \quad \text{Equation (2)}$$

According to Equation (2), i denotes the number of experts, and j represents the number of evaluation criteria. The parameters, u_{ij}, m_{ij}, and l_{ij} correspond to the minimum, most probable, and maximum evaluation values for the j-th criterion, respectively. In the final stage of the analysis, a tolerance threshold was applied to filter and confirm the influential indicators. Consistent with the approach adopted by Boluo et al. (2019), this study employed a threshold value of 0.7. The determination of the threshold level may vary across studies, depending on the analytical design and researchers' methodological perspectives. In the present study, a defuzzified value equal to or greater than 0.7 was considered acceptable, while values below 0.7 were excluded from the final model.

Table 6. Reliability derived from fuzzy delphi analysis

Core Components	Abbreviation	u	m	l	Defuzzified Value (Mean)	Outcome
Systematic mechanisms related to wages	X_1	0.830	0.780	0.690	0.740	Approved
Systematic mechanisms related to financial planning	X_2	0.860	0.810	0.730	0.770	Approved
Systematic mechanisms related to the supply chain	X_3	0.900	0.860	0.780	0.820	Approved

Systematic mechanisms related to customers	X_4	0.870	0.830	0.740	0.780	Approved
Systematic mechanisms related to profitability	X_5	0.920	0.880	0.810	0.820	Approved
Systematic mechanisms related to evaluation	X_6	0.890	0.850	0.770	0.800	Approved

Based on the defuzzified sectional means of each dimension derived from the research framework— all exceeding the threshold value of 0.7—it was determined that the identified qualitative dimensions possess sufficient reliability for further analysis. Accordingly, these validated dimensions were extended to the systematic representation evaluation in the quantitative phase of the study. Subsequently, and in line with the study's second research question, the foresight analysis was applied to identify the key driving forces, as presented in Table 7, using the linkage matrix. This matrix operates along contextual axes, where its input and output relationships are used to determine the relative influence of each driving factor. In this framework, the directional arrows represent the flow of influence between components: an arrow pointing to the right (→) indicates the direct influence of the core component in row i on column j, whereas an arrow pointing to the left (←) denotes the reverse influence of the core component in row j on row i.

Table 7. Implementation of the bond matrix process

Level 1 / Bonding relationships of system mechanisms related to wages and salaries with other criteria					
Row indicator	$j \leftarrow i$ ←	$j \rightarrow i$ →	$j \neq i$ ⃠	**Column indicator**	**Frequency**
System mechanisms related to wages and salaries	-	→	-	System mechanisms related to financial planning	20
System mechanisms related to wages and salaries	-	-	⃠	System mechanisms related to the supply chain	19
System mechanisms related to wages and salaries	-	-	⃠	System mechanisms related to customers	16
System mechanisms related to wages and salaries	←	-	-	System mechanisms related to profitability	18
System mechanisms related to wages and salaries	-	-	⃠	System mechanisms related to evaluation	19
Level 2 / Bonding relationships of system mechanisms related to financial planning with other criteria					
System mechanisms related to financial planning	-	→	-	System mechanisms related to the supply chain	19
System mechanisms related to financial planning	←	-	-	System mechanisms related to customers	19
System mechanisms related to financial planning	←	-	-	System mechanisms related to profitability	21
System mechanisms related to financial planning	-	→	-	System mechanisms related to evaluation	20
Level 3 / Bonding relationships of system mechanisms related to the supply chain with other criteria					
System mechanisms related to the supply chain	-	→	-	System mechanisms related to customers	18
System mechanisms related to the supply chain	←	-	-	System mechanisms related to profitability	17
System mechanisms related to the supply chain	←	-	-	System mechanisms related to evaluation	19
Level 4 / Bonding relationships of system mechanisms related to customers with other criteria					
System mechanisms related to customers	-	→	-	System mechanisms related to profitability	19
System mechanisms related to customers	←	-	-	System mechanisms related to evaluation	20
Level 5 / Bonding relationships of system mechanisms related to profitability with other criteria					

System mechanisms related to profitability	-	→	-	System mechanisms related to evaluation	19

The results of the bond (linkage) matrix, derived from the pairwise comparisons, are presented in Table 7. Considering the frequency of responses from participants in the quantitative phase, these results provided the input–output structure of the central phenomenon, as shown in Table 8, which served as the foundation for constructing the MICMAC matrix. The frequency scores indicate the degree of consensus among participants for each pairwise comparison, reflecting the strength and direction of relationships between the variables positioned in the rows and columns of Table 8.

Table 8. Inputs and outputs of pairwise evaluation of core components

Core Components	Abbreviation	X_1	X_2	X_3	X_4	X_5	X_6	Output	Input
System mechanisms related to wages and salaries	X_1	0	←	–	–	↑	–	1	1
System mechanisms related to financial planning	X_2	↑	0	←	↑	↑	←	3	2
System mechanisms related to the supply chain	X_3	–	↑	0	←	↑	↑	3	1
System mechanisms related to customers	X_4	–	←	↑	0	←	↑	2	2
System mechanisms related to profitability	X_5	←	←	←	↑	0	←	1	4
System mechanisms related to evaluation	X_6	–	↑	←	←	↑	0	2	3

As presented in Table 8, the output values indicated by the upward arrow (↑, purple) and the input values indicated by the leftward arrow (←) were identified and classified. Based on these results, the relative placement of each evaluated contextual axis is illustrated in Figure 7. Within the MICMAC matrix, the output values derived from the pairwise comparison represent the driving power of the variables, whereas the input values correspond to their dependency power. This relationship enables the identification of key driving and dependent factors shaping the systemic structure of the phenomenon under study.

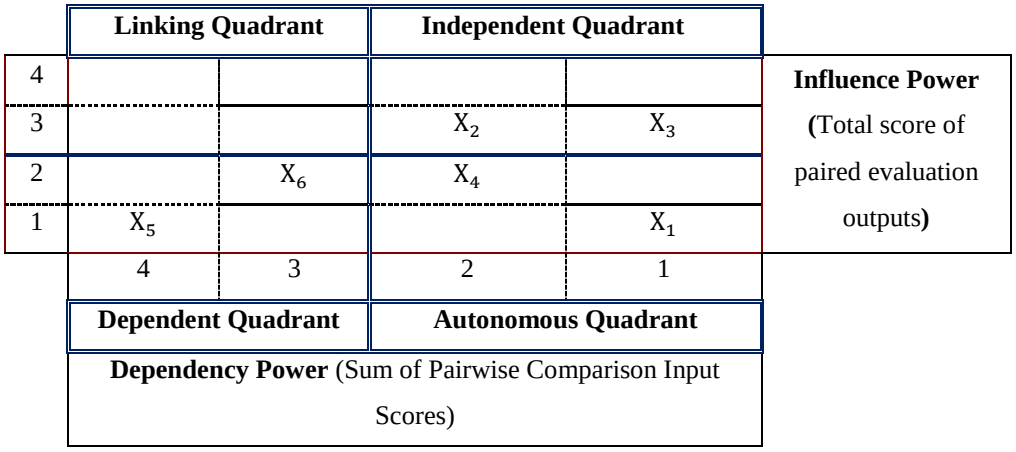

Figure 7. MICMAC matrix

By positioning each core component within the four quadrants of the MICMAC matrix, it was determined that two components—systemic mechanisms related to payroll systems (X_1) and systemic mechanisms related to customer management (X_4)—are located in the autonomous quadrant. These components exert minimal influence on other variables and are, in turn, only marginally affected by them. Conversely, systemic mechanisms related to evaluation systems (X_6) and systemic mechanisms related to profitability (X_5) fall within the dependent quadrant, indicating

a higher level of susceptibility to external influence. These dimensions tend to vary in response to changes in the components situated within the independent quadrant. Finally, two pivotal components—systemic mechanisms related to financial planning (X_2) and systemic mechanisms related to the supply chain (X_3)—occupy the independent quadrant, signifying strong influence over other variables within the system. These components were therefore identified as the key driving forces and serve as the foundation for scenario analysis. From the perspective of digital accounting legitimacy and the evolution of software services, these two core components highlight that the future trajectory of digital accounting will likely depend on the development of AI-driven financial programs, surpassing the capabilities of existing operational software systems.

Table 9. Redefinition of key drivers influencing the core phenomenon

Core Components	Conceptual Themes	Core Components	Conceptual Themes
Systemic mechanisms related to financial planning (X_2)	Planning for the selection of an investment plan or project	Systemic mechanisms related to the supply chain (X_3)	Determining the required inventory for the production line according to the scheduled plan
	Planning for resource budgeting to prevent redundancies		Determining the safety stock level of raw materials for production
	Planning to secure necessary financial resources		Determining the costs associated with inventory procurement, from ordering to warehouse entry
	Planning for the optimal allocation of financial resources to plans and projects		Determining inventory turnover rates based on logistical evaluations
	Planning to determine the payback period		Determining overhead costs from the supply chain to the production line
	Planning to manage the implementation costs of plans and projects		Determining the relative expiration rate of inventory through data mining (data envelopment analysis)

Table 10. Delphi analysis process for determining the reliability of key influential criteria

		(First Delphi Round)		(Second Delphi Round)		
	Core Themes	**Mean**	**Agreement Coefficient**	**Mean**	**Agreement Coefficient**	**Result**
Supply Chain Systemic Mechanisms	Determining the required inventory for the production line according to the scheduled plan	10.6	85.0	30.6	90.0	Confirmed
	Determining the safety stock level of raw materials for production	40.5	70.0	60.5	77.0	Confirmed
	Determining the costs associated with inventory procurement, from ordering to warehouse entry	00.6	80.0	10.6	85.0	Confirmed
	Challenges related to the fair value assessment of cryptocurrencies	00.4	40.0	Removed		
	Determining overhead costs from the supply chain to the production line	40.5	70.0	60.5	77.0	Confirmed
	Determining the relative expiration rate of inventory through data mining (data envelopment analysis)	50.5	70.0	00.6	80.0	Confirmed
Financial Planning	Planning for the selection of an investment plan or project	15.6	88.0	30.6	94.0	Confirmed

Systemic Mechanisms	Planning for resource budgeting to prevent redundancies	30.5	65.0	50.5	70.0	Confirmed
	Planning to secure necessary financial resources	15.5	60.0	35.5	67.0	Confirmed
	Planning for the optimal allocation of financial resources to plans and projects	30.5	65.0	50.5	70.0	Confirmed
	Planning to determine the payback period	50.5	75.0	00.6	80.0	Confirmed
	Planning to manage the implementation costs of plans and projects	50.3	35.0	Removed		

These AI-driven programs will need to accurately shape future financial supply chains through effective and adaptive financial planning. Given that the two identified components—systemic mechanisms related to financial planning (X_2) and systemic mechanisms related to the supply chain (X_3)—represent the most influential factors in establishing the legitimacy of digital accounting through software service development, the next stage of the research involves addressing the second research question through scenario development.

As outlined in Table 9, each conceptual theme related to these key components was redefined to construct the uncertainty questionnaire. To ensure the generalizability of these dimensions within the study context, the reliability of the conceptual themes—in alignment with their corresponding core components—was reassessed using the classical Delphi method. The results of this analysis, presented in Table 10, are based on two validation criteria: the mean value and the agreement coefficient.

Based on the findings of the two-stage Delphi analysis, which examined the reliability of the conceptual themes associated with the core components, out of twelve criteria proposed for scenario analysis, two were eliminated, while ten criteria (five per core component) were confirmed. Subsequently, as shown in Table 11, each conceptual theme was defined under three possible states—Positive, Neutral/Stable, and Negative—to facilitate the design of the uncertainty questionnaire. This questionnaire then serves as the foundation for the cross-impact matrix analysis, which identifies and structures potential future scenarios.

Table 11. Definition of possible states of key practical components

Core Components	Conceptual Themes	State	State name
System Mechanisms Related to Supply Chain "X_3"	Determining the inventory level required for the production line according to the schedule "X_3^1"	X_3^{11}	Legitimacy of digital accounting based on leveraging computational capacities to determine the production line's required inventory.
		X_3^{12}	Neutrality of the impact of leveraging software-based calculations of inventory required for the production line on the legitimacy of digital accounting.
		X_3^{13}	Insignificance of software-based calculations of inventory required for the production line on the legitimacy of digital accounting.
	Determining the safety stock level for raw materials for production "X_3^2"	X_3^{21}	Legitimacy of digital accounting based on leveraging software capacities for determining the safety stock level for production inventory.
		X_3^{22}	Conditional impact of inventory management policies on leveraging software capacities for determining safety stock levels on digital accounting.
		X_3^{23}	Neutrality of the impact of leveraging software capacities for determining the safety stock level on digital accounting.
	Determining the cost associated with supply inventory from order placement to warehouse entry "X_3^3"	X_3^{31}	The impact of developing software capacities in calculating inventory supply costs on the legitimacy of digital accounting.
		X_3^{32}	The appropriateness of the impact of developing software

			capacities in calculating inventory supply costs on the legitimacy of digital accounting.
		X_3^{33}	Neutrality of the impact of developing software capacities in calculating inventory supply costs on the legitimacy of digital accounting.
		X_3^{41}	Conducting software-based calculations of supply chain overhead costs as an effective driver of the legitimacy of digital accounting.
	Determining the overhead cost from the supply chain to the production line "X_3^4"	X_3^{42}	Focusing on software-based calculations of supply chain overhead costs to validate the current basis for digital accounting.
		X_3^{43}	Lack of impact of software-based calculations of supply chain overhead costs on the legitimacy of digital accounting.
		X_3^{51}	The influence of data mining computations in advanced financial software for predicting inventory expiration time on the legitimacy of digital accounting.
	Determining the relative expiration rate of inventory through data mining "X_3^5"	X_3^{52}	Appropriateness of financial policymaking in data mining computations for predicting inventory expiration time on the legitimacy of digital accounting.
		X_3^{53}	Neutrality of the impact of data mining computations in advanced financial software for predicting inventory expiration time on the legitimacy of digital accounting.
		X_2^{11}	Strengthening software capabilities in selecting investment projects as the basis for the legitimacy of digital accounting.
	Planning for the selection of an investment project or scheme "X_2^1"	X_2^{12}	Conditional reliance on software capabilities in selecting investment projects based on appropriate financial support as the basis for the legitimacy of digital accounting.
		X_2^{13}	Neutrality of the impact of software capabilities in selecting investment projects as the basis for the legitimacy of digital accounting.
		X_2^{21}	Strengthening software capabilities in resource budgeting as the basis for the legitimacy of digital accounting.
System Mechanisms Related to Financial Planning "X_2"	Planning for resource budgeting and preventing redundancies "X_2^2"	X_2^{22}	Conditional reliance on software capabilities in resource budgeting based on appropriate financial support as the basis for the legitimacy of digital accounting.
		X_2^{23}	Neutrality of the impact of software capabilities in resource budgeting as the basis for the legitimacy of digital accounting.
		X_2^{31}	Strengthening software capabilities in forecasting the provision of required financial resources as the basis for the legitimacy of digital accounting.
	Planning for the provision of required financial resources "X_2^3"	X_2^{32}	Conditional reliance on software capabilities in estimating the provision of required financial resources based on high financial leverage is the basis for the legitimacy of digital accounting.
		X_2^{33}	Neutrality of the impact of software capabilities in estimating the provision of required financial resources as the basis for the legitimacy of digital accounting.
		X_2^{41}	Developing software capabilities for optimal allocation of financial resources to investment projects as the basis for the legitimacy of digital accounting.
	Planning for optimal allocation of financial resources to projects and schemes "X_2^4"	X_2^{42}	Neutrality of the development of software capabilities for optimal allocation of financial resources to investment projects as the basis for the legitimacy of digital accounting.
		X_2^{43}	Lack of impact of developing software capabilities for optimal allocation of financial resources to investment projects as the basis for the legitimacy of digital accounting.
		X_2^{51}	Developing software capabilities for forecasting the investment payback period as a practical function of digital accounting.
	Planning to determine the investment payback period "X_2^5"	X_2^{52}	Conditional reliance on software capabilities on managerial ability in forecasting the investment payback period as a practical function of digital accounting.
		X_2^{53}	Neutrality of the impact of software capabilities in forecasting the investment payback period as a practical function of digital accounting.

By defining the potential states of each foundational theme under three conditions—Positive, Neutral/Stable, and Negative—a total of 30 evaluable scenarios were generated. Subsequently, experts were asked to complete a 30 × 30 uncertainty matrix questionnaire, specifying the relationship between each state according to three attributes: Reinforcing, Neutral, and Constraining, using a scale ranging from +3 to −3. The completed matrix was processed using the Scenario Wizard software to identify the most probable and internally consistent scenarios. This software performs complex calculations on the interrelationships among the identified drivers, allowing the extraction of a spectrum of scenarios characterized by varying levels of probability and internal coherence—namely, high-probability, possible, and high-consistency scenarios. Within this analytical framework, the Mode index—defined as the most frequently assigned score by experts—was used as the primary criterion for determining the dominant patterns within the cross-impact structure. The aggregated data sets were then entered into the Scenario Wizard for processing. Accordingly, this analytical technique in scenario planning facilitates the identification of a comprehensive range of potential futures based on the structured matrix relationships among the key drivers. Table 12 presents the uncertainty matrix questionnaire used for the cross-impact evaluation of the key influencing drivers.

Table 12. Mutual evaluation matrix checklist

	X_2^{11}	X_2^{12}	X_2^{13}	X_2^{21}	X_2^{22}	X_2^{23}	X_2^{31}	X_2^{32}	X_2^{33}	⋯	⋯	⋯	X_3^{41}	X_3^{42}	X_3^{43}	X_3^{51}	X_3^{52}	X_3^{53}
X_2^{11}				□	□	□	□	□	□	⋮	⋮	⋮	□	□	□	□	□	□
X_2^{12}				□	□	□	□	□	□	⋮	⋮	⋮	□	□	□	□	□	□
X_2^{13}				□	□	□	□	□	□	⋮	⋮	⋮	□	□	□	□	□	□
X_2^{21}	□	□	□				□	□	□	⋮	⋮	⋮	□	□	□	□	□	□
X_2^{22}	□	□	□				□	□	□	⋮	⋮	⋮	□	□	□	□	□	□
X_2^{23}	□	□	□				□	□	□	⋮	⋮	⋮	□	□	□	□	□	□
X_2^{31}	□	□	□	□	□	□				⋮	⋮	⋮	□	□	□	□	□	□
X_2^{32}	□	□	□	□	□	□				⋮	⋮	⋮	□	□	□	□	□	□
X_2^{33}	□	□	□	□	□	□				⋮	⋮	⋮	□	□	□	□	□	□
⋮	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯				⋯	⋯	⋯	⋯	⋯	⋯
⋮	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯		⋰		⋯	⋯	⋯	⋯	⋯	⋯
⋮	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯	⋯				⋯	⋯	⋯	⋯	⋯	⋯
X_3^{41}	□	□	□	□	□	□	□	□	□	⋮	⋮	⋮				□	□	□
X_3^{42}	□	□	□	□	□	□	□	□	□	⋮	⋮	⋮				□	□	□
X_3^{43}	□	□	□	□	□	□	□	□	□	⋮	⋮	⋮				□	□	□
X_3^{51}	□	□	□	□	□	□	□	□	□	⋮	⋮	⋮	□	□	□			
X_3^{52}	□	□	□	□	□	□	□	□	□	⋮	⋮	⋮	□	□	□			
X_3^{53}	□	□	□	□	□	□	□	□	□	⋮	⋮	⋮	□	□	□			

Based on the aggregate scores obtained from the cross-impact matrix, four distinct future scenarios were identified for the legitimacy of digital accounting in relation to the development of software services in Iran. These scenarios were analyzed under three evaluative conditions: Optimal, Static, and Critical. The outcomes of this analytical process are summarized in Table 13.

Table 13. Status of each basic theme based on possible scenarios

	State	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Determining the inventory level required for the production line based on the schedule "X_3^1"	X_3^{11}	-	-	Optimal State	Optimal State
	X_3^{12}	Static State	-	-	-

	X_3^{13}	-	Critical State	-	-
	X_3^{21}	-	-	Optimal State	Optimal State
Determining the safety stock level for raw materials for production "X_3^2"	X_3^{22}	Optimal State	-	-	-
	X_3^{23}	-	Static State	-	-
	X_3^{31}	-	-	Optimal State	Optimal State
Determining the cost associated with supply inventory from order placement to warehouse entry "X_3^3"	X_3^{32}	Optimal State	-	-	-
	X_3^{33}	-	Static State	-	-
	X_3^{41}	-	-	*Optimal State*	*Optimal State*
Determining the overhead cost from the supply chain to the production line "X_3^4"	X_3^{42}	*Static State*	-	-	-
	X_3^{43}	-	*Critical State*	-	-
	X_3^{51}	-	-	*Optimal State*	*Optimal State*
Determining the relative expiration rate of inventory through data mining "X_3^5"	X_3^{52}	*Optimal State*	-	-	-
	X_3^{53}	-	*Static State*	-	-
	X_2^{11}	-	-	*Optimal State*	*Optimal State*
Planning for the selection of an investment project or scheme "X_2^1"	X_2^{12}	*Optimal State*	-	-	-
	X_2^{13}	-	*Static State*	-	-
	X_2^{21}	-	-	*Optimal State*	*Optimal State*
Planning for resource budgeting and preventing redundancies "X_2^2"	X_2^{22}	*Optimal State*	-	-	-
	X_2^{23}	-	*Static State*	-	-
	X_2^{31}	-	-	*Optimal State*	*Optimal State*
Planning for the provision of required financial resources "X_2^3"	X_2^{32}	*Optimal State*	-	-	-
	X_2^{33}	-	*Static State*	-	-
	X_2^{41}	-	-	*Optimal State*	*Optimal State*
Planning for optimal allocation of financial resources to projects and schemes "X_2^4"	X_2^{42}	*Static State*	-	-	-
	X_2^{43}	-	*Critical State*	-	-
	X_2^{51}	-	-	*Optimal State*	*Optimal State*
Planning to determine the investment payback period "X_2^5"	X_2^{52}	*Optimal State*	-	-	-
	X_2^{53}	-	*Static State*	-	-

The future scenarios for the legitimacy of digital accounting in relation to the development of software services in Iran—categorized in Table 14—are defined under three primary conditions: Optimal, Static, and Critical. These conditions constitute the analytical foundation for determining

the potential future configurations of the core phenomenon. The positioning of each core component within these three states enables the delineation of probable scenario paths. Accordingly, based on the distribution of the core components across these defined conditions, a total of 40 possible scenarios were identified and analyzed, as summarized in Table 14.

The results indicate that, out of 40 projected scenarios, 27 were classified as favorable, 10 as static, and three as critical. This distribution suggests that the state of digital accounting in Iran is not functionally critical, and that a relatively straightforward trajectory for the development of financial software can be outlined based on the favorable scenarios. Consequently, in shaping future perspectives on the legitimacy of digital accounting grounded in software service development, particular attention should be directed toward the two most favorable scenarios. To construct these scenarios, a two-axis matrix was developed, incorporating system mechanisms related to financial planning (X_2) and supply chain mechanisms (X_3) as the main dimensions. Using mathematical function computation techniques, four matrices were generated to evaluate the 17 conceptual themes identified within the favorable scenarios. Each participant was asked to assign a score—on a 10-point scale (ranging from 0 to 10)—to the criteria defined for these scenarios. The scenario with the highest priority was determined based on the expected value associated with each matrix score. The mathematical function scenario with the greatest weight encompassed four defined cases within the quadrants of the two-axis matrix, labeled as the Identity Scenario, Sinusoidal Scenario, Bracket Scenario, and Logarithmic Scenario. These were evaluated according to mathematical function criteria and their corresponding expected values. Considering the participation of 14 experts in the scenario development process and the 10-point scoring scale, the mode index was applied to calculate the scores for the 17 favorable base themes, as presented in Equation (1).

Table 14. Differentiation of potential states in developing future scenarios

	Optimal State		Static State		Critical State		Total Scenarios	
Scenario	**Count**	**Frequency %**	**Count**	**Frequency %**	**Count**	**Frequency %**	**Count**	**Frequency %**
Scenario 1	7	25.94%	3	30%	-	-	10	25%
Scenario 2	-	-	7	70%	-	-	7	17.5%
Scenario 3	10	37.03%	-	-	3	-	13	32.5%
Scenario 4	10	37.03%	-	-	-	100%	10	25%
Column Total	27	100%	10	100%	3	100%	**40**	**100%**
Row Total	27	67.5%	10	25%	3	7.5%	**40**	**100%**

$$\mathbb{E}[X] = \left[\left(\frac{1}{\mathrm{N}} \times \gamma\right)^4\right] \qquad \text{Equation (1)}$$

In this context, $\mathbb{E}[X]$ represents the expected value of the mathematical functions applied to the four matrices—Identity, Sinusoidal, Bracket, and Logarithmic. N denotes the number of participants involved in evaluating the favorable core themes, and γ indicates the frequency distribution derived from the total scores. Since the expected value (v) is calculated based on probability theory, which assesses random variable states according to the average frequency of their occurrence, the scores assigned by 23 participants to each core theme yielded an average expected value of 4.88. This result implies that the minimum expected value calculated for the matrices should be no less than 4.88.

Table 15. Determining the most significant mathematical function matrix

Scores	***Identity Scenario (Quadrant IV)***	***Bracket Scenario (Quadrant III)***	***Sinusoidal Scenario (Quadrant II)***	***Logarithmic Scenario (Quadrant I)***
	40.39	***49.75***	***51.17***	***68.56***

Expected Value	*4.92*	*5.27*	*5.11*	*5.05*
Priority Ranking	*4th*	*1st*	*2nd*	*3rd*

Based on the assigned scores, the most significant scenario in shaping the future outlook for the legitimacy of digital accounting—grounded in software service development in Iran—is the Bracket Scenario, located in the third quadrant of the matrix illustrated in Figure 8. This scenario is concisely referred to as the Amadic Scenario. To better understand the structure of this matrix, it is important to consider its two primary axes: system mechanisms related to financial planning and system mechanisms related to the supply chain. These axes constitute the foundation for constructing and interpreting the scenario framework.

System mechanisms related to financial planning

Figure 8. Matrix scenarios for the future outlook on the legitimacy of digital accounting based on the development of software services

Therefore, based on this matrix and the intersections of the two primary axes, the dimensions of each scenario are presented in Table 16. An important consideration in scenario planning is the selection of descriptive titles that are conceptually aligned with the central phenomenon yet distinctive or uncommon. Such titles enhance readers' engagement and deepen their understanding of the phenomenon under study.

The explanatory descriptions provided for each scenario in Table 16 serve to conceptually align

theoretical frameworks with the corresponding thematic constructs that define the scenarios. By emphasizing a distinctive title grounded in the ontological foundations of relevant theories or related terminology, these descriptions effectively convey the key evaluative dimensions of each scenario. Accordingly, the subsequent sections present a detailed account of each scenario.

 Arvik scenario

Arvik—an Armenian term meaning "light"—has been selected as the explanatory title for the first-quadrant scenario, positioned at the intersection of systemic mechanisms related to financial planning and those associated with the supply chain. The rationale behind this designation lies in the idealized legitimacy of future digital accounting, grounded in software-based needs assessments. In this scenario, the future legitimacy of digital accounting depends primarily on mechanisms linked to financial software development. Through advanced analytical capabilities, such software enhances the predictability of accounting outcomes and supports the efficient allocation of financial resources for investment projects aligned with predetermined budgets. Furthermore, the advancement of AI-driven financial applications equips digital accounting systems with the capacity to evaluate a company's supply chain comprehensively—from the entry stage to the production line. Predicting inventory expiration timelines, in turn, enables firms to minimize financial costs associated with material procurement and production processes.

Table 16. Breakdown of scenarios related to the future outlook on the legitimacy of digital accounting based on software service development

Scenario Title	***Descriptive Statement***	***Evaluation Factors***
Identity Mathematical Function	*Arvik Scenario*	*- Strengthening software capabilities in forecasting required financial resources as a basis for the legitimacy of digital accounting.* *- Impact of data mining calculations in advanced financial software to predict inventory expiration, supporting digital accounting legitimacy.* *- Enhancing software capabilities for selecting investment projects as a basis for the legitimacy of digital accounting.* *- Influence of developing software capacities in calculating inventory supply costs on digital accounting legitimacy.* *- Conditionality of software capabilities in budgeting resources based on appropriate financing as a foundation for the legitimacy of digital accounting.*
Sinusoidal Mathematical Function	*Biometric Scenario*	*- Strengthening software capabilities in resource budgeting as a basis for digital accounting legitimacy.* *- Developing software capabilities for the optimal allocation of financial resources to investment projects as a foundation for digital accounting legitimacy.* *- Enhancing software capabilities in forecasting payback periods as a practical function of digital accounting.* *- Conditionality of software capabilities in selecting investment projects based on appropriate financing as a basis for digital accounting legitimacy.*
Bracket Mathematical Function	*Amadic Scenario*	*- Legitimacy of digital accounting based on leveraging computational capacities to determine the required inventory for production lines.* *- Legitimacy of digital accounting based on utilizing software capacities to determine reserve stock levels for production.* *- Performing software-based calculations of overhead supply chain costs as a significant driver for digital accounting legitimacy.* *- Necessity of financial policy alignment with data mining calculations to predict inventory expiration, reinforcing digital accounting legitimacy.*
Logarithmic Mathematical	*Neotic Scenario*	*- Software capacity development is necessary to calculate inventory supply costs on digital accounting legitimacy.*

Function	*- Conditionality of software capabilities in estimating required financial resources based on high financial leverage as a foundation for the legitimacy of digital accounting.* *- Conditional impact of inventory management policies on utilizing software capacities for determining reserve stock levels in digital accounting.* *- Dependence of software capabilities on managerial skills in predicting payback periods as a practical function of digital accounting.*

 Biometric scenario

Beyond its specialized meaning in biology, the term “biometric” broadly refers to an evaluative scale that relies on measurable data for forecasting and planning purposes. This explanatory label has been adopted for the scenario situated at the intersection of strong systemic mechanisms related to financial planning and weak systemic mechanisms associated with the supply chain. The rationale for this designation stems from the envisioned legitimacy of digital accounting supported by the development of analytically capable financial software. In the future, such capabilities are expected to facilitate long-term accounting and financial planning by enabling more effective budgeting, optimized resource allocation, forecasting of investment return periods, and the selection of investment projects within the framework of dynamic financial management.

 Amadic scenario

Amadic—an interpreted term meaning “logistics” in the context of the supply chain—has been selected as the title for the scenario positioned in the third quadrant, representing the intersection of weak systemic mechanisms related to financial planning and highly influential systemic mechanisms associated with the supply chain. This scenario emphasizes the computational capacities of next-generation financial software that underpin the legitimacy of digital accounting. Analytical operations in this scenario are grounded in micro-level processes, enabling artificial intelligence to assist production line managers in estimating optimal inventory levels and aligning them with precautionary reserves. Through predictive mechanisms that forecast inventory expiration timelines, overhead costs in the supply chain for raw materials can be minimized using data-mining techniques. Furthermore, improved financial policy frameworks within this scenario are expected to strengthen managerial discipline and reduce the likelihood of resource wastage.

 Neotic sscenario

Neotic—meaning “logical reasoning”—has been selected as the explanatory term for the scenario located in the fourth quadrant. This quadrant represents the intersection of weak systemic mechanisms related to financial planning and the low impact of systemic mechanisms associated with the supply chain in shaping the future of digital accounting based on financial software development. The explanatory term chosen for this scenario reflects a form of pragmatic realism that balances existing capacity constraints with the analytical potential that accounting software can attain through artificial intelligence. Accordingly, the analytical requirements associated with calculating inventory supply costs and determining precautionary reserves—through effective inventory management—alongside the conditional capabilities for securing financial resources via leverage and forecasting investment return periods, can collectively help sustain the stability of digital accounting in the future while minimizing potential disruptions.

5. Discussion and conclusion

This study aimed to develop a developmental outlook for software services in achieving the legitimacy of digital accounting in Iran. Specifically, it sought to identify the future requirements of

digital accounting based on AI-driven software capabilities. To accomplish this, the grounded theory methodology was employed to determine the areas of influence of systemic mechanisms within digital accounting. Through three stages of coding, 282 open codes were identified and subsequently categorized into 33 conceptual themes, six core components, and three structural dimensions, forming the foundation of the theoretical framework for digital accounting legitimacy. These categories—grouped into intra-structural, strategic, and supra-structural levels—illustrated the future needs of digital accounting in developing AI-based software services to enhance legitimacy. In the quantitative phase, using a foresight approach, the study addressed the second research question: defining the developmental trajectory of digital accounting legitimacy based on software service advancement in Iran. Scenario-planning analyses identified four distinct scenarios, as detailed in the findings section. Among these, the mathematical function matrix revealed that the most probable pathway for achieving digital accounting legitimacy—through the development of AI-driven software services—was represented by the third-quadrant scenario, designated by the explanatory term "Amadic."

In interpreting this scenario, the operational logistics capabilities of digital accounting are deemed essential for achieving legitimacy through the future development of software-based services. These capabilities enhance computational efficiency in managing inventory and production line resources. By enabling such functions, digital accounting systems can effectively forecast precautionary reserves, reducing the risk of spoilage or expiration of raw materials and minimizing future financial costs associated with the supply chain. Within this framework, practical legitimacy in digital accounting requires software systems that, unlike earlier generations of financial service providers, can conduct operational calculations while simultaneously offering strategic guidance for financial policymaking units. Such systems improve supply chain forecasting in today's competitive capital markets, allowing firms to undertake timely and informed actions. Consequently, the Amadic Scenario can be regarded as a pathway through which AI-driven software services achieve higher legitimacy in digital accounting. Owing to enhanced computational capacities, this scenario enables firms—particularly accounting units—to address supply chain challenges alongside traditional accounting functions. Through advanced software applications, artificial intelligence facilitates the policymaking processes necessary for accurate forecasting, thereby preventing production line disruptions under critical conditions such as energy shortages, equipment depreciation, international sanctions restricting raw material imports, and technological knowledge gaps in production operations. These measures collectively ensure the sustained efficiency of accounting functions while minimizing production overhead costs. When aligning these findings with previous research, it is noteworthy that this study focused on the practical future-oriented needs of digital accounting development. Given the rapid influence of AI on software service advancement, accounting departments within industries must proactively adapt to meet growing expectations in increasingly competitive markets. Therefore, direct comparison with prior studies is not feasible; instead, content-based analogies may be drawn with works such as Xiu et al. (2020), Gao (2024), and Pham and Vu (2022).

First, knowledge-based firms engaged in software service development are encouraged to integrate artificial intelligence into the computational and operational functions of accounting. Beyond the traditional role of recording financial events within earlier generations of management accounting information systems, future financial tools should extend their functionality beyond information disclosure. Guided by analytical needs assessments that identify higher-level functions of digital accounting, these firms should design more instrumental features for professional users and practitioners—particularly in industrial companies listed on the capital market—to strengthen the strategic capabilities of the accounting profession within a software-based framework, thereby enhancing its legitimacy in meeting informational expectations. Second, policymakers are advised to

normalize the institutional focus on the legitimate functions of digital accounting and to issue regulatory guidelines that facilitate the adoption of software services across industries. Moreover, incentive policies—such as tax exemptions, export privileges, or other supportive measures—should be considered to help firms transition toward AI-based accounting systems. Finally, companies operating as financial startups should account for the current economic conditions of the country and provide software services that meet institutional standards and oversight requirements. Delivering advanced, supervised, and high-capability digital accounting tools will support companies in achieving compliance and operational efficiency within an evolving technological landscape.

References

1. Abikoye, B. E., Umeorah, S. C., Adelaja, A. O., Ayodele, O. and Ogunsuji, Y. M. (2024). Regulatory compliance and efficiency in financial technologies: challenges and innovations. *World Journal of Advanced Research and Reviews*, 23(1), pp. 1830-1844.
2. Agyei-Boapeah, H., Evans, R. and Nisar, T. M. (2022). Disruptive innovation: designing business platforms for new financial services. *Journal of Business Research*, 150, pp. 134-146. https://doi.org/10.1016/j.jbusres.2022.05.066
3. Alsharari, N. M. and Ikem, F. (2023). Digital accounting systems and information technology in the public sector: mutual interaction. *Journal of Systems and Information Technology*, 25(1), pp. 53-73. https://doi.org/10.1108/JSIT-09-2021-0190
4. Antonini, C. (2024). Accounting digitalization in the quest for environmental sustainability. *Current Opinion in Environmental Sustainability*, 66, A. 101399. https://doi.org/10.1016/j.cosust.2023.101399
5. Ayabei, W., Makokha, A. N. and Malenya, A. (2023). Effect of quickbooks systems on financial performance among the small and medium enterprises in bungoma county, Kenya. *International Journal of Research in Engineering and Science*, 11(6), pp. 467-482.
6. Behling, G., Lenzi, F. C. and Rossetto, C. R. (2022). Upcoming issues, new methods: using interactive qualitative analysis (IQA) in management research. *Revista de Administração Contemporânea*, 26(04), A. e200417. https://doi.org/10.1590/1982-7849rac2022200417.en
7. Berger, A. N. and Boot, A. W. (2024). Financial intermediation services and competition analyses: Review and paths forward for improvement. *Journal of Financial Intermediation*, 57(2), A. 101072. https://doi.org/10.1016/j.jfi.2024.101072
8. Boluo, G. , Barzideh, F. and Alahyari Abhari, H. (2020). A model for assessment of the risk of fraud in an audit of financial statements. *Journal of Accounting Knowledge*, 11(4), pp. 25-45. https://doi.org/10.22103/jak.2020.15880.3254
9. Breakey, H. (2020). Incorporating philosophical theory, ethical decision-making models, and multidimensional legitimacy into practical ethics education, Schwartz, M., Harris, H., Highfield, C. and Breakey, H. (Ed.) Educating for Ethical Survival (Research in Ethical Issues in Organizations, Vol. 24), Emerald Publishing Limited, Leeds, pp. 117-126. https://doi.org/10.1108/S1529-209620200000024007
10. Carè, R., Boitan, I. A., Stoian, A. M. and Fatima, R. (2025). Exploring the landscape of financial inclusion through the lens of financial technologies: A review. *Finance Research Letters*, 72, A. 106500. https://doi.org/10.1016/j.frl.2024.106500
11. Cochoy, F., Hagberg, J., McIntyre, M.P. and SöRum, N. (2017). Digitalizing consumption: introduction, in Cochoy, F., Hagberg, J., Sörum, N. and McIntyre, M.P. (Eds), Digitalizing Consumption: How Devices Shape Consumer Culture, Routledge, London, pp. 1-19.
12. Davis, J. S. (2019). IQA: qualitative research to discover how and why students learn from

economic games. *International Review of Economics Education*, 31(2), A. 100160. https://doi.org/10.1016/j.iree.2019.100160

13. Dethier, E., Kern, D. R., Stevens, G. and Boden, A. (2024). Making order in household accounting-digital invoices as domestic work artifacts. *Computer Supported Cooperative Work (CSCW)*, 33(4), pp. 879-924. https://doi.org/10.1007/s10606-024-09495-w
14. Gao, X. (2024). Unlocking the path to digital financial accounting: a study on Chinese SMEs and startups. *Global Finance Journal*, 61(2), A. 100970. https://doi.org/10.1016/j.gfj.2024.100970
15. Ghashghaei, F. and Mashayekh, Sh. (2019). Developing process ability and information system maturity Model In accounting department. *Journal of Accounting Knowledge and Management Auditing*, 8(29), pp. 91-118 (In Persian). https://doi.org/10.22051/jera.2018.22058.2174
16. Glaser, B. G. (1992). Theoretical sensitivity: advances in the methodology of grounded theory. Mill Valley, Calif.: Sociology Press, Mill Valley, CA.
17. Henwood, K. L. and Pidgeon, N. F. (1992). Qualitative research and psychological theorizing. *British Journal of Psychology*, 83(1), pp. 97-111. http://dx.doi.org/10.1111/j.2044-8295.1992.tb02426.x
18. Huy, P. Q. and Phuc, V. K. (2024). Insight into the impact of digital accounting information system on sustainable innovation ecosystem. *Sustainable Futures*, 8(2), A. 100377. https://doi.org/10.1016/j.sftr.2024.100377
19. Kalalian Moghadam, H., Maharti, Y., Ashrafi, M. and Khorakian, A. (2020). Identifying effective factors on the recognition of opportunities for creating social value in Iran: Glaserian Grounded Theory. *Ferdowsi University of Mashhad Journal of Social Sciences*, 17(1), pp. 141-87 (In Persian). https://doi.org/10.22067/social.2021.29569
20. Lacy, S., Gills, C., Walker, F., Reedy, C., Runnels, T., Mala, T., ... and Larson, T. (2019). Accounting system features: usage for different types of businesses. *International Journal of Recent Research Aspects*, 6(3), pp. 1-7.
21. Laili, N, H., Khairi, Kh, F. and Masruki, R. (2023). An analysis of the use of accounting system on cloud: A case study in Malaysia, In: Hamdan, A., Harraf, A., Buallay, A., Arora, P., Alsabatin, H. (eds) From Industry 4.0 to Industry 5.0. Studies in Systems, Decision and Control, vol 470. Springer, Cham. pp. 999-1010. https://doi.org/10.1007/978-3-031-28314-7_84
22. Li, X., Chen, X., Ou, L. and Wang, W. (2024). Design method of microcontroller-based intelligent accounting device assisted power supply study, Proc. SPIE 12979, Ninth International Conference on Energy Materials and Electrical Engineering (ICEMEE 2023), A. 1297948 (6 February 2024); https://doi.org/10.1117/12.3015219
23. Liu, X., Tian, H., Leng, Z. and Ma, Y. (2025). Financial technology, financing constraints, and future industrial development. *Finance Research Letters*, 73, A. 106671. https://doi.org/10.1016/j.frl.2024.106671
24. Lock, I. and Schulz-Knappe, C. (2019). Credible corporate social responsibility (CSR) communication predicts legitimacy: Evidence from an experimental study. *Corporate Communications: An International Journal*, 24(1), pp. 2-20. https://doi.org/10.1108/CCIJ-07-2018-0071
25. Lombardi, R. and Secundo, G. (2021). The digital transformation of corporate reporting–a systematic literature review and avenues for future research. *Meditari Accountancy Research*, 29(5), pp. 1179-1208. https://doi.org/10.1108/MEDAR-04-2020-0870

26. Loo, I. D. and Bots, J. (2018). The life of an accounting information systems research course. *Accounting Education*, 27(4), pp. 358-382. https://doi.org/10.1080/09639284.2018.1471726
27. Napisah, L. S., Taufikurochman, C. and Harto, B. (2024). The effect of digitalization on the sustainability of accounting practices in the financial industry. *Journal of Social Science and Business Studies*, 2(4), pp. 268-276. https://doi.org/10.61487/jssbs.v2i4.100
28. Naser, K. (1993). Creative financial accounting: its nature and use, Prentice Hall, New York, NY.
29. Northcutt, N., McCoy, D. (2004). Interactive qualitative analysis: a systems method for qualitative research, US: Sage, US.
30. Nwoke, J. (2024). Digital transformation in financial services and FinTech: Trends, innovations and emerging technologies. *International Journal of Finance*, 9(6), pp. 1-24. https://doi.org/10.47941/ijf.2224
31. Offiong, U. P., Szopik-Depczyńska, K., Cheba, K. and Ioppolo, G. (2024). FinTech as a digital innovation in microfinance companies–systematic literature review. *European Journal of Innovation Management*, 27(9), pp. 562-581. https://doi.org/10.1108/EJIM-04-2024-0462
32. Osuma, G. (2025). The impact of financial inclusion on poverty reduction and economic growth in Sub-Saharan Africa: A comparative study of digital financial services. *Social Sciences & Humanities Open*, 11(2), A. 101263. https://doi.org/10.1016/j.ssaho.2024.101263
33. Pham, Q. H. and Vu, K. P. (2022). Digitalization in small and medium enterprise: a parsimonious model of digitalization of accounting information for sustainable innovation ecosystem value generation. *Asia Pacific Journal of Innovation and Entrepreneurship*, 16(1), pp. 2-37. https://doi.org/10.1108/APJIE-02-2022-0013
34. Prasetianingrum, S. and Sonjaya, Y. (2024). The evolution of digital accounting and accounting information systems in the modern business landscape. *Advances in Applied Accounting Research*, 2(1), pp. 39-53. https://doi.org/10.60079/aaar.v2i1.165
35. Qatawneh, A. M. and Makhlouf, M. H. (2025). Influence of smart mobile banking services on senior banks' clients intention to use: moderating role of digital accounting. *Global Knowledge, Memory and Communication*, 74(3/4), pp. 1028-1044. https://doi.org/10.1108/GKMC-01-2023-0018
36. Rakhshani, M. , Zeratgari, R. , Pifeh, A. and Payan, A. (2024). Analyzing consequences of accounting information systems on the performance efficiency managers with a mixed approach. *Public Management Researches*, 16(62), pp. 289-316. https://doi.org/10.22111/jmr.2024.43322.5835
37. Reinecke, J., Van Bommel, K. and Spicer, A. (2017). When orders of worth clash: negotiating legitimacy in situations of moral multiplexity, justification, evaluation and critique in the study of organizations (Research in the Sociology of Organizations, Vol. 52), Emerald Publishing Limited, Leeds, pp. 33-72. https://doi.org/10.1108/S0733-558X20170000052002
38. Sadri, N., Ranjbar, M.H. and Rostamijaz, H. (2023). Effective evaluation system based on management accounting information for strategy control using an exploratory approach, *Journal of Management Accounting*, 15(55), pp. 41-61 (In Persian). https://doi.org/10.30495/jma.2023.21908
39. Said, Y. and Aliu, A. (2022). The influece of accounting softwear in achieving the international accounting standard boards qualitative characteristics of financial information. *International Journal of Advanced Research*, 10(2), pp. 26-38.
40. Santos, M. (2024). 'If you believe in a platform world…'–corporate banking and digital transformation in investor relations discourse. *Geoforum*, 151(1), A. 103695. https://doi.org/10.1016/j.geoforum.2023.103695

41. Sheikhi, M., Hejazi, R. and Zajindar, M. (2023). Presenting the model of the role of emerging technologies in the accounting information system and financial reporting. *Journal of Accounting and Social Interests*, 13(2), pp. 1-30 (In Persian). https://doi.org/10.22051/JAASCI.2023.43186.1764
42. Soleimani, Sh., Moradi, Z. and Moghadam, A. (2024). Proposing the accounting model of strategic management based on the development of accounting databases in crisis conditions, *Management Accounting Journal*, 16(57), pp. 127-148 (In Persian). https://doi.org/10.30495/jma.2023.22627
43. Thottoli, M. M. (2021). Knowledge and use of accounting software: evidence from Oman. *Journal of Industry-University Collaboration*, 3(1), pp. 2-14. https://doi.org/10.1108/JIUC-04-2020-0005
44. Valentinetti, D. and Rea, M. A. (2025). Factors influencing the digitalization of sustainability accounting, reporting and disclosure: a systematic literature review. *Meditari Accountancy Research*, 33(2), pp. 633-680. https://doi.org/10.1108/MEDAR-02-2024-2385
45. Wu, C. H. and Pambudi, P. D. L. (2025). Digital transformation in fintech: choosing between application and Software as a Service (SaaS). *Asia Pacific Management Review*, 30(2), A. 100342. https://doi.org/10.1016/j.apmrv.2024.12.006
46. Xiu, L., Lu, F. and Liang, X. (2020). Legitimized identity vs identifiable legitimacy: toward a theoretical framework of the relationship between organizational identity and organizational legitimacy. *Nankai Business Review International*, 11(1), pp. 102-120. https://doi.org/10.1108/NBRI-03-2019-0009
47. Yaftian, A., Mirshekary, S. and Mihret, D. G. (2017). Learning commercial computerised accounting programmes: perceptions and motivations. *Accounting Research Journal*, 30(3), pp. 312-332. https://doi.org/10.1108/ARJ-08-2015-0107

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Mandatory Risk Disclosure Under Changing Accounting Standards: Effects on the Cost of Capital

Mojtaba Golmohammadi*
Department of Finance and Accounting, Humanities Faculty, Meybod University, Meybod, Iran

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Abstract

In alignment with international accounting standards, the Iran Audit Organization (IAO) has required corporations to disclose risk information in their financial statements since 2019. This study is the first to examine the informational value of these newly mandated disclosures under Iran's accounting standards. While prior international research has examined the effects of risk disclosure, this study fills a significant gap by focusing on an emerging market—specifically, Iran's distinctive institutional environment—where accounting reforms and disclosure practices remain underexplored. To achieve this objective, we analyzed 1,580 firm-year observations from companies listed on the Tehran Stock Exchange (TSE) between 2014 and 2023 using multivariate panel data regressions with fixed effects. The empirical results show that mandatory risk disclosure is statistically unrelated to firms' cost of capital. Furthermore, the interaction terms between mandatory risk disclosure and corporate governance variables—such as ownership concentration and board independence—are also insignificant. However, the findings indicate that both board independence and institutional ownership are negatively and significantly associated with the cost of capital. These results suggest that although the adoption of new accounting standards has increased the quantity of mandatory risk disclosures, such disclosures do not necessarily reduce the cost of capital within the Iranian context. This outcome may stem from superficial compliance with disclosure requirements and limited oversight by audit committees and independent auditors. Overall, this study offers new insights into how transitional economies navigate disclosure mandates, with actionable implications for improving transparency, strengthening corporate governance, and realizing the potential benefits of accounting reforms.

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*Corresponding Author: Mojtaba Golmohammadi
Email: golmohammadi@meybod.ac.ir
Tel:
ORCID: 0000-0001-5485-4288

1. Introduction

Risk disclosure plays a crucial role in maintaining firms' credibility and reducing information asymmetry between managers and external stakeholders (Lei & Luo, 2023). In an increasingly complex economic environment, transparent communication of risks that influence financial performance and firm value has become indispensable. Such transparency enables shareholders, investors, and creditors to make more informed and rational decisions. Bushman and Smith (2001) argue that inadequate disclosure erodes trust and undermines stakeholder confidence, emphasizing the pivotal role of transparency in fostering stakeholder engagement and accountability. Given the importance of risk disclosure in mitigating information asymmetry, a key question arises: How does such disclosure influence firms' core financial outcomes, particularly the cost of capital?

Risk disclosure can influence a corporation's cost of capital through multiple channels, as evidenced by studies such as Leuz and Verrecchia (2000). First, by reducing information asymmetry, disclosure enhances investors' ability to assess corporate risk more accurately. Second, it increases transparency and accountability, thereby fostering trust among stakeholders in financial markets. Third, it strengthens corporate governance mechanisms, reducing the likelihood of fraud and managerial opportunism. Furthermore, Fauzi and Firmansyah (2023) argue that transparent risk disclosure can lower the cost of capital by addressing stakeholder expectations particularly those related to the efficient allocation of corporate resources. Beyond these direct effects, the finance and accounting literature has extensively explored the relationship between disclosure and financing costs. The subsequent section reviews key findings from prior studies and examines the implications of recent disclosure policies in Iran.

The association between the cost of capital and corporate transparency particularly through risk disclosure—has been extensively examined in the finance and accounting literature (e.g., Pakdelan et al., 2021; Ibrahim et al., 2022; Hao, 2024). In recent years, policymakers at both national and international levels have paid increasing attention to risk disclosure, prompting accounting standard-setting bodies to adopt a more responsive stance, including in Iran (Fasihi & Hosseini, 2020; Blue et al., 2024). This growing emphasis is reflected in recent amendments to Iran's accounting standards, which now require firms to disclose both qualitative and quantitative information regarding risks and risk management frameworks in their financial statements. Specifically, revisions to paragraphs 23–32 of Accounting Standard No. 37 (Financial Instruments: Disclosures) issued by the Iran Audit Organization (IAO, 2023) mandate entities to disclose detailed information about the nature and management of key risks, including market, liquidity, and credit risk.

Given the recent amendments to Iranian accounting standards, understanding the relationship between risk disclosure and the cost of capital has become increasingly important. The cost of capital—representing the minimum expected return required by investors is a fundamental determinant of firm value. Risk plays a pivotal role in shaping this cost: as perceived risk increases, investors demand higher expected returns. Accordingly, the cost of capital reflects the minimum acceptable rate of return for investors (Fama & French, 1993). Extensive prior research (e.g., Ibrahim & Aboud, 2024; He et al., 2019; Nahar et al., 2016; Leuz & Verrecchia, 2000; Botosan, 1997) has examined the relationship between disclosure levels and the cost of equity, with most studies focusing on developed markets.

The 2019 amendment to Iranian accounting standards represents an exogenous shock to firms' disclosure requirements. This change was neither voluntary nor firm-specific; instead, it was implemented universally and mandatorily across all listed companies. These characteristics render the reform a natural quasi-experiment, enabling an empirical examination of its effects. Accordingly, the study employs a dummy variable, SRefit, to distinguish the pre- and post-2019 periods and to precisely isolate the impact of this accounting standard change.

Empirical evidence indicates that voluntary risk disclosure can reduce a firm's cost of capital by enhancing market liquidity and mitigating information asymmetry. Consistent with this view, studies conducted in emerging markets have generally documented a negative association between risk disclosure and the cost of capital. For instance, Pakdelan et al. (2021) found no significant relationship between risk disclosure and the cost of debt; however, their results revealed a negative and significant association between risk disclosure and both the cost of common equity and the weighted average cost of capital among Iranian firms.

This study examines whether mandatory quantitative and qualitative risk disclosures, as required under Iran's accounting standards, reduce firms' cost of equity. The Iranian capital market an emerging economy characterized by limited voluntary disclosure, market inefficiencies, and pervasive information asymmetry (Rajabalizadeh & Schadewitz, 2025) provides a distinctive setting for evaluating the effects of mandatory risk disclosure on firms' financing costs. In addition, the study investigates the moderating role of corporate governance mechanisms in this relationship.

This study makes several significant contributions to the literature. First, it fills a key research gap by examining how firms' cost of equity is influenced by the mandatory disclosure of quantitative and qualitative risk information under Iran's accounting standards. This area has received limited scholarly attention. Second, although the body of research on mandatory risk disclosure has been expanding globally, studies focusing on emerging markets remain relatively scarce. This gap is particularly evident in the Iranian context, where the specific effects of recent accounting standard reforms on firms' cost of equity have not yet been systematically investigated.

Iran's distinctive institutional environment, together with recent accounting reforms particularly the introduction of new risk disclosure requirements provides a compelling context for examining their impact on firms' cost of equity. In addition, this study investigates the moderating role of corporate governance mechanisms in the relationship between mandatory risk disclosure and the cost of equity. A review of prior studies reveals that the association between risk disclosure and the cost of equity has been explored from multiple perspectives, with findings generally reporting either a negative or positive relationship between the two variables.

The remainder of this paper is structured as follows. Section 2 reviews the existing literature on risk disclosure, with particular emphasis on its direct and indirect effects on the cost of capital. It summarizes prior empirical findings and highlights key theoretical considerations. Section 3 describes the research methodology, including data sources, regression models, and sample selection criteria used to test the study's hypotheses. Section 4 presents the empirical results and discusses their relation to the study's overarching themes. Finally, Section 5 concludes by summarizing the main findings, outlining their practical implications, and offering directions for future research and policy.

2. Literature review

Information asymmetry where managers possess more and superior information than external stakeholders can give rise to problems such as adverse selection and moral hazard, ultimately increasing a firm's cost of capital. Improved disclosure can mitigate information asymmetry, potentially lowering the cost of equity and enhancing corporate value (Healy and Palepu, 2001; Diamond and Verrecchia, 1991; Botosan, 1997; Ibrahim and Aboud, 2024).

According to signaling theory, voluntary risk disclosure serves as a positive signal to external stakeholders, reflecting management's commitment to transparency in communicating risks and risk management practices. Such disclosure enhances stakeholder confidence, promotes effective risk management, and reduces uncertainty regarding future cash flows. As a result, investors and other stakeholders require a lower risk premium, thereby decreasing the firm's cost of equity (Myers and

Majluf, 1984; Core et al., 2015; Connelly et al., 2025).

Recent studies exploring new dimensions of risk disclosure have deepened our understanding of how mandatory disclosure practices influence firms' cost of equity. Increasingly, research on corporate governance and financial reporting highlights the growing importance of transparency, particularly amid the evolution of mandatory risk disclosure requirements across developed and emerging markets over the past few years. Historically, firms have provided only limited information about their risk exposure, often relying on qualitative disclosures that lack consistency and comparability. This inconsistency has led to divergent perceptions of corporate risk among investors and creditors, underscoring the need for more standardized and structured reporting frameworks (Thitinun and Yomchinda, 2021).

The adoption of IFRS 7 marked a pivotal development in the evolution of risk disclosure practices. This standard seeks to enhance the quality of financial instrument reporting by requiring entities to provide both qualitative and quantitative information about risk exposures (Thitinun & Yomchinda, 2021). Specifically, IFRS 7 mandates the disclosure of credit, liquidity, and market risks, compelling firms to communicate more comprehensively about the risks they face and their potential impact on financial performance. Researchers have increasingly examined the effects of these disclosure requirements on corporate risk-taking behavior and the cost of equity. Prior studies suggest that mandatory risk disclosures can influence investor perceptions and, consequently, affect a firm's cost of equity (Ibrahim & Aboud, 2024; Nahar et al., 2016). In line with these global developments, Iran's accounting standards have been aligned with international frameworks and now require firms to disclose similar risk categories in their financial statements. Therefore, based on previous empirical findings, it is reasonable to expect that such disclosures will affect firms' cost of capital in the Iranian context.

2.1. Potential relationships between mandatory risk disclosure and the cost of capital: direct or inverse

Theoretical and empirical evidence suggest that there are both inverse and direct relationships between risk disclosure and the cost of capital.

2.1.1. Direct relationship

A review of prior studies indicates that the effect of risk disclosure on the cost of equity depends on the nature and tone of the information disclosed. Specifically, when the disclosed information is negative or unfavorable, it heightens uncertainty regarding the firm's future cash flows and, consequently, increases the cost of equity (Thitinun & Yomchinda, 2021). Johnstone (2016) and Dutta and Nezlobin (2017) further demonstrate that unfavorable disclosures amplify investors' ambiguity about firm value, resulting in a higher required return. Emphasizing the contextual sensitivity of risk disclosure, Tirado-Beltrán et al. (2020) show that a positive association between risk disclosure and the cost of equity is observed only for non-financial risks.

Verrecchia (1983), drawing on proprietary cost theory, argued that disclosing certain types of information—such as specific risks or managerial strategies may expose sensitive details to competitors, thereby weakening a firm's competitive advantage. This potential exposure can prompt investors to demand higher expected returns, ultimately increasing the firm's cost of equity.

Campbell et al. (2014) emphasize the critical role of tone in risk disclosures, showing that a more negative tone is associated with higher subsequent stock return volatility. This finding suggests that risk disclosures may be interpreted as negative signals, particularly when they are perceived as overly pessimistic or reveal previously undisclosed vulnerabilities. When investors view mandatory risk disclosures as indicators of weakness or poor risk management, they may perceive higher risk and

demand a higher cost of equity. Moreover, Campbell et al. argue that extensive disclosure can expose firms to greater scrutiny from regulators, investors, and other stakeholders, as well as increase the risk of litigation if such disclosures are deemed inaccurate or misleading. Figure 1 illustrates the hypothesized direct relationship between mandatory risk disclosure and the cost of capital.

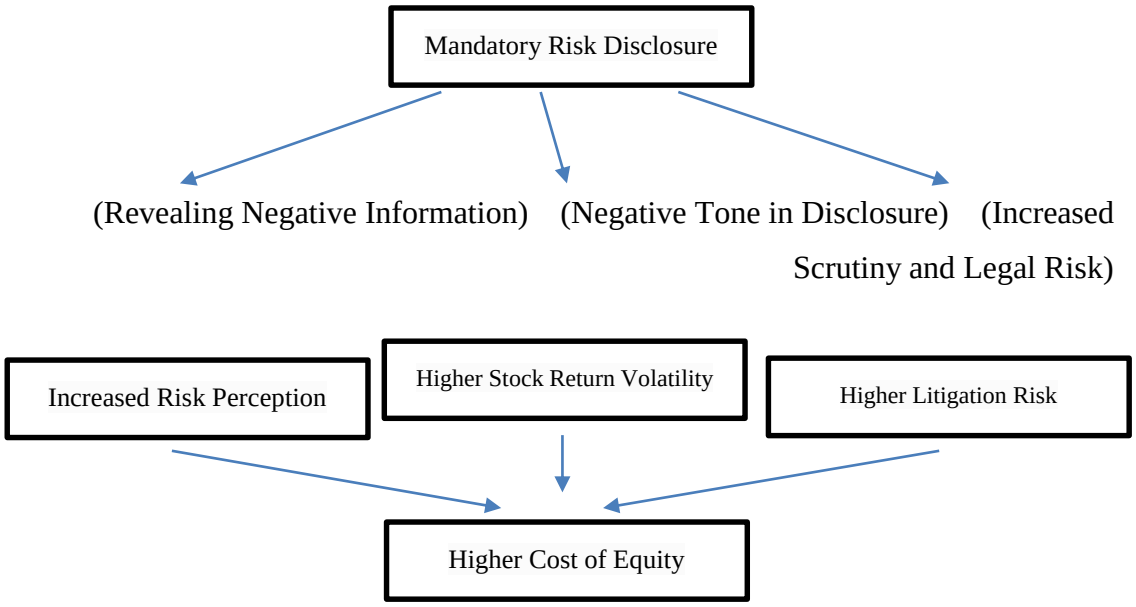

Figure 1. The direct relationship between mandatory risk disclosure and the cost of capital

2.1.2. Inverse relationship

According to Akerlof (1970), moral hazard and adverse selection arise from information asymmetry between managers and investors. When investors lack complete knowledge of a firm's risk profile, they demand higher expected returns to compensate for this uncertainty. Mandatory risk disclosure helps mitigate this information gap by providing detailed quantitative and qualitative information on firms' risk exposure. Such transparency reduces perceived uncertainty and, consequently, lowers investors' required rate of return that is, the firm's cost of equity. This mechanism aligns with signaling theory (Spence, 1973), which suggests that high-quality firms voluntarily disclose more information to signal their sound management practices and credibility. Empirical evidence supports this reasoning: Yasar et al. (2020) find that market participants respond positively to credible signals from informed insiders, particularly when these signals counterbalance negative information. Similarly, Lambert et al. (2007) argue that low information quality constitutes a negative signal, thereby increasing firms' cost of capital.

Furthermore, according to agency theory (Jensen & Meckling, 1976), disclosure serves as a mechanism to reduce agency costs. In contrast to the theory's ideal assumptions, managers do not always act in shareholders' best interests. The central argument is that increased risk disclosure diminishes information asymmetry between managers and shareholders, thereby lowering the firm's cost of capital (Verrecchia, 2001). Bertomeu et al. (2011) suggest that informed investors benefit from the informational advantages generated by firms' disclosure policies, thereby further reducing the cost of capital. Similarly, Lopes and Alencar (2010) document a negative association between disclosure quality and the cost of capital among Brazilian firms, attributing the relatively weak relationship between risk disclosure and the cost of capital to the country's well-developed corporate environment.

According to legitimacy theory (Suchman, 1995) and stakeholder theory (Freeman, 1984), firms seek to maintain organizational legitimacy while addressing the interests of their stakeholders. Enhanced disclosure increases transparency and credibility, thereby enabling companies to better meet the expectations of diverse stakeholder groups (Corazza et al., 2020). Such disclosure functions as a key mechanism for establishing and sustaining corporate legitimacy (Shivaani & Agarwal, 2020; Martens & Bui, 2023). As Araújo Júnior et al. (2014) argue, providing comprehensive, fair, neutral, and relevant information to various stakeholders allows them to more effectively assess and monitor corporate activities and managerial performance.

Consistent with the arguments of Deegan (2006) and Alam (2006), protecting stakeholders' interests is essential for establishing corporate legitimacy, with information disclosure serving as a key mechanism in this process. Empirical evidence supports this perspective. For instance, Lemma et al. (2019) found that South African firms enhance their legitimacy through voluntary information disclosure, which in turn is associated with a lower cost of capital. Similarly, Bui et al. (2020) provide international evidence that risk disclosure weakens the positive relationship between higher greenhouse gas (GHG) emissions and the cost of capital. Collectively, these findings suggest that disclosing risk-related information can reduce firms' cost of capital while simultaneously reinforcing their legitimacy.

Mandatory risk disclosure enhances corporate credibility by improving transparency and accountability, thereby enabling stakeholders such as investors and creditors—to more effectively monitor managerial risk-taking behavior. This reduction in agency costs and the risk premium demanded by investors lowers firms' cost of capital. Addressing stakeholder concerns through transparent disclosure also signals responsible governance, which further reduces perceptions of managerial recklessness and, consequently, the cost of capital. Diamond and Verrecchia (1991) argue that greater disclosure mitigates information asymmetry by limiting private access to information and reducing investor uncertainty regarding investment risks and outcomes. Enhanced risk disclosure can therefore lower transaction costs and improve stock market liquidity, increasing trading volume and attracting a broader investor base. As liquidity rises, the perceived risk of holding a firm's securities declines, ultimately leading to a lower cost of equity. Empirical evidence supports the negative association between the quality of risk disclosure and information asymmetry (e.g., Miihkinen, 2013; Campbell et al., 2014). Moreover, Kassamany et al. (2023) confirm the positive impact of mandatory risk disclosure on market liquidity, an effect further strengthened by the adoption of international accounting standards.

In this context, Botosan (1997) reports a negative association between the extent of disclosure and the cost of equity, particularly among firms with low analyst coverage. Hail and Leuz (2006) demonstrate that firms operating in countries with stronger disclosure requirements and enforcement mechanisms tend to face lower equity capital costs. Similarly, Leuz and Verrecchia (2000) show that German firms adopting international accounting standards experience higher trading volumes and narrower bid–ask spreads, which they attribute to enhanced stock liquidity and reduced information asymmetry. Furthermore, Kravet and Muslu (2013) find that companies providing more extensive risk disclosures in their 10-K filings exhibit lower levels of information asymmetry. The inverse relationship between mandatory risk disclosure and the cost of capital is illustrated in Figure 2.

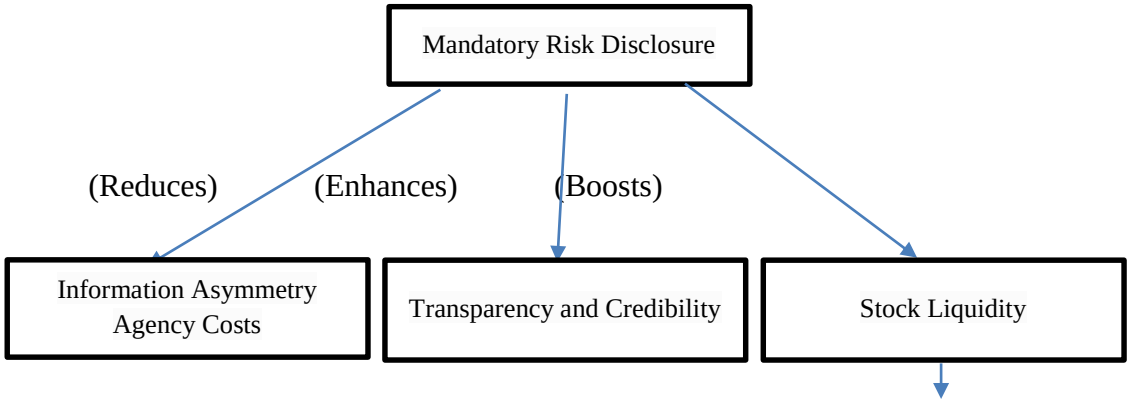

Figure 2. The inverse relationship between mandatory risk disclosure and the cost of capital

Although the general theoretical relationship between disclosure and the cost of capital is well established, the specific requirements introduced by the recent amendments to Iranian Accounting Standards create distinct theoretical channels through which a reduction in the cost of capital can be expected. Aligned with international developments, these amendments require disclosures that go beyond mere risk acknowledgment, incorporating both qualitative and quantitative dimensions. This expansion enhances the information available to capital providers and supports the theoretical expectation of a lower cost of capital.

Specifically, IAS 1 (paragraphs 134–136) requires firms to disclose their objectives, policies, and procedures for managing capital, thereby providing investors with critical insights into the strategic management of financial resources and risk. According to agency theory (Jensen & Meckling, 1976), such transparency in managerial processes reduces information asymmetry regarding managerial ability and risk tolerance, which, in turn, lowers perceived agency costs and, consequently, the cost of capital. Consistent with signaling theory (Spence, 1973; Core et al., 2015), comprehensive disclosure of robust capital management policies can also signal managerial quality and prudent financial stewardship, thereby reducing the risk premium investors require.

Additionally, IAS 37 (paragraphs 23–32) requires firms to disclose risks associated with financial instruments—namely credit, liquidity, and market risks—and to explain how these risks are managed. Such disclosures address key sources of investor uncertainty. Through both quantitative and qualitative reporting, these standards are theoretically designed to further reduce information asymmetry (Healy & Palepu, 2001; Diamond & Verrecchia, 1991). Quantitative disclosures (e.g., sensitivity analyses for market risk) enable investors to estimate exposure levels more accurately, while qualitative information (e.g., descriptions of risk management structures) provides essential contextual understanding. This enriched information set is expected to improve the precision of investor forecasts and decrease perceived risk, ultimately reducing the required rate of return (Botosan, 1997). Moreover, enhanced disclosure of specific financial risks can improve market liquidity by reducing adverse selection costs for informed traders (Diamond & Verrecchia, 1991;

Leuz & Verrecchia, 2000), thereby lowering the overall cost of capital.

Hence, the recent amendments to Iranian Accounting Standards—requiring firms to disclose capital management policies and provide comprehensive quantitative and qualitative information on financial instrument risks—establish a strong theoretical foundation for anticipating a causal relationship between disclosure and the cost of capital. Specifically, these mandatory disclosures are expected to reduce information asymmetry, enhance signaling quality, strengthen monitoring mechanisms, and potentially increase market liquidity. Collectively, these effects should lower the cost of capital for compliant firms.

H1: Mandatory risk disclosure under Iran's accounting standards has a significant relationship with the cost of capital.

2.2. Corporate governance mechanisms as a moderator

The moderating role of corporate governance mechanisms in the relationship between mandatory risk disclosure and the cost of equity can be explained through several well-established theoretical perspectives, including agency theory, signaling theory, legitimacy theory, and stakeholder theory (Ntim et al., 2013). Strong corporate governance enhances the credibility and informativeness of risk disclosures, thereby influencing the extent to which disclosure requirements affect the firm's cost of equity.

Agency theory (Jensen & Meckling, 1976) posits that conflicts often arise between managers (agents) and shareholders (principals) due to information asymmetry and divergent objectives. Managers may be reluctant to fully disclose risks if they perceive that such disclosures could adversely affect their compensation, reputation, or job security. As a result, they may act in their own interests rather than shareholders', potentially leading to suboptimal corporate decisions. Corporate governance mechanisms are designed to mitigate agency problems by aligning managerial incentives with shareholder interests and by strengthening monitoring and accountability processes (Fama & Jensen, 1983).

When corporate governance is strong, investors are more likely to perceive risk disclosures as credible and reliable, since effective monitoring reduces the likelihood of managerial opportunism (Gordon et al., 2010). This enhanced credibility lowers investors' perceived risk, thereby reducing the required rate of return and, consequently, the firm's cost of capital. Accordingly, we expect that stronger corporate governance will amplify the negative relationship between mandatory risk disclosure and the cost of equity.

Signals help reduce information asymmetry by mitigating conflicts of interest between owners and managers (Taj, 2016). Corporate governance mechanisms can serve as informational signals in their own right (Ibrahim & Aboud, 2024). Strong governance structures convey a firm's commitment to transparency and accountability, thereby enhancing the credibility of its risk disclosure signals (Gordon et al., 2010). Empirical evidence suggests that higher-quality governance attributes—such as CEO duality, institutional ownership, board independence, and female board representation—promote greater risk disclosure through effective market signaling (Saggar & Singh, 2017; Salem et al., 2019; Gull et al., 2023).

Past research (e.g., Dam & Scholtens, 2012) shows that higher levels of stakeholder conflict motivate firms to respond through greater disclosure, particularly of risk-related information. Holm and Laursen (2007) argue that a more substantial commitment to transparency and accountability via risk disclosure reduces information asymmetry between managers and corporate stakeholders. According to Rhodes (2010), this reduction in information asymmetry can mitigate agency problems by aligning managerial interests with those of stakeholders. Managerial stakeholder theory posits that risk disclosure enables firms to manage stakeholder expectations, secure their support, and ensure

organizational continuity by addressing the informational needs of shareholders, employees, and government entities. As emphasized by Ntim et al. (2013), corporate governance mechanisms play a critical role in achieving these outcomes.

So, for firms with stronger corporate governance mechanisms, the negative relationship between mandatory risk disclosure and the cost of capital is expected to be more pronounced. This relationship is illustrated in Figure 3.

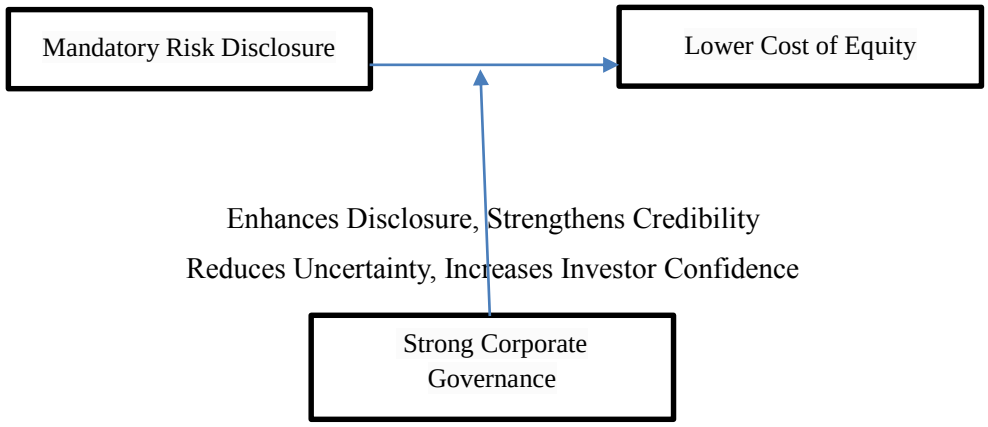

Figure 3. Corporate governance mechanisms as a moderator of the relationship between mandatory risk disclosure and the cost of capital

H2: Corporate governance mechanisms moderate the relationship between mandatory risk disclosure mandated by Iran's accounting standards and the corporate cost of capital.

3. Methodology

This study adopts a descriptive–correlational design and is applied in nature. The statistical population comprises all corporations listed on the Tehran Stock Exchange (TSE) between 2014 and 2023. To examine the long-term effects of the accounting standard amendments, data were collected for five years before and five years after the implementation of the new standards. The following criteria were applied in selecting the final sample used to test the research hypotheses:

1. The company must not operate in the real estate, investment, or other financial intermediation industries.
2. The company must not have changed its fiscal year during the study period.
3. All research variables must be available for the entire observation period.

After applying the above criteria and using a systematic elimination approach, a final sample of 158 firms was selected for statistical analysis. To examine the relationship between the cost of equity and mandatory risk disclosure, the following regression model (Model 1) was employed (Gebhardt et al., 2001; Dhaliwal et al., 2006; He et al., 2019):

$$COC_{it} = \alpha + \beta_1 SRef_{it} + \gamma_1 Size_{it} + \gamma_2 Lev_{it} + \gamma_3 ROA_{it} + \gamma_4 Growth_{it} + \gamma_5 BTM_{it} + \gamma_6 Age_{it} + Industry\ Dummy\ Variables + Year\ Dummy\ Variables + \varepsilon_{it} \quad (1)$$

Where:

COC_{it}: This is the study's dependent variable. The calculation method is described in detail in the following section. $SRef_{it}$: The main independent variable, capturing the effect of changes in accounting standards. It equals 1 for fiscal years 2019 and onward (i.e., the post-reform period when the new accounting standards are reflected in financial statements), and zero otherwise. $Size_{it}$: A control variable measuring corporate size, calculated as the natural logarithm of the firm's average total assets and sales. Lev_{it}: A control variable measuring financial leverage, calculated as the ratio of total debt to total assets. ROA_{it}: A control variable representing profitability, calculated as the ratio of net profit to total assets. $Growth_{it}$: A control variable capturing the annual rate of sales growth. BTM_{it}: A control variable defined as the ratio of the book value of equity to its market value. Age_{it}: A control variable for firm maturity, measured as the natural logarithm of (1 + the number of years since the company's initial public offering).

Although this approach is limited in capturing firm-level heterogeneity, SRefit is used as a binary variable due to the novelty of the accounting standard reform and the challenges of constructing standardized, objective measures of disclosure intensity or quality for a large dataset under Iranian conditions. This operationalization allows the study to capture the average market response to the adoption of the new mandatory disclosure regime.

3.1. Measuring the cost of capital

In this study, two indicators are employed to measure the cost of equity. The first indicator is based on the Capital Asset Pricing Model (CAPM) and is calculated according to Model 2. This measure is denoted as $COC1_{it}$:

$$COC1_{it} = R_f + \beta_i (R_{m\ t} - R_f) \quad (2)$$

In which $COC1_{it}$ represents the firm's cost of equity based on the CAPM, Rf denotes the risk-free rate, set at 18% for years before 2023 and 23% for 2023, reflecting the official interest rates in Iran, β_i represents the sensitivity of the firm's stock returns to market returns, and $R_{m,t}$ indicates the market return rate.

The second indicator for measuring the cost of equity is based on the Gordon Growth Model and is calculated according to Model 3. This measure is denoted as $COC2_{it}$:

$$COC2_{it} = \frac{D_{0\,i}(1+g_i)}{P_{0\,it}} + g_i \quad (3)$$

In which $COC2_{it}$ represents the firm's cost of equity based on the Gordon Growth Model, $D_{0,i}$ denotes the dividend per share at the end of the previous fiscal year, $P_{0,it}$ indicates the market price per share at the beginning of the current year, and g_i represents the expected sales growth rate.

To investigate the moderating role of corporate governance mechanisms in the relationship between mandatory risk disclosure and the cost of equity, Regression Model 4 was employed, as specified below:

$$COC_{it} = \alpha + \beta_1 SRef_{it} + \beta_2 CG_{it} + \beta_3 SRef_{it} * CG_{it} + \gamma_1 Size_{it} + \gamma_2 Lev_{it} + \gamma_3 ROA_{it} + \gamma_4 Growth_{it} + \gamma_5 BTM_{it} + \gamma_6 Age_{it} + Industry\ Dummy\ Variables + Year\ Dummy\ Variables + \varepsilon_{it} \quad (4)$$

Where:

CG_{it} is treated as a moderating variable in this study. Three indicators of corporate governance were employed: Board independence: Operationalized as the proportion of non-executive (independent) members on the board relative to the total number of board members. Institutional ownership: Defined as the percentage of a firm's shares held by banks, insurance companies, financial institutions, holding companies, organizations, government agencies, and state-owned enterprises. Ownership concentration: Measured by comparing a firm's free-floating shares to the cross-sectional average across all firms. Firms with a free-floating share percentage above the average were assigned a value of 0, while those below or equal to the average were assigned a value of 1. This measurement approach is based on Mehrani and Safarzadeh (2011) and is recommended for the Iranian context according to expert opinion. The use of a binary variable for ownership concentration has also been adopted in studies outside Iran (Hautz et al., 2013; He & Huang, 2017; Azar et al., 2018).

4. Findings

Table 1 presents the descriptive statistics of the variables. The mean values of the cost of capital variables (COC1it and $COC2_{it}$) suggest that, on average, Iranian firms exhibit a cost of capital within a reasonable range. Both variables display positive skewness, indicating that extreme values above the mean are relatively uncommon. The average debt ratio is approximately 0.59, reflecting a substantial reliance on debt in these firms' capital structures. In the context of the Iranian economy—particularly during periods of international sanctions—firms often face limited access to external financing, thereby increasing their dependence on domestic debt.

Table 1. Descriptive statistics

variable	Median	Mean	Min	Max	SD	skewness	kurtosis
$COC1_{it}$	0.195	0.201	0.837	-0.363	0.291	0.092	3.232
$COC2_{it}$	0.094	0.159	0.939	-0.329	0.326	0.806	3.185
$Size_{it}$	14.956	15.136	14.413	16.058	0.512	0.617	2.632
Lev_{it}	0.602	0.588	0.300	0.840	0.174	-0.189	1.946
ROA_{it}	0.071	0.105	0.485	-0.155	0.154	0.776	3.500
$Growth_{it}$	0.099	0.134	-0.225	0.601	0.255	0.437	2.219
BM_{it}	0.396	0.459	-5.536	3.301	0.447	-1.107	2.100
Age_{it}	2.796	2.832	2.513	3.001	0.120	-0.322	2.267
$BoaIndu_{it}$	0.612	0.647	0.000	0.874	0.174	-0.607	2.951
$InsOwn_{it}$	0.823	0.711	0.000	1.020	0.276	-1.069	3.679
$OwnCon_{it}$	1.100	0.597	0.000	1.100	0.502	-0.318	1.299

Table 2 presents the results for the first hypothesis, which examines the relationship between mandatory risk disclosure and the cost of equity using both the CAPM and Gordon growth models. The coefficient of compulsory risk disclosure ($SRef_{it}$) is negative in both models; however, it is not statistically significant. This indicates that higher levels of mandatory risk disclosure do not significantly affect the cost of capital. Among the control variables, firm size ($Size_{it}$) is positively and significantly associated with the cost of capital in both models. Leverage (Lev_{it}) exhibits a significant

negative relationship with the cost of equity. Furthermore, profitability (ROA_{it}) and sales growth (Growthit) are both positively and significantly related to the cost of equity.

To assess potential multicollinearity among the independent variables in our regression models (Table 2), we computed the Variance Inflation Factor (VIF) for each predictor. All VIF values are well below the commonly applied threshold of 10, with a maximum of 1.986, indicating that multicollinearity is not a concern. This confirms the stability and reliability of the estimated regression coefficients and their associated t-values reported in Table 2. We also examined first-order serial correlation in the regression residuals using the Durbin-Watson (DW) statistic. The DW values are 1.761 for Model 1 (CAPM) and 1.742 for Model 2 (Gordon), both of which are close to 2, suggesting that first-order autocorrelation is not a concern. These diagnostic results support the validity of the statistical inferences drawn from the regression models.

The adjusted R^2 values of 0.515 for the CAPM model and 0.778 for the Gordon model indicate that the latter provides a substantially better fit, explaining a larger proportion of the variance in the cost of capital. This conclusion is further supported by the higher F-statistic observed for the Gordon model. Although the risk disclosure variable itself is not statistically significant, the results suggest that firm-specific characteristics play a meaningful role in determining the cost of capital. The higher adjusted R^2 for the Gordon model implies that its estimates are more reliable and provide a more accurate assessment of the factors influencing firms' cost of capital.

Table 2. Test of hypothesis 1

$$COC_{it} = \alpha + \beta_1 SRef_{it} + \gamma_1 Size_{it} + \gamma_2 Lev_{it} + \gamma_3 ROA_{it} + \gamma_4 Growth_{it} + \gamma_5 BTM_{it} + \gamma_6 Age_{it} + \varepsilon_{it}$$

	$COC1_{it}$ = CAPM (1)		$COC2_{it}$ = Gordon (2)		
Variable	**β**	**t-Stat**	**β**	**t-Stat**	**VIF**
α_0	0.945***	3.805	0.401***	3.496	
$SRef_{it}$	-0.028	-0.635	-0.017	-0.465	1.151
$Size_{it}$	0.031***	2.833	0.043***	3.762	1.854
Lev_{it}	-0.118***	-2.655	-0.083***	-2.231	1.629
ROA_{it}	0.152***	2.401	0.108**	2.035	1.553
$Growth_{it}$	0.082**	2.133	0.102***	3.130	1.437
BTM_{it}	0.011	0.471	0.007	0.311	1.986
Age_{it}	-0.019	-0.765	-0.011	-0.415	1.352
Industry fixed effects	Included		included		
Year fixed effects	Included		Included		
Adjusted R^2	0.535		0.795		
Durbin-Watson	1.761		1.742		
F Statistics	29.550***		78.150***		

***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

The regression results in Table 3 examine the relationships among mandatory risk disclosure, corporate governance mechanisms, and the cost of capital, as estimated by both the CAPM and the Gordon growth models. The findings indicate that mandatory risk disclosure ($SRef_{it}$), reflecting changes in accounting standards, does not exhibit a statistically significant direct effect on the cost of capital (β1 is insignificant in both models). Moreover, the interaction term representing the moderating effect of corporate governance ($SRef_{it} \times CG_{it}$) is also insignificant, suggesting that board independence does not moderate the relationship between mandatory risk disclosure and the cost of

capital. Nevertheless, board independence itself demonstrates a significant negative association with the cost of capital in both models. This result implies that firms with higher board independence experience a lower cost of capital, independent of the level of mandatory risk disclosure.

These findings suggest that reforms in accounting standards regarding risk disclosure, while influencing the extent of mandatory disclosure (SRefit), do not have a significant effect on firms' cost of equity. In contrast, the significant negative coefficient of board independence in both models highlights the substantial role of corporate governance mechanisms in shaping the cost of equity. This result implies that greater board independence may mitigate agency problems and reduce information asymmetry. Overall, while mandatory risk disclosure has a limited impact on the cost of capital, corporate governance emerges as a more critical determinant of firms' financing costs.

Table 3. Test of hypothesis 2 (CG_{it}= $BoaIndu_{it}$)

$$COC_{it} = \alpha + \beta_1 SRef_{it} + \beta_2 CG_{it} + \beta_3 SRef_{it} * CG_{it} + \gamma_1 Size_{it} + \gamma_2 Lev_{it} + \gamma_3 ROA_{it} + \gamma_4 Growth_{it} + \gamma_5 BTM_{it} + \gamma_6 Age_{it} + \varepsilon_{it}$$

Variable		$COC1_{it}$ = CAPM (1) β	t-Stat	$COC2_{it}$ = Gordon (2) β	t-Stat	vif
	α_0	0.876***	3.283	0.348***	3.041	
$SRef_{it}$		0.021	0.445	0.012	0.327	1.252
CG_{it}		-0.132**	-2.141	-0.076*	-1.872	1.451
$SRef_{it} * CG_{it}$		-0.012	-0.305	-0.007	-0.225	1.657
$Size_{it}$		0.029***	2.663	0.041***	3.604	1.902
Lev_{it}		-0.112***	-2.568	-0.078***	-2.176	1.684
ROA_{it}		0.145***	2.327	0.101**	1.956	1.588
$Growth_{it}$		0.078**	2.044	0.098***	3.071	1.482
BTM_{it}		0.009	0.397	0.005	0.246	2.056
Age_{it}		-0.016	-0.692	-0.009	-0.366	1.381
Industry fixed effects		Included		included		
Year fixed effects		Included		Included		
Adjusted R^2		0.546		0.804		
Durbin-Watson		1.813		1.688		
F Statistics		27.850***		75.230***		

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 4. Test of hypothesis 2 (CG_{it}= $InsOwn_{it}$)

$$COC_{it} = \alpha + \beta_1 SRef_{it} + \beta_2 CG_{it} + \beta_3 SRef_{it} * CG_{it} + \gamma_1 Size_{it} + \gamma_2 Lev_{it} + \gamma_3 ROA_{it} + \gamma_4 Growth_{it} + \gamma_5 BTM_{it} + \gamma_6 Age_{it} + \varepsilon_{it}$$

Variable		$COC1_{it}$ = CAPM (1) β	t-Stat	$COC2_{it}$ = Gordon (2) β	t-Stat	vif
	α_0	0.908***	3.401	0.361***	3.145	
$SRef_{it}$		-0.015	-0.343	-0.011	-0.274	1.281
CG_{it}		-0.141*	-1.883	-0.081*	-1.794	1.757
$SRef_{it} * CG_{it}$		-0.040*	-1.804	-0.029*	-1.742	1.954
$Size_{it}$		0.027***	2.626	0.039***	3.487	1.883
Lev_{it}		-0.121***	-2.615	-0.085***	-2.245	1.655
ROA_{it}		0.150***	2.379	0.103**	1.986	1.574
$Growth_{it}$		0.083**	2.029	0.100***	3.057	1.468
BTM_{it}		0.011	0.394	0.006	0.242	2.101
Age_{it}		-0.018	-0.733	-0.010	-0.388	1.370
Industry fixed effects		Included		included		
Year fixed effects		Included		Included		
Adjusted R^2		0.552		0.814		
Durbin-Watson		1.796		1.724		
F Statistics		29.106***		77.957***		

***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 4 presents the regression results for the second hypothesis, using institutional ownership ($InsOwn_{it}$) as an indicator of corporate governance. Consistent with the previous analysis, mandatory risk disclosure ($SRef_{it}$) does not exhibit a statistically significant relationship with the cost of equity in either the CAPM or Gordon growth models. However, the coefficient for institutional ownership is negative and significant, indicating that higher levels of institutional ownership substantially reduce the cost of equity. Additionally, the interaction term representing the moderating effect ($SRef_{it} \times CG_{it}$) is also negative, suggesting that institutional ownership may attenuate the impact of new accounting standards on mandatory risk disclosure, which could, in turn, influence firms' cost of capital.

Additional information about the connection between required risk disclosure, ownership concentration, and the cost of capital can be found in the re-estimated regression models (Table 5), which use OwnConit as the corporate governance metric. Interestingly, in both the CAPM and Gordon growth models, the coefficients for required risk disclosure ($SRef_{it}$) and its relationship to ownership concentration ($SRef_{it}$*CG_{it}) are negative and statistically insignificant. The negative coefficient on CG_{it} suggests that ownership concentration may be inversely related to the cost of capital.

Table 5. Test of hypothesis 2 (CG_{it}= $OwnCon_{it}$)

$$COC_{it} = \alpha + \beta_1 SRef_{it} + \beta_2 CG_{it} + \beta_3 SRef_{it} * CG_{it} + \gamma_1 Size_{it} + \gamma_2 Lev_{it} + \gamma_3 ROA_{it} + \gamma_4 Growth_{it} + \gamma_5 BTM_{it} + \gamma_6 Age_{it} + \varepsilon_{it}$$

Variable		$COC1_{it}$ = CAPM (1) β	t-Stat	$COC2_{it}$ = Gordon (2) β	t-Stat	vif
	α_0	0.928***	3.506	0.383***	3.242	
$SRef_{it}$		-0.019	-0.423	-0.015	-0.355	1.304
CG_{it}		-0.078	-1.665	-0.049	-1.626	1.549
$SRef_{it} * CG_{it}$		-0.035	-1.658	-0.026	-1.592	1.721
$Size_{it}$		0.024***	2.466	0.037***	3.382	1.957
Lev_{it}		-0.128***	-2.720	-0.091***	-2.315	1.713
ROA_{it}		0.158***	2.497	0.108**	2.028	1.607
$Growth_{it}$		0.075**	1.977	0.094***	2.994	1.505
BTM_{it}		0.007	0.337	0.003	0.188	2.159
Age_{it}		-0.024	-0.830	-0.014	-0.505	1.403
Industry fixed effects		Included		Included		
Year fixed effects		Included		Included		
Adjusted R^2		0.568		0.829		
Durbin-Watson		1.802		1.762		
F Statistics		30.522***		79.145***		

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

4.1. Robustness check

To further assess the validity of our results for Hypothesis 1 and address potential concerns related to heteroskedasticity and serial correlation in panel data, we re-estimated our baseline models (Model 1 and Model 2 in Table 2) using firm-clustered standard errors. The results of this robustness test are presented in Table 6. Although the t-statistics are slightly adjusted compared to the baseline fixed-effects estimators, the coefficient estimates (β) remain unchanged. Importantly, the statistical significance and signs of all variables, including the main variable of interest ($SRef_{it}$), are preserved. Mandatory risk disclosure ($SRef_{it}$) continues to show no significant relationship with the cost of capital under both the CAPM and Gordon models. These results confirm that our main findings for Hypothesis 1 are robust to potential violations of standard error assumptions, including heteroskedasticity and within-firm serial correlation.

Table 6. Robustness check for hypothesis 1 using firm-clustered standard errors

$$COC_{it} = \alpha + \beta_1 SRef_{it} + \gamma_1 Size_{it} + \gamma_2 Lev_{it} + \gamma_3 ROA_{it} + \gamma_4 Growth_{it} + \gamma_5 BTM_{it} + \gamma_6 Age_{it} + \varepsilon_{it}$$

	$COC1_{it}$ = CAPM (1)		**$COC2_{it}$ = Gordon (2)**		
Variable	**β**	**t-Stat**	**β**	**t-Stat**	**vif**
α_0	0.951***	3.755	0.405***	3.458	
$SRef_{it}$	-0.025	-0.596	-0.015	-0.433	1.151
$Size_{it}$	0.032***	2.788	0.045***	3.715	1.854
Lev_{it}	-0.120***	-2.613	-0.085***	-2.206	1.629
ROA_{it}	0.155***	2.377	0.110**	2.019	1.553
$Growth_{it}$	0.085**	2.108	0.105***	3.098	1.437
BTM_{it}	0.012	0.468	0.008	0.312	1.986
Age_{it}	-0.018	-0.750	-0.010	-0.400	1.352
Adjusted R^2	0.535		0.795		
Durbin-Watson	1.761		1.742		
F Statistics	25.851***		70.126***		

***, **, and * indicate significance at the 1%, 5% and 10% levels, respectively.

5. Conclusion

This paper investigates the relationship between mandatory risk disclosure and the cost of capital following the implementation of new accounting standards in Iran, and the moderating role of corporate governance mechanisms. Using both the Capital Asset Pricing Model (CAPM) and the Gordon Growth Model, the regression analyses yield several notable insights. The findings reveal that mandatory risk disclosure ($SRef_{it}$) does not exhibit a statistically significant direct relationship with the cost of capital, contrasting with evidence from studies conducted in developed markets (Leuz & Verrecchia, 2000).

Said and Mellett (2013) similarly found low levels of compliance with mandatory risk disclosure among Egyptian firms, influenced by factors such as auditor type, board size, and CEO duality. Consistent with these findings, prior studies—including Lopes and Alencar (2010), Nahar et al. (2016), and Bui et al. (2020) have documented a negative association between both voluntary and mandatory risk disclosure and the cost of capital.

There are several possible explanations for why theoretical expectations regarding the direct and indirect effects of mandatory risk disclosure on the cost of capital were not supported. First, the low quality of the disclosed information may render mandatory risk reporting ineffective in influencing investors' perceptions. If the information provided is not timely, accurate, or reliable, investors are likely to disregard it, thereby limiting its impact on firms' cost of capital and perceived risk. Furthermore, since the mandatory disclosure requirements are relatively new, many firms may still lack sufficient understanding of how to prepare and present risk-related information in a meaningful way. Consequently, investors may derive little benefit from disclosures that are incomplete, poorly structured, or irrelevant.

Furthermore, firms may be less willing to fully and accurately disclose risk-related information when enforcement mechanisms for non-compliance are weak or ineffective. The Iranian capital market is characterized by limited voluntary disclosure, pronounced information asymmetry, and high levels of unsystematic risk—all of which can influence the effect of mandatory risk disclosure on the cost of capital. Finally, another contributing factor may be the superficial nature of many firms' qualitative and quantitative risk disclosures, combined with insufficient oversight by institutional bodies, such as audit committees and independent auditors, of the quality and completeness of the

disclosed information.

The finding that mandatory risk disclosure ($SRef_{it}$), introduced through recent amendments to Iranian accounting standards, does not appear to reduce firms' cost of capital warrants interpretation within Iran's distinctive institutional environment. Several characteristics of this developing market likely moderate and weaken the theoretically expected relationship. First, the high level of information asymmetry in the Iranian capital market (Rajabalizadeh & Schadewitz, 2025) may heighten demand for mandatory disclosure. However, when such asymmetry is accompanied by low-quality reporting or superficial compliance possibly due to weak enforcement mechanisms or firms' limited familiarity with the new standards the informational value perceived by investors becomes restricted, thereby rendering the expected reduction in the cost of capital largely ineffective.

Second, pervasive unsystematic risks such as sanctions, inflation, and exchange rate volatility may overshadow investors' perceptions of firm-specific risks, rendering mandatory risk disclosures largely redundant. Consequently, variations in the cost of capital may be driven more by macroeconomic determinants than by firm-level disclosures mandated by accounting standards. Finally, extensive institutional and state control in the Iranian market may lead major stakeholders to rely less on public disclosures and more on private channels of information or direct monitoring. While this strong governance factor, as reflected in the significant coefficients for our governance variables, reduces the cost of capital, it simultaneously diminishes the marginal contribution of mandatory risk disclosures in mitigating market-wide information asymmetry. Overall, although the recent accounting reforms aim to enhance the informativeness of financial reporting, these institutional characteristics likely explain the observed absence of a significant statistical relationship between increased mandatory risk disclosure and the cost of capital in Iran.

Furthermore, ownership concentration and board independence do not moderate the relationship between mandatory risk disclosure and the cost of capital. In the Iranian context, mandating greater risk disclosure has not resulted in a lower cost of capital for firms. It is therefore essential to distinguish between the direct and moderating effects of corporate governance identified in this study. While our second hypothesis—addressing the moderating influence of corporate governance on the relationship between mandatory risk disclosure (SRefit) and the cost of capital was not supported (as indicated by the insignificant interaction terms across all models in Tables 3, 4, and 5), the results consistently reveal a significant direct negative association between governance mechanisms and the cost of capital. In particular, board independence and institutional ownership, and to a lesser extent ownership concentration, are found to reduce firms' cost of capital. Accordingly, the emphasis on corporate governance in our conclusions stems from this strong direct effect, suggesting that sound governance practices lower the cost of capital primarily through enhanced monitoring and reduced information asymmetry, rather than by moderating the impact of the accounting standard changes examined in this study.

A consistent finding across our analyses (Tables 2–5) is the pronounced difference in explanatory power between the models based on the CAPM-derived cost of capital (COC1) and those using the Gordon Growth Model (COC2). Specifically, the Gordon Growth Model generally yields a substantially higher adjusted R^2 and a larger F-statistic compared with the CAPM model. This evidence suggests that, given the included control and independent variables, the Gordon Growth Model provides a significantly better fit in explaining variations in the cost of capital among Iranian firms during the sample period.

This discrepancy can be explained by the underlying inputs and assumptions of the two models within the unique context of Iran's emerging market. The Gordon Growth Model relies more heavily on firm-level fundamentals such as growth rates and dividend expectations which may be perceived by investors as more tangible and meaningful in an environment characterized by market

inefficiencies and dominant firm-specific (unsystematic) risks. In contrast, the CAPM's reliance on beta and market returns may fail to capture the full spectrum of risks and investor expectations in a market subject to external factors beyond historical systematic risk, such as sanctions and persistent inflation. Given that both models are widely applied, the stronger statistical fit of the Gordon Growth Model in this study suggests that its underlying components align more closely with the factors driving firms' cost of capital in this particular emerging market setting. Accordingly, the findings from the Gordon Growth Model (COC2) can be regarded as more empirically robust within the scope of this research.

The findings of this study offer several practical implications. First, firms should recognize that mere compliance with mandatory risk disclosure requirements may not effectively reduce their cost of capital. To enhance investor confidence and lower financing costs, companies should instead prioritize strengthening their corporate governance mechanisms particularly by improving institutional ownership structures and increasing board independence. Second, investors evaluating opportunities in the Iranian market should consider corporate governance characteristics, such as institutional ownership and board independence, as key indicators of firm quality. Firms with stronger governance structures are likely to exhibit lower risk profiles, which can translate into lower capital costs. Finally, regulatory authorities should actively monitor the effectiveness of corporate governance frameworks and incentivize firms to improve the quality, consistency, and transparency of their governance practices to foster greater trust and market efficiency.

In this regard, it is recommended that policymaking and regulatory bodies such as the Securities and Exchange Organization (SEO), the Iran Audit Organization (IAO), and the Iranian Association of Certified Public Accountants (IACPA) implement both punitive and incentive-based measures to improve the quality of disclosures following changes in accounting standards. One recommendation is to introduce a graduated penalty system for non-compliance, calibrated to the severity of disclosure deficiencies. Reputational accountability could also be strengthened by publicly identifying non-compliant firms and disclosing the nature of their deficiencies in official reports. Moreover, firms that fail to comply with both quantitative and qualitative risk disclosure requirements could be temporarily restricted from issuing new equity or debt instruments. On the incentive side, measures such as tax benefits for firms that fully comply with disclosure requirements, professional training programs on risk management, and public recognition for the top-performing companies in disclosure quality could be implemented. Finally, it is advisable to conduct a qualitative review of firms' risk disclosures. Audit committees, risk committees, and independent auditors should assess and comment on the quality and comprehensiveness of these disclosures in financial statements.

This study has several limitations. First, the analysis focuses exclusively on firms listed on the TSE, an emerging market characterized by limited voluntary disclosure. This feature may constrain the generalizability of the findings to more developed capital markets. Second, the study employs a binary variable (SRefit) based on changes in accounting standards to capture mandatory risk disclosure. However, this measure may not fully capture variations in disclosure quality such as the distinction between qualitative and quantitative information and does not address issues related to superficial compliance. Third, although two approaches are used to estimate the cost of capital (the Gordon Growth Model and the Capital Asset Pricing Model [CAPM]), the lack of a statistically significant relationship between mandatory risk disclosure and the cost of capital suggests that differences in estimation methods may influence the results. Finally, the analysis incorporates only three corporate governance mechanisms—board independence, institutional ownership, and ownership concentration—while excluding other potentially relevant factors, such as audit committee effectiveness and risk committee characteristics.

Future research should incorporate richer measures of risk disclosure quality, including content

analysis of narrative reports and quantitative indicators of risk exposure, to address the limitations identified in this study. To better understand the contextual factors influencing disclosure effects, scholars could extend their analyses across different institutional settings, comparing developed and emerging economies. Additionally, examining alternative corporate governance mechanisms such as the roles of risk committees and audit committees would offer further insights into how governance structures shape disclosure outcomes. In highly information-asymmetric environments such as Iran, future studies may also explore stakeholder perceptions of disclosure credibility and its influence on investment decisions through experimental or survey-based approaches. Such methodological extensions would deepen our understanding of how risk disclosure reduces financing costs and mitigates information asymmetry.

References

1. Akerlof, G. A. (1970). The market for "lemons": quality uncertainty and the market mechanism. *The Quarterly Journal of Economics, 84*(3), pp. 488–500. https://doi.org/10.2307/1879431
2. Alam, M. (2006). Stakeholder theory. In Methodological Issues in Accounting Research: Theories, Methods, and Issues (pp. 207-222). Spiramus, London, UK
3. Azar, J., Schmalz, M. C. and Tecu, I. (2018). Anticompetitive effects of common ownership. *The Journal of Finance*, 73(4), pp. 1513-1565. https://doi.org/10.1111/jofi.12698
4. Bertomeu, J., Beyer, A. and Dye, R. A. (2011). Capital structure, cost of capital, and voluntary disclosures. *The Accounting Review*, 86(3), pp. 857-886. https://doi.org/10.2308/accr.00000037
5. Blue, G., Faraji, O., Khotanlou, M. and Rezaee, Z. (2024). A corporate risk assessment and reporting model in emerging economies. *Journal of Applied Accounting Research*, 25(4), pp. 783-811. https://doi.org/10.1108/JAAR-02-2023-0047
6. Botosan, C. A. (1997). Disclosure level and the cost of equity capital. *The Accounting Review*, 72(3), pp. 323-349. https://www.jstor.org/stable/248475
7. Bui, B., Moses, O. and Houqe, M. N. (2020). Carbon disclosure, emission intensity and cost of equity capital: multi-country evidence. *Accounting & Finance*, 60(1), pp. 47-71. https://doi.org/10.1111/acfi.12492
8. Bushman, R. M. and Smith, A. J. (2001). Financial accounting information and corporate governance. *Journal of accounting and Economics*, 32(1-3), pp. 237-333. https://doi.org/10.1016/S0165-4101(01)00027-1
9. Campbell, J. L., Chen, H., Dhaliwal, D. S., Lu, H. M. and Steele, L. B. (2014). The information content of mandatory risk factor disclosures in corporate filings. *Review of Accounting Studies*, 19(1), pp. 396-455. https://doi.org/10.1007/s11142-013-9258-3
10. Connelly, B. L., Certo, S. T., Reutzel, C. R., DesJardine, M. R. and Zhou, Y. S. (2025). Signaling theory: state of the theory and its future. *Journal of Management*, 51(1), pp. 24-61. https://doi.org/10.1177/01492063241268459
11. Corazza, L., Truant, E., Scagnelli, S. D. and Mio, C. (2020). Sustainability reporting after the Costa Concordia disaster: a multi-theory study on legitimacy, impression management and image restoration. *Accounting, Auditing & Accountability Journal*, 33(8), pp. 1909-1941. https://doi.org/10.1108/AAAJ-05-2018-3488
12. Core, J. E., Hail, L. and Verdi, R. S. (2015). Mandatory disclosure quality, inside ownership, and cost of capital. *European Accounting Review*, 24(1), pp. 1-29. https://doi.org/10.1080/09638180.2014.985691
13. Dam, L. and Scholtens, B. (2012). Does ownership type matter for corporate social responsibility?. *Corporate Governance: An International Review*, 20(3), pp. 233-252.

https://doi.org/10.1111/j.1467-8683.2011.00907.x
14. Deegan, C. (2006). Legitimacy theory. In Z. Hoque (Ed.), *Issues in accounting research: theories and methods*. Spiramus Press Ltd, London, U.K.
15. Dhaliwal, D., Heitzman, S. and Zhen Li, O. L. I. V. E. R. (2006). Taxes, leverage, and the cost of equity capital. *Journal of Accounting Research*, 44(4), pp. 691-723. https://doi.org/10.1111/j.1475-679X.2006.00214.x
16. Diamond, D. W. and Verrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. *The Journal of Finance*, 46(4), pp. 1325-1359. https://doi.org/10.1111/j.1540-6261.1991.tb04620.x
17. Dutta, S. and Nezlobin, A. (2017). Information disclosure, firm growth, and the cost of capital. *Journal of Financial Economics*, 123(2), pp. 415-431. https://doi.org/10.1016/j.jfineco.2016.04.001
18. Fama, E. F. and French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33(1), pp. 3-56. https://doi.org/10.1016/0304-405X(93)90023-5
19. Fama, E. F. and Jensen, M. C. (1983). Separation of ownership and control. *The journal of Law and Economics*, 26(2), pp. 301-325. https://www.jstor.org/stable/725104
20. Fasihi, S. and Hosseini, S. A. (2020). Do risk disclosure increase firms' value?. *Iranian Journal of Finance*, 4(2), pp. 67-76. https://doi.org/10.22034/ijf.2020.232416.1132
21. Fauzi, I. and Firmansyah, A. (2023). Corporate social responsibility disclosure, intellectual capital disclosure, risk disclosure, cost of capital: moderating role of earnings management. *Accounting Analysis Journal*, 12(1), pp. 50-70. https://journal.unnes.ac.id/sju/index.php/aaj/article/view/66185
22. Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman Publishing. Cambridge university press, Cambridge, England.
23. Gebhardt, W. R., Lee, C. M. and Swaminathan, B. (2001). Toward an implied cost of capital. *Journal of Accounting Research*, 39(1), pp. 135-176. https://doi.org/10.1111/1475-679X.00007
24. Gordon, L. A., Loeb, M. P. and Sohail, T. (2010). Market value of voluntary disclosures concerning information security. *MIS Quarterly*, 34(3), pp. 567-594. https://doi.org/10.2307/25750692
25. Gull, A. A., Abid, A., Hussainey, K., Ahsan, T. and Haque, A. (2023). Corporate governance reforms and risk disclosure quality: evidence from an emerging economy. *Journal of Accounting in Emerging Economies*, 13(2), pp. 331-354. https://doi.org/10.1108/JAEE-11-2021-0378
26. Hail, L. and Leuz, C. (2006). International differences in the cost of equity capital: do legal institutions and securities regulation matter?. *Journal of Accounting Research*, 44(3), pp. 485-531. https://doi.org/10.1111/j.1475-679X.2006.00209.x
27. Hao, J. (2024). Disclosure regulation, cost of capital, and firm values. *Journal of Accounting and Economics*, 77(1), A. 101605. https://doi.org/10.1016/j.jacceco.2023.101605
28. Hautz, J., Mayer, M. C. and Stadler, C. (2013). Ownership identity and concentration: A study of their joint impact on corporate diversification. *British Journal of Management*, 24(1), pp. 102-126. https://doi.org/10.1111/j.1467-8551.2011.00792.x
29. He, J. and Huang, J. (2017). Product market competition in a world of cross-ownership: Evidence from institutional blockholdings. *The Review of Financial Studies*, 30(8), pp. 2674-2718. https://doi.org/10.1093/rfs/hhx028
30. He, J., Plumlee, M. A. and Wen, H. (2019). Voluntary disclosure, mandatory disclosure and the cost of capital. *Journal of Business Finance & Accounting*, 46(3-4), pp. 307-335. https://doi.org/10.1111/jbfa.12368
31. Healy, P. M. and Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the

capital markets: A review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31(1-3), 405-440. https://doi.org/10.1016/S0165-4101(01)00018-0
32. Holm, C. and Laursen, P. B. (2007). Risk and control developments in corporate governance: changing the role of the external auditor?. *Corporate Governance: An International Review*, 15(2), pp. 322-333. https://doi.org/10.1111/j.1467-8683.2007.00563.x
33. Ibrahim, A. E. A. and Aboud, A. (2024). Corporate risk disclosure and firm value: UK evidence. *International Journal of Finance & Economics*, 29(4), pp. 4225-4246. https://doi.org/10.1002/ijfe.2871
34. Ibrahim, A. E. A., Hussainey, K., Nawaz, T., Ntim, C. and Elamer, A. (2022). A systematic literature review on risk disclosure research: State-of-the-art and future research agenda. *International Review of Financial Analysis*, 82, A. 102217. https://doi.org/10.1016/j.irfa.2022.102217
35. Iranian Audit Organization. (IAO). (2023). Accounting Standards (Publication 160). Tehran: Audit Organization, Tehran, Iran.
36. Jensen, M. C. and Meckling, W. H. (1976). Theory of the firm: managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics, 3*(4), pp. 305–360. https://doi.org/10.1016/0304-405X(76)90026-X
37. Johnstone, D. (2016). The effect of information on uncertainty and the cost of capital. *Contemporary Accounting Research*, 33(2), pp. 752-774. https://doi.org/10.1111/1911-3846.12165
38. Júnior, J. F. A., Oliveira, M. C., Ponte, V. M. R. and de Sousa Ribeiro, M. (2014). Social disclosure of Brazilian and UK firms in light of stakeholder theory, legitimacy theory and voluntary disclosure theory. *Advances in Scientific and Applied Accounting*, 7(2), pp. 175-200. https://doi.org/10.14392/ASAA.2014070201
39. Kassamany, T., Harb, E., Louhichi, W. and Nasr, M. (2023). Impact of risk disclosure on the volatility, liquidity and performance of the UK and Canadian insurance companies. *Competitiveness Review: An International Business Journal*, 33(1), pp. 30-61. https://doi.org/10.1108/CR-10-2021-0129
40. Kravet, T. and Muslu, V. (2013). Textual risk disclosures and investors' risk perceptions. *Review of Accounting Studies*, 18(4), pp. 1088-1122. https://doi.org/10.1007/s11142-013-9228-9
41. Lambert, R., Leuz, C. and Verrecchia, R. E. (2007). Accounting information, disclosure, and the cost of capital. *Journal of Accounting Research*, 45(2), pp. 385-420. https://doi.org/10.1111/j.1475-679X.2007.00238.x
42. Lei, L. and Luo, Y. (2023). Political/policy uncertainty, corporate disclosure, and information asymmetry. *Accounting Perspectives*, 22(1), pp. 87-110. https://doi.org/10.1111/1911-3838.12317
43. Lemma, T. T., Feedman, M., Mlilo, M. and Park, J. D. (2019). Corporate carbon risk, voluntary disclosure, and cost of capital: S outh A frican evidence. *Business Strategy and the Environment*, 28(1), pp. 111-126. https://doi.org/10.1002/bse.2242
44. Leuz, C. and Verrecchia, R. E. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research,* 38, pp. 91-124. https://doi.org/10.2307/2672910
45. Lopes, A. B. and de Alencar, R. C. (2010). Disclosure and cost of equity capital in emerging markets: the Brazilian case. *The International Journal of Accounting*, 45(4), pp. 443-464. https://doi.org/10.1016/j.intacc.2010.09.003
46. Martens, W. and Bui, C. N. M. (2023). An exploration of legitimacy theory in accounting literature. *Open Access Library Journal*, 10(1), pp. 1-20. https://doi.org/10.4236/oalib.1109713
47. Mehrani, K. and Safarzadeh, M.H. (2011). 'Explaining the relationship between corporate

governance and earnings quality with a native approach ', *Journal of Accounting Knowledge*, 2(7), pp. 69-98 (In Persion). https://doi.org/10.22103/jak.2011.13
48. Miihkinen, A. (2013). The usefulness of firm risk disclosures under different firm riskiness, investor-interest, and market conditions: New evidence from Finland. *Advances in Accounting*, 29(2), pp. 312-331. https://doi.org/10.1016/j.adiac.2013.09.006
49. Myers, S. C. and Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), pp. 187-221. https://doi.org/10.1016/0304-405X(84)90023-0
50. Nahar, S., Azim, M. and Anne Jubb, C. (2016). Risk disclosure, cost of capital and bank performance. *International Journal of Accounting & Information Management*, 24(4), pp. 476-494. https://doi.org/10.1108/IJAIM-02-2016-0016
51. Ntim, C. G., Lindop, S. and Thomas, D. A. (2013). Corporate governance and risk reporting in South Africa: A study of corporate risk disclosures in the pre-and post-2007/2008 global financial crisis periods. *International Review of Financial Analysis*, 30, pp. 363-383. https://doi.org/10.1016/j.irfa.2013.07.001
52. Pakdelan, S., Azarberahman, A., Akbari, S. and Azarberahman, J. (2021). Does risk disclosure affect firm's cost of capital. *International Journal of Management, Accounting and Economics*, 8(11), pp. 816-837. https://www.ijmae.com/article_144390_a37812153eb23b4b7359d7c387f60738.pdf
53. Rajabalizadeh, J. and Schadewitz, H. (2025). Audit report readability and information efficiency: evidence from the Tehran Stock Exchange. *Journal of Accounting in Emerging Economies*, 15(2), pp. 491-516. https://doi.org/10.1108/JAEE-08-2024-0344
54. Rhodes, M. J. (2010). Information asymmetry and socially responsible investment. *Journal of Business Ethics*, 95(1), pp. 145-150. https://doi.org/10.1007/s10551-009-0343-2
55. Saggar, R. and Singh, B. (2017). Corporate governance and risk reporting: Indian evidence. *Managerial Auditing Journal*, 32(4/5), pp. 378-405. https://doi.org/10.1108/MAJ-03-2016-1341
56. Said Mokhtar, E. and Mellett, H. (2013). Competition, corporate governance, ownership structure and risk reporting. *Managerial Auditing Journal*, 28(9), pp. 838-865. https://doi.org/10.1108/MAJ-11-2012-0776
57. Salem, I. H., Ayadi, S. D. and Hussainey, K. (2019). Corporate governance and risk disclosure quality: Tunisian evidence. *Journal of Accounting in Emerging Economies*, 9(4), pp. 567-602. https://doi.org/10.1108/JAEE-01-2019-0005
58. Shivaani, M. V. and Agarwal, N. (2020). Does competitive position of a firm affect the quality of risk disclosure?. *Pacific-Basin Finance Journal*, 61, A. 101317. https://doi.org/10.1016/j.pacfin.2020.101317
59. Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics, 87*(3), pp. 355–374. https://doi.org/10.2307/1882010
60. Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3), pp. 571-610. https://doi.org/10.2307/258788
61. Taj, S. A. (2016). Application of signaling theory in management research: addressing major gaps in theory. *European Management Journal*, 34(4), pp. 338-348. https://doi.org/10.1016/j.emj.2016.02.001
62. Thitinun, P. and Yomchinda, N. (2021). The effect of specific risk disclosure under IFRS7 on cost of capital. *Academy of Accounting and Financial Studies Journal*, 251, p. 12. https://www.abacademies.org/articles/The-effect-of-specific-risk-disclosure-under-ifrs-7-on-Cost-of-capital-1528-2635-25-1-673.pdf
63. Tirado-Beltrán, J. M., Cabedo, D. and Muñoz Ramírez, D. E. (2020). Risk disclosure and cost of

equity: A Bayesian approach. *Instituto Tecnológico Metropolitano*, 6(11), pp. 25-43. https://doi.org/10.22430/24223182.1497

64. Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, 5, pp. 179-194. https://doi.org/10.1016/0165-4101(83)90011-3
65. Verrecchia, R. E. (2001). Essays on disclosure. *Journal of Accounting and Economics*, 32(1-3), pp. 97-180. https://doi.org/10.1016/S0165-4101(01)00025-8
66. Yasar, B., Martin, T. and Kiessling, T. (2020). An empirical test of signalling theory. *Management Research Review*, 43(11), pp. 1309-1335. https://doi.org/10.1108/MRR-08-2019-0338

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Implementing Water Accounting in a Developing Economy: Barriers and Insights from Iran

Mohammad Nazaripour*, Jafar Babazadeh Hashin

Department of Accounting, Faculty of Management and Accounting, Hazrat-e Masoumeh University, Qom, Iran

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Abstract

All industrial activities rely on water, either directly for production or indirectly to support manufacturing processes. Given the severe water scarcity in Iran, manufacturing companies face substantial challenges in managing their water resources. This study investigates the barriers to adopting water accounting in Iran's manufacturing sector amid the country's ongoing water crisis. A novel six-dimensional framework is proposed that encompasses technical/infrastructural, regulatory/policy, human capital, cultural/organizational, economic/financial, and external environmental barriers. Using a descriptive–survey design, data were collected from 170 accountants and analyzed through exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) using SPSS 26 and AMOS 24. The results indicate that technical/infrastructural barriers exert the strongest influence, followed by regulatory and policy gaps, while all six dimensions demonstrate interrelated effects. This study contributes a context-specific analytical framework that addresses the research gap in Iran's underexplored manufacturing sector and provides practical insights for sustainable water management. By systematically identifying and evaluating the interconnected barriers, the research offers actionable recommendations to enhance the implementation of water accounting and promote more sustainable resource management practices.

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*Corresponding Author: Mohammad Nazaripour
Email: mnazaripour@yahoo.com
Tel: 09181777697
ORCID: 0000-0001-9564-2230

1. Introduction

Water is a fundamental resource essential for sustaining life, supporting economic development, and maintaining environmental stability (Westall & Brack, 2018). Within the manufacturing sector, water plays a critical role in processes such as cooling, cleaning, and direct production, making it a cornerstone of industrial operations (Refalo & Zammit, 2013). However, the escalating global demand for water driven by population growth, industrial expansion, and climate change has intensified water scarcity across many regions, posing serious challenges to sustainable resource management (Karimi et al., 2024). Iran, a semi-arid country, faces an especially acute water crisis marked by prolonged droughts, groundwater overexploitation, and systemic mismanagement, which collectively threaten its socio-economic and environmental stability (Mirzavand & Bagheri, 2020). The manufacturing sector, a vital pillar of Iran's economy, is particularly vulnerable. Inefficient water use in this sector exacerbates resource scarcity, disrupts production continuity, and heightens operational risks (Mokhtari Hashi, 2024). Addressing these challenges necessitates innovative approaches to water governance, among which water accounting has emerged as a critical mechanism for promoting transparency, efficiency, and sustainability in resource management.

Water accounting provides a systematic framework for measuring, monitoring, and reporting water consumption and discharge. It enables organizations to quantify their water footprint, identify inefficiencies, and implement targeted improvements (Morrison et al., 2010). For manufacturing firms, water accounting represents not merely a sustainability initiative but a strategic imperative that enhances operational efficiency, reduces costs, and ensures compliance with environmental regulations (Meurer & Van Bellen, 2024; Mokhtari Hashi, 2024). By delivering accurate data on water-use patterns, water accounting supports evidence-based decision-making, risk mitigation, and corporate environmental stewardship—thereby contributing to global efforts toward sustainable water management and resource conservation (Sofocleous, 2010). In water-stressed regions such as Iran, where scarcity constitutes a critical business risk, water accounting is increasingly recognized as a cornerstone of corporate resilience and sustainability strategies (Muller, 2012). Effective implementation can optimize resource utilization, minimize environmental impacts, and position firms as leaders in sustainable industrial practices.

Despite its critical importance, water accounting remains significantly underutilized within Iran's manufacturing sector. The limited adoption of comprehensive frameworks and the continued reliance on outdated, fragmented methods have resulted in inaccurate data and ineffective water management practices (Mokhtari Hashi, 2024; Nazaripour, 2021). While global literature emphasizes the role of water accounting in sustainable resource management particularly in developed regions such as Australia and the European Union (Vardon et al., 2007; Hunink et al., 2019; Ferreira et al., 2023) there is a striking lack of research addressing the barriers to implementation in developing economies that face distinct socio-economic and geopolitical constraints, such as Iran. Previous studies (e.g., Nazaripour, 2021; Asnad & Fakhari, 2024) have identified isolated barriers, such as regulatory deficiencies or technical limitations, but have failed to offer a comprehensive framework that integrates the complex interrelations among cultural, economic, regulatory, technical, human capital, and external environmental factors. Iran's unique context characterized by international sanctions, centralized governance, and cultural resistance to organizational change—introduces specific challenges that remain underexplored (Nazaripour & Zakizadeh, 2023). For instance, sanctions restrict access to advanced technologies and international funding; centralized governance structures inhibit decentralized collaboration; and cultural norms that prioritize short-term gains over long-term sustainability discourage investment in water management innovation (Danışman, 2010; Nouri et al., 2023). Addressing these gaps, this study develops a comprehensive, context-specific framework to systematically examine the multifaceted barriers hindering the adoption of water accounting practices

in Iran's manufacturing sector.

This study aims to examine the barriers to the adoption of water accounting in Iran's manufacturing sector and to propose actionable, context-specific strategies to promote sustainable water management practices. To achieve this objective, the research develops a novel six-dimensional framework comprising technical/infrastructural, regulatory/policy, human capital, cultural/organizational, economic/financial, and external environmental barriers each reflecting Iran's distinct socio-economic and environmental context. Accordingly, the study seeks to address the following research questions:

- What are the primary barriers to adopting water accounting in Iran's manufacturing sector?
- How do these barriers interact to impede effective implementation?
- What tailored strategies can address these barriers to enhance sustainable water management in Iran's manufacturing context?

These research questions guide the study's methodological design, which employs advanced statistical techniques to validate the proposed framework and generate practical recommendations. Focusing on Iran's manufacturing sector, the study seeks to enhance the adoption of water accounting by addressing context-specific challenges, including sanctions-related technological constraints, weak regulatory enforcement, and cultural resistance to organizational change. Using a descriptive–survey approach, data were collected from 170 accountants and analyzed through exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM). The validated six-dimensional framework comprising technical/infrastructural, regulatory/policy, human capital, cultural/organizational, economic/financial, and external environmental barriers provides a comprehensive foundation for promoting sustainable water management practices amid Iran's severe water crisis.

The remainder of this paper is organized as follows. The literature review synthesizes relevant prior studies, while the methodology section outlines the research design and data analysis procedures. The findings section presents the analytical results, followed by the discussion, which interprets these findings in light of the research objectives. Finally, the conclusion summarizes the key contributions and highlights the study's theoretical and practical implications.

2. Literature review

Water accounting plays a crucial role in advancing sustainable resource management; however, its level of adoption varies considerably across countries. Developed economies, such as Australia and the members of the European Union, have established comprehensive, institutionalized frameworks (Vardon et al., 2007; Hunink et al., 2019). In contrast, developing economies—particularly those located in water-scarce regions—face distinct institutional, technical, and socio-economic challenges that hinder widespread implementation. This study focuses on Iran's manufacturing sector and addresses a critical gap in the existing literature by providing an in-depth analysis of the barriers to adopting water accounting in this specific national context.

2.1. Cultural and organizational barriers (COB)

Cultural and organizational barriers (COBs) continue to hinder the adoption of sustainable practices, such as water accounting, in Iran. Centralized decision-making and bureaucratic inefficiencies, exacerbated by international sanctions, obstruct effective information sharing and resource allocation (Afzal & Lim, 2022; Christ & Burritt, 2017). Moreover, a prevailing culture of secrecy and weak inter-organizational communication further complicates sustainability initiatives (Nazaripour & Ravand, 2021). Iran's top-down governance structure contrasts sharply with

Australia's decentralized model, thereby limiting opportunities for collaboration. From an Institutional Theory perspective, cultural norms significantly influence regulatory compliance (Burdon & Sorour, 2020). Meanwhile, the resource-based view (RBV) underscores deficiencies in organizational training and collaboration (Kero & Bogale, 2023). Additionally, the lack of trust and rigid hierarchies impede progress toward sustainability (Rösler et al., 2021). To overcome these challenges, proposed strategies include fostering strong leadership commitment, expanding training programs, and embedding sustainability principles into core organizational values (Ketprapakorn & Kantabutra, 2022).

2.2. Economic and financial barriers (EFB)

Economic and financial barriers (EFBs) pose substantial obstacles to sustainable water management in Iran. Iran's economic vulnerabilities—aggravated by international sanctions—have restricted access to financial capital, advanced technologies, and foreign investment, thereby impeding the development of essential water infrastructure (Madani, 2021; Nazaripour, 2021). In addition, prolonged droughts and persistently low water prices have reduced agricultural revenues and discouraged conservation-oriented investments. These conditions contrast sharply with the adaptive and market-responsive financial systems observed in countries such as Australia and India (Karimi et al., 2024; Eskandar & Hadadi, 2022). Drawing on Institutional Theory, the study demonstrates how financial constraints undermine regulatory compliance (Burdon & Sorour, 2020; Esmaeilishirazifard et al., 2024), while the Resource-Based View (RBV) highlights how resource scarcity hampers the effectiveness of water accounting systems (Kero & Bogale, 2023; Polzin et al., 2016). The findings reveal a unique interplay of sanctions, underpricing, and chronic underinvestment as major impediments to sustainability (Gietema, 2022). To address these challenges, the paper proposes policy interventions such as targeted subsidies and tiered water pricing to better align economic incentives with environmental objectives (Nazaripour & Ravand, 2021; Karimi et al., 2024).

2.3. Regulatory and policy barriers (RPB)

Regulatory and policy barriers (RPB) significantly impede the adoption of water accounting practices in Iran, revealing a critical gap in the existing literature. Centralized governance structures and underdeveloped regulatory frameworks hinder effective water management, while policy inconsistencies—exacerbated by international sanctions further complicate the allocation and implementation of water rights (Nazaripour, 2021; Nazaripour & Zakizadeh, 2023). In contrast to the decentralized governance models of countries such as Australia and India, Iran's top-down approach limits institutional accountability and undermines the effectiveness of water accounting systems (Chanchani, 2023; Nouri et al., 2023). Drawing on Institutional Theory, this study demonstrates that regulatory uncertainty and fragmented policy environments discourage sustainable investment (Meurer & Van Bellen, 2024). It also highlights how sanctions, low water pricing, and weak enforcement mechanisms contribute to persistent structural dependencies that remain largely unaddressed (Nazaripour & Ravand, 2021). Furthermore, inconsistent policies have led to ongoing technical neglect in the sector (Leach et al., 2010). To strengthen Iran's regulatory landscape, this paper recommends adopting elements from the Australian and European Union models to better align national water accounting practices with global best standards (Vardon et al., 2023; Karimi et al., 2024).

2.4. Technical and infrastructure barriers (TIB)

Technical and infrastructure barriers (TIB) significantly hinder the implementation of water

accounting practices in Iran. The country's aging water infrastructure—characterized by system leaks and outdated technologies—reduces the accuracy and reliability of water accounting data (Nazaripour & Ravand, 2021; Esmaeilishirazifard et al., 2024). International sanctions further aggravate this situation by restricting access to advanced technologies. At the same time, chronic underinvestment has deepened existing technical deficiencies, leaving Iran behind countries such as Australia and India in terms of water management capabilities (Miller et al., 2023; Madani, 2021). Drawing on the Resource-Based View (RBV), this study emphasizes the shortage of technical resources within Iran's manufacturing sector, particularly the lack of advanced metering systems and trained personnel (Adelakun, 2023). These deteriorating conditions, coupled with technological isolation, have created persistent and unresolved structural dependencies (Madani, 2021; Alhassan et al., 2023). To modernize Iran's water accounting systems, this paper recommends integrating Internet of Things (IoT) sensors, artificial intelligence (AI) analytics, and cloud-based platforms to enhance efficiency, accuracy, and transparency in water resource management (Abedi, 2022).

2.5. Human capital barriers (HCB)

Human capital barriers (HCB) significantly hinder the effective adoption of water accounting practices in Iran, exposing a critical gap in the literature. Major challenges include a shortage of skilled labor, insufficient training programs, and international sanctions that constrain knowledge transfer (Nazaripour, 2021). The persistent brain drain further exacerbates the scarcity of qualified professionals in Iran's manufacturing sector, making the establishment and maintenance of water accounting systems increasingly complex (Mazur et al., 2023; Nazaripour & Zakizadeh, 2023). In contrast, countries such as Australia and India benefit from strong educational infrastructures that support the integration of water accounting into industrial and environmental management practices (López et al., 2019). This study highlights the interconnections among sanctions, brain drain, and inadequate investment in education, emphasizing the urgent need for specialized training in data analytics and sustainable water management, as well as enhanced collaboration between academia and industry (Nazaripour & Ravand, 2021; Farzanegan & Batmanghelidj, 2024). Moreover, continuous professional development remains essential to ensure long-term institutional capacity in this field (Ikevuje et al., 2024).

2.6. External environmental barriers (EEB)

External environmental barriers (EEBs) pose significant challenges to implementing water accounting practices in Iran. The country's arid climate and recurring droughts—intensified by climate change—undermine the efficiency and consistency of water accounting systems (Nouri et al., 2023). Additional environmental pressures, including transboundary water disputes and progressive desertification, further complicate resource management and policy execution. These challenges stand in sharp contrast to the more stable hydrological conditions observed in countries such as Australia and India (Cosgrove & Loucks, 2015). This study illustrates how environmental stressors weaken the reliability of water accounting systems by disrupting data collection, monitoring, and management processes. Unpredictable weather patterns and extreme climatic events exacerbate data inconsistencies and operational uncertainties (Okitasari et al., 2018). To strengthen resilience in Iran's water management practices, the study underscores the importance of multi-stakeholder collaboration, active engagement of policymakers, and sustained community participation (Nazaripour & Zakizadeh, 2023; Vardon et al., 2025; Merei, 2024).

2.7. Synthesis and contribution

The literature on water accounting demonstrates that developed nations have established robust

institutional and regulatory frameworks (Vardon et al., 2007; Hunink et al., 2019). However, substantial gaps remain in understanding and addressing the barriers faced by developing countries such as Iran. Key challenges include cultural resistance, economic constraints, regulatory inconsistencies, and shortages of skilled human capital. International sanctions further aggravate economic and technical difficulties, while centralized governance structures amplify existing regulatory weaknesses (Nazaripour & Zakizadeh, 2023). To address these deficiencies, this study develops a comprehensive six-factor framework to examine barriers to the implementation of water accounting in Iran's manufacturing sector. The framework refines existing theoretical models and proposes practical interventions to promote sustainable water management and enhance institutional resilience.

3. Methodology

This study adopts a descriptive survey research design to examine the barriers hindering the adoption of water accounting practices in Iran's manufacturing sector. Advanced statistical analyses are employed to validate a six-factor framework encompassing technical and infrastructure, regulatory and policy, human capital, cultural and organizational, economic and financial, and external environmental barriers. The methodological approach is guided by three core research questions: (1) What are the primary barriers to adopting water accounting in Iran's manufacturing sector? (2) How do these barriers interact to impede effective implementation? (3) What context-specific strategies can mitigate or overcome these barriers? The subsequent subsections outline the sampling procedures, data collection methods, research instruments, and analytical techniques used in this study. Measures were also incorporated to minimize potential biases and ensure the reliability and validity of the analyses.

3.1. Sampling

Snowball sampling was employed to recruit participants, as this approach was deemed appropriate given the need for specialized expertise in water accounting within Iran's manufacturing sector. The initial participants—accountants with experience in water-use monitoring or sustainability reporting—were identified through professional associations, industry networks, and academic contacts. Each participant subsequently referred other professionals with comparable expertise, enabling the formation of a targeted and information-rich sample capable of providing reliable insights into barriers to water accounting adoption.

To mitigate potential biases inherent in snowball sampling such as the over-representation of interconnected networks or homogeneous perspectives the sample was diversified across multiple dimensions. Participants were recruited from a variety of manufacturing sectors (e.g., textiles, chemicals, food processing, and automotive) to capture industry-specific challenges. In addition, companies of varying sizes, ranging from small and medium-sized enterprises (SMEs) to large corporations, were included to account for differences in resource availability. Regional diversity was also ensured by selecting participants from areas with distinct levels of water scarcity. All participants were screened for familiarity with water accounting practices through a preliminary questionnaire that assessed their experience with water-use measurement and reporting, thereby enhancing the data's relevance and reliability. In total, 181 questionnaires were distributed, yielding 170 valid responses, for a 93.9% response rate. This sample size provided sufficient statistical power while minimizing sampling bias.

3.2. Data collection

Data were collected through an online questionnaire administered between January and April

2025. This approach was selected to enhance accessibility across Iran's geographically diverse regions and to overcome logistical constraints associated with international sanctions. Participants were recruited via professional networks, industry associations, and peer referrals. Recruitment emails included a detailed study overview, an informed consent form, and a brief screening questionnaire designed to verify participants' expertise in water accounting or related financial management roles. In total, 181 accountants were invited to participate. Of these, 170 met the eligibility criteria and completed the survey, while 11 responses were excluded due to incomplete data or insufficient domain expertise.

Ethical standards were strictly observed. Informed consent was obtained from all participants, anonymity was ensured, and data were handled in accordance with institutional ethics and data protection regulations. All data were securely stored on a restricted-access platform and used solely for research purposes.

3.3. Instruments

The questionnaire consisted of two sections: demographic information and 36 Likert-scale items measuring six barrier constructs. The demographic section captured participants' sector, company size, region, years of experience, and familiarity with water accounting. The main section included 36 items—six for each of the following constructs (technical/infrastructure, regulatory/policy, human capital, cultural/organizational, economic/financial, and external environmental)—rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). Items were adapted from prior studies (e.g., Madani, 2014; Nazaripour & Ravand, 2021; Nouri et al., 2023) and contextualized for Iran's manufacturing sector.

The instrument was validated by a panel of five experts with over ten years of experience in water accounting, environmental management, or industrial accounting in Iran. They evaluated the items for content validity, clarity, and relevance and recommended minor revisions to three items. A pilot test with 20 accountants confirmed reliability (Cronbach's $\alpha \geq 0.7$ for all constructs) and resulted in slight wording adjustments. The final questionnaire was then administered online to ensure consistency in data collection.

3.4. Data analysis

Data analysis employed exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) using SPSS 26 and AMOS 24, both of which were selected for their suitability for exploratory research in understudied contexts (Ghaleb & Yaslioglu, 2024). These methods, consistent with the descriptive–survey design, enabled detailed data collection from expert respondents and the examination of complex interrelationships among barriers in Iran's manufacturing sector. EFA identified latent constructs among the 36 items, confirming the six-barrier framework (Research Question 1). CFA validated the measurement model, while SEM analyzed interrelationships among the barriers and their influence on water accounting adoption (Research Question 2). Descriptive statistics summarized barrier significance, and thematic analysis of open-ended responses provided insights for context-specific mitigation strategies (Research Question 3).

Reliability and validity were confirmed across all constructs. Composite reliability (CR) values exceeded 0.7, and average variance extracted (AVE) values were above 0.5, indicating satisfactory convergent validity. Discriminant validity was established, with both the maximum shared variance (MSV) and the average shared variance (ASV) lower than the AVE, as summarized in Tables 11–12. Statistical assumptions were verified to ensure analytical robustness. Normality was confirmed through skewness and kurtosis values within the acceptable range (±2). Multicollinearity diagnostics showed all variance inflation factor (VIF) values below 5, indicating no significant collinearity issues.

Outliers were assessed using the Mahalanobis distance, and none were detected. All tests were performed in SPSS 26 and AMOS 24, confirming the suitability of the data for EFA, CFA, and SEM analyses.

4. Findings

This section first presents descriptive statistics, then the results of hypothesis testing, and finally the subsequent analysis of the findings.

Table 1. Demographic description of the survey sample

Variable	Category	%	Variable	Category	%
Gender	Male	74.7	Education	Bachelor's degree	38.2
	Female	25.3		Master's degree	61.8
Age	Under 30 years old	10.6	Experience	Under 5 years	11.8
	30-39 years old	44.7		5-9 years	32.4
	40-50 years old	29.4		10-20 years	40.6
	Above 50 years old	15.3		Above 20 years	15.2

Note: the sample size was 170 accountants

Table 1 presents the respondents' demographic characteristics. The majority were male (74.7%), and 25.3% were female. Most participants (61.8%) held a master's degree, and 51.2% had 10-20 years of accounting experience. The largest age group was 30–39 years, representing 44.7% of the sample.

The subsequent sections present the research findings in detail.

4.1. Exploratory factor analysis

An adequate sample size is essential for conducting exploratory factor analysis (EFA) (Shrestha, 2021). The Kaiser–Meyer–Olkin (KMO) and Bartlett's Test of Sphericity were applied to assess data suitability. As shown in Table 2, the KMO value of 0.900 indicates excellent sampling adequacy, while Bartlett's test yielded a significance level of 0.000, confirming sufficient correlations among variables (Shrestha, 2021). These results verify the appropriateness of EFA for identifying and interpreting the dataset's underlying factor structure.

Table 2. KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.900
Bartlett's Test of Sphericity	Approx. Chi-Square	3975.039
	df	630
	Sig.	0.000

After confirming sample adequacy, exploratory factor analysis was performed using the principal components method with Varimax rotation on the 36 questionnaire items. The results, summarized in Table 3, show the proportion of variance explained by each extracted factor. Higher communalities indicate stronger explanatory power; all values exceeded 0.50, confirming that the identified factors adequately represent the observed variables. Minor variability was observed among items—for example, Item 9 recorded a communality of 0.744, while Item 34 showed a lower value of 0.568.

Table 3. Communalities

Question	Extraction	Question	Extraction	Question	Extraction	Question	Extraction

1	0.755	10	0.767	19	0.704	28	0.665
2	0.613	11	0.586	20	0.621	29	0.643
3	0.659	12	0.682	21	0.615	30	0.690
4	0.698	13	0.672	22	0.720	31	0.723
5	0.650	14	0.628	23	0.600	32	0.614
6	0.744	15	0.700	24	0.686	33	0.589
7	0.767	16	0.744	25	0.611	34	0.568
8	0.708	17	0.641	26	0.645	35	0.598
9	0.770	18	0.726	27	0.630	36	0.671

Note: The extraction method used is principal component analysis. The initial commonality for all items is set to one.

Factors with eigenvalues greater than one were retained as the extraction criterion, as shown in Table 4. The six extracted factors collectively explained 66.94% of the total variance. To achieve a clearer and more interpretable structure, Varimax rotation was applied. Table 4 presents the extracted factors, the variance explained by each, and the cumulative variance before and after rotation. Compared with the unrotated solution, Varimax rotation redistributes variance among factors, enhancing interpretability by providing a more balanced representation of the underlying constructs (Darton, 1980).

Table 4. Total variance explained

Component	Initial Eigenvalues/Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.170	33.807	33.807	4.350	12.084	12.084
2	3.749	10.415	44.222	4.253	11.814	23.898
3	2.595	7.207	51.429	3.946	10.960	34.858
4	2.149	5.971	57.400	3.941	10.947	45.805
5	1.745	4.847	62.247	3.848	10.690	56.495
6	1.691	4.697	66.944	3.761	10.449	66.944

Tables 4–10 present the factor loadings of the questionnaire items for each extracted component. A loading threshold of 0.40 was applied to assign items to their respective factors (Samuels, 2017). Each table reports the factor loadings and corresponding Cronbach's alpha values. As all loadings exceed 0.50, the items exhibit strong reliability and high internal consistency within each factor. Factor names were determined based on the thematic content of the items they were associated with.

Table 5. Rotated matrix for the first component (Economic and Financial Barriers) and Cronbach's Alpha

	Factor loading	Cronbach's alpha	Question
1	0.836	0.912	Struggle to balance short-term finances with long-term environmental water goals
2	0.816		Lack of commitment from senior management to environmental initiatives, such as water accounting
3	0.811		Fail to adopt environmental accounting initiatives, especially water accounting
4	0.785		Provide inadequate support for employees implementing environmental initiatives, including water accounting
5	0.780		Neglect to educate employees on the importance of water, accounting for economic and social responsibility
6	0.596		Resist changes to implementing water accounting

Table 5 summarizes the key economic and financial barriers (EFB) hindering the adoption of water

accounting in Iran's manufacturing sector. The main challenge is balancing short-term financial demands with long-term sustainability objectives (factor loading = 0.836, β = 0.83, p < 0.001), reflecting the dominance of immediate financial pressures in resource-constrained firms. A lack of senior management commitment also represents a significant barrier (factor loading = 0.816, β = 0.81, p < 0.001), as managers tend to prioritize short-term survival over environmental initiatives. Additional obstacles include inadequate employee training and support (factor loadings = 0.780–0.811, β = 0.78–0.81, p < 0.001) and resistance to change (factor loading = 0.596, β = 0.60, p < 0.001). Overall, these findings suggest that financial constraints—intensified by international sanctions—alongside managerial and cultural resistance substantially impede the adoption of water accounting, underscoring the need for targeted, context-specific interventions.

Table 6. Rotated matrix for the second component (Cultural and Organizational Barriers) and Cronbach's Alpha

	Factor loading	Cronbach's alpha	Question
1	0.787	0.901	Persistently low water prices in Iran hinder essential investment in water systems
2	0.779		Government incentives like subsidies or tax breaks are inadequate for promoting water accounting adoption
3	0.761		Unclear ROI assessments discourage the implementation of water accounting systems
4	0.748		High design and implementation costs are a major barrier to adopting water accounting
5	0.719		Implementing water accounting systems without reallocating resources causes unsustainable strain and project failures
6	0.696		Water accounting systems are often undervalued and overlooked, despite their cost-effectiveness

Table 6 summarizes the key cultural and organizational barriers to implementing water accounting in Iran's manufacturing sector. The primary issue is the low price of water (factor loading = 0.787, β = 0.79, 95% CI [0.75, 0.83], p < 0.001), reflecting a cultural perception of water abundance that discourages sustainable investment. Additional barriers include limited government incentives (factor loading = 0.779, β = 0.78), unclear return-on-investment assessments (factor loading = 0.761, β = 0.76), high implementation costs (factor loading = 0.748, β = 0.75), inefficient resource allocation (factor loading = 0.719, β = 0.72), and the undervaluation of water accounting (factor loading = 0.696, β = 0.70). Findings from 170 accountants across various manufacturing sectors reveal that these barriers are rooted in socio-cultural norms and distorted water pricing structures. The results underscore the need for policy reforms—particularly in pricing mechanisms, incentive systems, and capacity-building—to foster sustainability under the constraints of economic sanctions.

Table 7. Rotated matrix for the third component (Technical and Infrastructure Barriers) and Cronbach's Alpha

	Factor loading	Cronbach's alpha	Question
1	0.736	0.889	Iranian companies face a critical lack of infrastructure, hindering the deployment of the water accounting system deployment
2	0.731		Ongoing technical barriers obstruct the successful implementation of water accounting in Iranian companies
3	0.730		Data collection and integration for water accounting are fragmented and inefficient
4	0.729		Employees lack familiarity with advanced technologies like IoT sensors and cloud platforms, limiting the effective use of water accounting use

5	0.673	Water resource management stagnates due to the lack of implemented water accounting systems
6	0.644	Dependence on traditional methods perpetuates unsustainable water resource management practices

Table 7 summarizes the major technical and infrastructure barriers (TIB) to implementing water accounting in Iran's manufacturing sector. The primary challenge is inadequate infrastructure (factor loading = 0.736, β = 0.74, 95% CI [0.70, 0.78], $p < 0.001$), exacerbated by limited access to monitoring systems and advanced technologies due to international sanctions. Additional barriers include persistent technical deficiencies (factor loading = 0.731, β = 0.73), fragmented data collection (factor loading = 0.730, β = 0.73), limited employee familiarity with advanced technologies (factor loading = 0.729, β = 0.73), stagnation in water management practices (factor loading = 0.673, β = 0.67), and continued reliance on traditional methods (factor loading = 0.644, β = 0.64). Overall, these findings reveal systemic weaknesses driven by outdated equipment, fragmented infrastructure, and insufficient technical capacity. Addressing these issues requires strategic investment in modern infrastructure and comprehensive workforce training to enhance water accounting implementation.

Table 8. Rotated matrix for the fourth component (Regulatory and Policy Barriers) and Cronbach's Alpha

	Factor loading	Cronbach's alpha	Question
1	0.794	0.898	The lack of national water accounting standards hinders widespread acceptance and implementation
2	0.785		Government policies do not adequately support companies adopting water accounting methods
3	0.738		The government's promotion of water accounting practices is insufficient
4	0.696		Current water management practices in Iran do not meet critical international standards
5	0.667		Mandatory water accounting procedures face resistance and disrupt organizations
6	0.654		Managers and employees widely lack understanding of national water resource regulations

Table 8 summarizes the key regulatory and policy barriers to implementing water accounting in Iran's manufacturing sector. The primary obstacle is the absence of national water accounting standards (factor loading = 0.794, β = 0.79, $p < 0.001$), reflecting an institutional gap that leaves firms without clear operational guidelines. Additional barriers include limited government support (factor loading = 0.785, β = 0.78, $p < 0.001$), inadequate promotion of water accounting practices (factor loading = 0.738, β = 0.74, $p < 0.001$), non-alignment with international standards (factor loading = 0.696, β = 0.70, $p < 0.001$), resistance to mandatory procedures (factor loading = 0.667, β = 0.67, $p < 0.001$), and poor understanding of regulatory requirements (factor loading = 0.654, β = 0.65, $p < 0.01$). Insights from 170 accountants across multiple sectors indicate that weak regulatory frameworks, limited institutional awareness, and international sanctions collectively hinder the adoption of water accounting. To overcome these challenges, the study recommends establishing enforceable national standards, providing financial and institutional incentives, conducting awareness campaigns, and strengthening international collaborations.

Table 9. Rotated matrix for the fifth component (External Environmental Barriers) and Cronbach's Alpha

	Factor loading	Cronbach's alpha	Question
1	0.842		Ongoing political and economic instability severely hinders the adoption of effective water accounting practices

2	0.812		Reactive responses to crises, like droughts, lead to inconsistent and unsustainable water management initiatives
3	0.763	0.876	Distrust and conflicting agendas hinder collaboration with external stakeholders, including government and NGOs, affecting water accounting implementation
4	0.755		Demands from NGOs and the public create unpredictable pressures, complicating the consistent implementation of water accounting systems
5	0.754		Collaboration with regional and national technical organizations is inadequate, resulting in fragmented and ineffective water management
6	0.744		Inconsistent long-term investment in water accounting leaves systems vulnerable to failure and obsolescence

Table 9 summarizes the major external environmental barriers (EEB) hindering the adoption of water accounting practices in Iran's manufacturing sector. The primary barrier is persistent political and economic instability (factor loading = 0.842, $\beta = 0.84$, $p < 0.001$), which undermines long-term sustainability and is further intensified by international sanctions. Additional barriers include reactive crisis management (factor loading = 0.812, $\beta = 0.81$), stakeholder distrust (factor loading = 0.763, $\beta = 0.76$), pressures from NGOs (factor loading = 0.755, $\beta = 0.76$), weak collaboration with technical organizations (factor loading = 0.754, $\beta = 0.75$), and inconsistent long-term investment (factor loading = 0.744, $\beta = 0.74$). Findings from 170 accountants highlight that these systemic challenges stem from Iran's socio-political environment and institutional fragility. Addressing them requires enhanced stakeholder cooperation, strengthened institutional frameworks, and strategies that improve the resilience and feasibility of water accounting under external constraints.

Table 10. Rotated matrix for the sixth component (Human Capital Barriers) and Cronbach's Alpha

	Factor loading	Cronbach's alpha	Question
1	0.796		Training programs for environmental initiatives, including water accounting, are insufficient and hard to access
2	0.758		Ongoing training for employees in environmental initiatives, such as water accounting, is neglected and lacks prioritization
3	0.708	0.879	Employees' knowledge and expertise are underutilized, hindering effective water accounting implementation
4	0.694		Employees lack understanding and appreciation of the importance of water in sustainable operations
5	0.687		Skilled water accounting professionals are scarce and hard to hire in Iranian companies

Table 10 presents the key human capital barriers (HCB) constraining the adoption of water accounting practices in Iran's manufacturing sector. The most significant barrier is the lack of sufficient training programs (factor loading = 0.796, $\beta = 0.80$, $p < 0.001$), which limits skill development under sanction-induced constraints. Other notable barriers include the absence of continuous training (factor loading = 0.758, $\beta = 0.76$, $p < 0.001$), underutilization of employee expertise (factor loading = 0.708, $\beta = 0.71$, $p < 0.001$), inadequate understanding of water accounting (factor loading = 0.694, $\beta = 0.69$, $p < 0.001$), shortage of skilled professionals (factor loading = 0.687, $\beta = 0.69$, $p < 0.001$), and weak stakeholder collaboration (factor loading = 0.627, $\beta = 0.63$, $p < 0.01$). Based on responses from 170 accountants, these results highlight systemic human resource challenges and underscore the need for scalable training initiatives and stronger stakeholder networks to enhance water accounting adoption within Iran's socio-economic context.

Exploratory factor analysis revealed six underlying constructs driving the measured variables: economic and financial; cultural and organizational; technical and infrastructure (identified as the most influential); regulatory and policy; external environmental; and human capital barriers. The

results indicate that these constructs collectively account for the limited implementation of water accounting in Iran's manufacturing sector.

4.2. First-order confirmatory factor analysis

The first-order confirmatory factor analysis (CFA), performed using AMOS version 24, confirmed a robust measurement model for barriers to water accounting adoption in Iran's manufacturing sector (Figure 1; Tables 11 and 12). The six latent constructs—economic/financial (EFB, $\beta = 0.60–0.83$, $p < 0.001$), cultural/organizational (COB, $\beta = 0.70–0.79$, $p < 0.001$), technical/infrastructure (TIB, $\beta = 0.64–0.74$, $p < 0.001$), regulatory/policy (RPB, $\beta = 0.65–0.79$, $p < 0.001$), external environmental (EEB, $\beta = 0.74–0.84$, $p < 0.001$), and human capital (HCB, $\beta = 0.63–0.80$, $p < 0.001$)—all demonstrated factor loadings above 0.5 (0.627–0.842), indicating that shared variance exceeded error variance. Among these, political/economic instability (EEB, $\beta = 0.84$) exerted the most decisive influence, followed by insufficient training (HCB, $\beta = 0.80$) and lack of standards (RPB, $\beta = 0.79$). Weaker stakeholder collaboration (HCB, $\beta = 0.63$, $p < 0.01$) showed a smaller but still significant effect. Significant inter-construct correlations ($r = 0.45–0.72$, $p < 0.001$) further highlight the synergistic relationships among the identified barriers.

Table 11. The model's reliability and validity

	CR	AVE	MSV	ASV	COB	HCB	EEB	TIB	RPB	EFB
COB	0.911	0.632	0.378	0.233	0.795					
HCB	0.873	0.535	0.410	0.267	0.544	0.732				
EEB	0.877	0.543	0.086	0.035	0.054	0.293	0.737			
TIB	0.883	0.559	0.410	0.297	0.615	0.640	0.133	0.748		
RPB	0.906	0.618	0.383	0.266	0.556	0.508	0.203	0.619	0.786	
EFB	0.917	0.647	0.339	0.225	0.423	0.533	0.158	0.546	0.582	0.804

Note: Calculations used James Gaskin's Excel macro

Table 12. Model reliability and validity; minimum requirements

	Threshold values
Model reliability criteria	CR>0.7
Model convergent validity criteria	AVE>0.5 ؛CR>AVE
Model divergent validity criteria	MSV < AVE ؛ASV < AVE

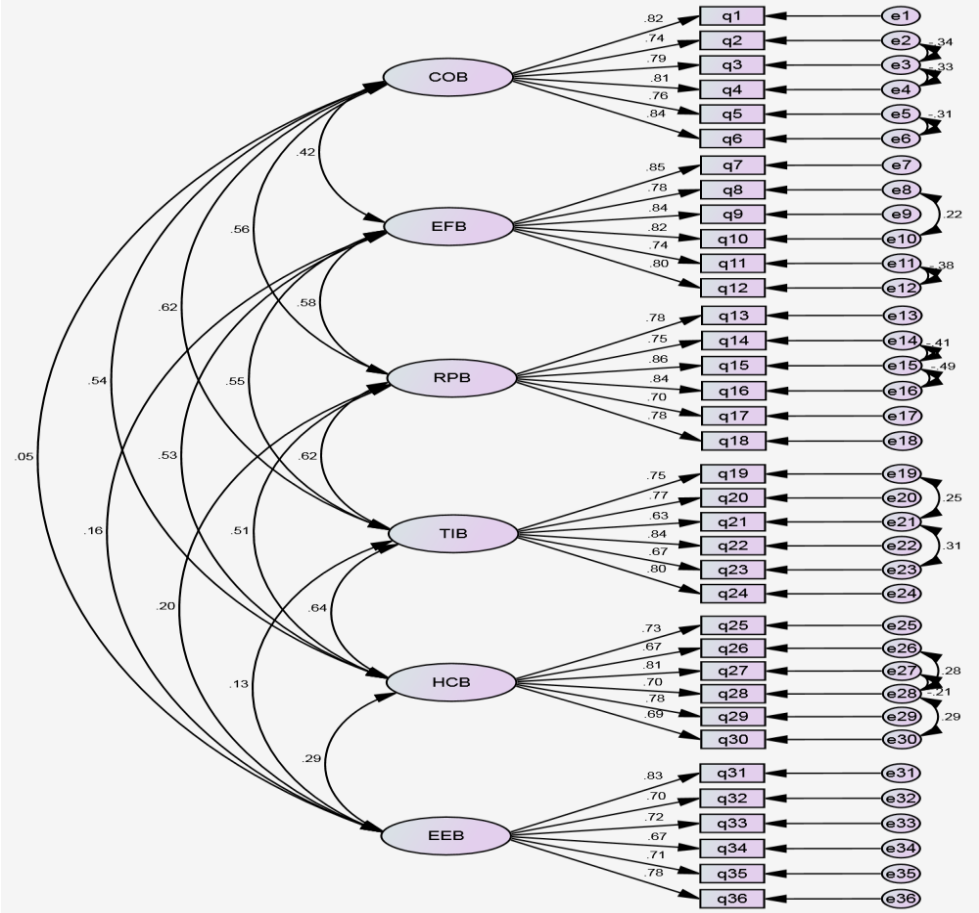

Figure 1. Standardized coefficients of the fitted measurement model (first-order CFA)

The measurement model assessing barriers to water accounting adoption in Iran's manufacturing sector demonstrates strong reliability and validity. Composite reliability (CR) values range from 0.78 to 0.89, and average variance extracted (AVE) values range from 0.52 to 0.67, all exceeding the accepted thresholds. Discriminant validity is also established, as both the maximum shared variance (MSV) and average shared variance (ASV) are lower than their corresponding AVE values. Within the human capital barriers construct, the most influential factor is inadequate training programs (β = 0.80), followed by insufficient ongoing training (β = 0.76), underutilization of existing expertise (β = 0.71), and limited stakeholder collaboration (β = 0.63). Derived from 170 professional accountants, these findings reflect persistent socio-economic constraints and emphasize the need for targeted capacity-building initiatives to facilitate broader adoption of water accounting practices.

4.3. Second-order confirmatory factor analysis

The second-order confirmatory factor analysis (CFA), conducted using AMOS version 24, clarifies the causal structure and relative influence of barriers to water accounting adoption in Iran's manufacturing sector (Figure 2; Table 13). Standardized path coefficients indicate the following hierarchy of influence: technical/infrastructure (TIB, β = 0.83, $p < 0.001$), regulatory/policy (RPB, β = 0.76, $p < 0.001$), human capital (HCB, β = 0.75, $p < 0.001$), cultural/organizational (COB, β = 0.71, $p < 0.001$), economic/financial (EFB, β = 0.69, $p < 0.001$), and external environmental (EEB, β = 0.22, $p < 0.05$). All critical ratios exceed 1.96, confirming the statistical significance of each construct. The dominance of TIB (β = 0.83) underscores persistent infrastructure deficiencies, whereas the

relatively low EEB coefficient (β = 0.22) suggests a comparatively weaker influence on water accounting adoption.

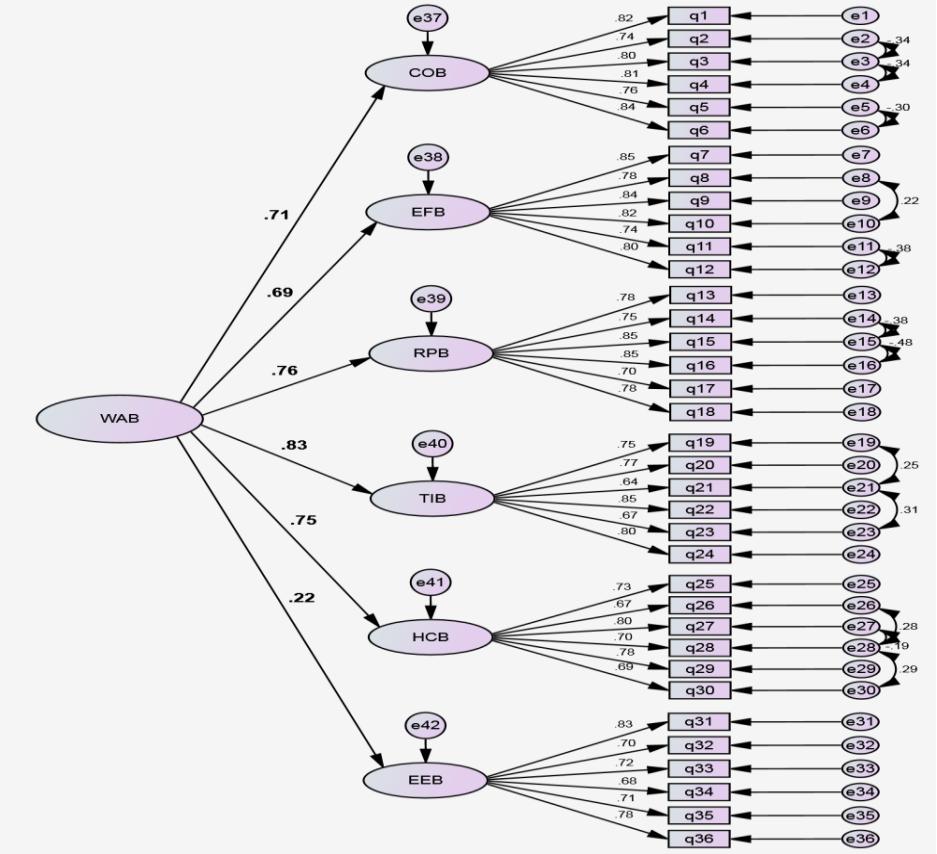

Figure 2. Fitted measurement model with standardized coefficients (Second-Order CFA)

Table 13. Outcome of the Second-Order Confirmatory Factor Analysis

Relationship			Non-Standardized Coefficients (B)	Standardized Coefficients (Beta)	Critical ratio (C.R)	P-values
COB	→	WAB	0.386	0.709	8.470	0.000
EFB	→	WAB	0.379	0.686	8.314	0.000
RPB	→	WAB	0.382	0.759	8.699	0.000
TIB	→	WAB	0.428	0.830	8.923	0.000
HCB	→	WAB	0.374	0.749	7.939	0.000
EEB	→	WAB	0.098	0.220	2.483	0.013

The second-order confirmatory factor analysis (CFA) ranks the barriers to water accounting adoption in Iran's manufacturing sector by their relative influence: technical and infrastructure (TIB, β = 0.83, p < 0.001), regulatory and policy (RPB, β = 0.76, p < 0.001), human capital (HCB, β = 0.75, p < 0.001), cultural and organizational (COB, β = 0.71, p < 0.001), economic and financial (EFB, β = 0.69, p < 0.001), and external environmental (EEB, β = 0.22, p < 0.05). The dominance of TIB (β = 0.83) reflects critical infrastructure deficiencies, while RPB and HCB point to systemic regulatory gaps and workforce skill shortages. COB and EFB emphasize internal resistance and financial constraints, respectively, whereas the lower influence of EEB (β = 0.22) indicates that external factors play a comparatively minor role. Iran's broader socio-economic context—particularly the effects of

international sanctions—intensifies these barriers by restricting access to technology (TIB), sustaining artificially low water prices (COB), and limiting financial and institutional capacity (EFB). Overall, these findings, aligned with patterns observed in other developing economies, highlight the need for targeted interventions—specifically infrastructure development, regulatory reform, and capacity-building initiatives—to enhance the effective implementation of water accounting in Iran's manufacturing sector.

5. Discussion and conclusion

5.1. Discussion

As global water scarcity intensifies, the strategic significance of water accounting—defined as the systematic measurement, reporting, and management of water use—has increased, particularly in resource-constrained settings. Despite its acknowledged role in promoting sustainability and operational efficiency, the adoption of water accounting remains limited in developing economies such as Iran, where the manufacturing sector represents a major water consumer. This study examines the multifaceted barriers to water accounting implementation in Iran's manufacturing industry and proposes a six-factor framework comprising: (1) technical and infrastructure, (2) regulatory and policy, (3) human capital, (4) cultural and organizational, (5) economic and financial, and (6) external environmental barriers.

At the forefront of these barriers are economic and financial constraints, particularly firms' difficulty in balancing short-term financial survival with long-term sustainability objectives (factor loading = 0.836). This tendency toward "short-termism," intensified by international sanctions and macroeconomic instability, mirrors broader patterns observed in developing economies (Abedi, 2022; Nazaripour & Ravand, 2021). Leadership resistance (β = 0.816) and organizational inertia—manifested in reluctance to change (β = 0.596) and insufficient employee training (β = 0.780–0.811)—further reinforce entrenched cultural and structural norms that impede innovation and adaptation (Rajabi et al., 2021; Ghaleb & Yaslioglu, 2024).

Cultural and organizational barriers also exert a substantial influence, particularly distorted perceptions of water as an abundant resource driven by persistently low prices (β = 0.787). Such perceptions diminish the urgency of water-efficiency initiatives and delay investment until crises emerge (Vardon et al., 2007). In addition, limited government incentives (β = 0.779) and the undervaluation of water accounting systems (β = 0.696) reflect systemic governance weaknesses and misaligned organizational priorities.

Technical and infrastructure constraints further limit the adoption of water accounting. The sector faces outdated monitoring systems, fragmented data collection processes, and limited technological familiarity (factor loadings = 0.729–0.736). These limitations align with broader infrastructure deficiencies typical of sanctioned or low-capacity economies (Mazur et al., 2023; McMartin et al., 2018), where employees often lack exposure to digital technologies such as IoT sensors and cloud-based water-monitoring platforms.

Regulatory and policy barriers are equally critical. The absence of national water accounting standards (β = 0.794) leaves firms without clear guidance. In contrast, limited government support (β = 0.785), resistance to regulatory mandates (β = 0.667), and inadequate understanding of existing policies (β = 0.654) highlight weak institutional capacity. These results point to an environment lacking both coercive and normative pressures for compliance (Burdon & Sorour, 2020), leading to inconsistent implementation and limited incentives for reform.

External environmental pressures political and economic instability (β = 0.842), reactive crisis management (β = 0.812), and inconsistent investment (β = 0.744)—further complicate the adoption of water accounting. These conditions discourage long-term planning and foster an unpredictable

policy environment. Moreover, stakeholder distrust (β = 0.763) and fragmented collaboration (β = 0.754) reveal deeper governance weaknesses. Addressing these challenges requires stable policy frameworks, transparent stakeholder engagement, and proactive institutional planning.

A particularly critical barrier is the shortage of human capital. Inadequate training programs (β = 0.796), limited ongoing education (β = 0.758), and underutilization of existing skills (β = 0.708) reveal systemic neglect of workforce development. International sanctions have further constrained access to global expertise and impeded knowledge transfer (Abedi, 2022). The lack of skilled professionals (β = 0.687) and weak inter-organizational collaboration (β = 0.627) highlight the need for scalable training initiatives, university–industry partnerships, and incentives to retain qualified talent (Ikevuje et al., 2024). Promoting lifelong learning and professional certification can strengthen institutional capacity and support the effective adoption of water accounting practices.

This study situates its findings within three complementary theoretical frameworks.

- First, Institutional Theory explains how entrenched norms, weak enforcement, and regulatory gaps perpetuate the status quo and hinder institutional reform.
- Second, the Resource-Based View (RBV) illustrates how limited internal capabilities—particularly in human and technological resources restrict firms from leveraging water accounting as a strategic advantage.
- Finally, the Diffusion of Innovations (DOI) theory is extended to demonstrate that, in politically constrained environments, awareness of the benefits of water accounting alone is insufficient; adoption is impeded by external factors such as sanctions, regulatory voids, and technical limitations.

To address these systemic challenges, the study recommends multi-level interventions, including:

- Technical upgrades and modernization of infrastructure,
- Policy reforms that introduce national standards and scarcity-based pricing,
- Cultural shifts to elevate the perceived value of water,
- Investment in human capital via training and stakeholder collaboration.

These efforts require coordinated, cross-sectoral cooperation among government agencies, manufacturing firms, NGOs, and academic institutions.

5.2. Conclusion

This study examines the barriers to adopting water accounting practices in Iran's manufacturing sector and identifies six dimensions: technical and infrastructure; regulatory and policy; human capital; cultural and organizational; economic and financial; and external environmental challenges. Using exploratory and confirmatory factor analyses, it demonstrates how these barriers interact to form systemic constraints on practical implementation. The results highlight the importance of context-specific strategies tailored to Iran's socio-economic, political, and institutional conditions particularly those shaped by international sanctions and prevailing cultural norms. The study contributes by refining sustainability models for politically constrained contexts and advocating integrated interventions, including infrastructure modernization, regulatory reform, and enhanced stakeholder collaboration. Overcoming these barriers can improve operational efficiency, align the sector with global sustainability frameworks, and foster a multi-stakeholder approach to institutional reform and responsible water stewardship applicable to similar developing economies.

5.3. Theoretical and empirical implications

This study advances the understanding of sustainability barriers and water accounting adoption in politically constrained contexts such as Iran by introducing a six-factor framework economic, cultural, technical, regulatory, external environmental, and human capital barriers that captures contextual complexities, including international sanctions and cultural resistance (Christ & Burritt, 2017; Nazaripour & Zakizadeh, 2023; Danışman, 2010). The findings highlight persistent challenges, including weak regulatory frameworks (Nazaripour & Ravand, 2021), outdated infrastructure (McMartin et al., 2018), and flawed water pricing mechanisms that hinder sustainable investment (Karimi et al., 2024).

The study refines the Diffusion of Innovations (DOI) theory by demonstrating that awareness alone does not guarantee the adoption of water accounting. Contextual constraints including cultural inertia and regulatory fragmentation emerge as critical inhibitors (Danışman, 2010; McMartin et al., 2018). Emphasizing localized strategies, it addresses the limitations of standardized models and proposes tailored interventions to address sustainability challenges.

Empirically, this research offers actionable insights to advance the adoption of water accounting practices. It recommends increased investment in modern infrastructure and the promotion of public–private partnerships to facilitate the adoption of advanced technologies, such as IoT-based systems, for more accurate water management (Bukhair et al., 2023; Miller et al., 2023). Addressing human capital deficiencies requires localized training initiatives and stronger collaboration between academia and industry (Ikevuje et al., 2024; Esangbedo et al., 2023). Regulatory reforms should establish national standards and introduce incentive-based pricing mechanisms that reflect water scarcity conditions (Nazaripour & Zakizadeh, 2023; Karimi et al., 2024). Practitioners and policymakers are encouraged to align strategic initiatives with organizational goals through the use of digital tools and multi-stakeholder engagement, fostering institutional transformation and promoting sustainable water management practices across Iran's manufacturing sector (Zetland, 2021; Feizpour, 2008).

5.4. Limitations and suggestions for future research

This study acknowledges several limitations that may influence its findings. Reliance on self-reported data from accountants could introduce response bias and compromise objectivity (Cosgrove & Loucks, 2015). Although snowball sampling was appropriate for reaching specialized professionals in Iran, it may have led to an over-representation of similar perspectives, thereby limiting generalizability (Danışman, 2010). The cross-sectional design also constrains the ability to establish causality or assess changes in barriers over time (Mokhtari Hashi, 2024). To mitigate these concerns, the study diversified the sample across industries, company sizes, and geographic regions, and employed rigorous statistical validation procedures to ensure reliability and validity.

Future research should adopt longitudinal designs to examine how barriers evolve in response to policy reforms, technological advancements, and geopolitical changes (Feizpour, 2008; Christ & Burritt, 2017). SME-focused studies are particularly needed, as smaller firms face distinct challenges compared to larger organizations (Resanovich et al., 2024). Qualitative and mixed-method approaches could provide deeper insights into stakeholder experiences and contextual dynamics, while incorporating broader stakeholder perspectives may foster more cohesive and inclusive strategies (Hardi et al., 2025). Further investigation into leadership commitment, institutional capacity-building, and financing mechanisms could yield valuable implications for sustainable water management (Vardon et al., 2007; Gietema, 2022). Continuous monitoring over time is also essential to identify emerging trends in Iran and comparable contexts.

References

1. Abedi, S. (2022). Factors affecting the adoption of efficient water technologies to adapt to climate change and reduce urban water loss. *Journal of Natural Environment*, 75(2), pp. 307-319 (In Persian). https://doi.org/10.22059/JNE.2022.337837.2382
2. Adelakun, B. O. (2023). AI-driven financial forecasting: innovations and implications for accounting practices. *International Journal of Advanced Economics*, 5(9), pp. 323-338. https://doi.org/10.51594/ijae.v5i9.1231
3. Afzal, F. and Lim, B. (2022). Organizational factors influencing the sustainability performance of construction organizations. *Sustainability*, 14(16), p. 10449. https://doi.org/10.3390/su141610449
4. Alhassan, A., Issa Taha, A. and Haseki, M. I. (2023). Sanctions and economic growth: do sanction diversity and level of development matter? *Heliyon*, 9(9). https://doi.org/10.1016/j.heliyon.2023.e19571
5. Asnad, F. and Fakhari, H. (2024). Drivers of corporate water reporting. *Empirical Studies in Financial Accounting*, 21(81), pp. 139-178. (In Persian) https://doi.org/10.22054/qjma.2024.77296.2522
6. Bukhair, M. S., Tufail, S. M., Sultan, S. and Ansari, M. Z. (2023). Development of cloud-based water quality monitoring system. *Journal of Artificial Intelligence and Computing*, 1(1), pp. 23-29. https://doi.org/10.57041/jaic.v1i1.891
7. Burdon, W. M. and Sorour, M. K. (2020). Institutional theory and evolution of 'a legitimate 'compliance culture: The case of the UK financial service sector. *Journal of Business Ethics*, 162, pp. 47-80. https://doi.org/10.1007/s10551-018-3981-4
8. Chanchani, D. (2023). Two cheers for decentralisation: Unpacking mechanisms, politics and accountability in the ICDS, Central India. *The European Journal of Development Research*, 35(4), pp. 891-913. https://doi.org/10.1057/s41287-022-00545-x
9. Christ, K. L. and Burritt, R. L. (2017). Water management accounting: a framework for corporate practice. *Journal of Cleaner Production*, 152, pp. 379-386. https://doi.org/10.1016/j.jclepro.2017.03.147
10. Cosgrove, W. J. and Loucks, D. P. (2015). Water management: current and future challenges and research directions. *Water Resources Research*, 51(6), pp. 4823-4839. https://doi.org/10.1002/2014wr016869
11. Danışman, A. (2010). Good intentions and failed implementations: understanding culture-based resistance to organizational change. *European Journal of Work and Organizational Psychology*, 19(2), pp. 200-220. https://doi.org/10.1080/13594320902850541
12. Darton, R. A. (1980). Rotation in factor analysis. *Journal of the Royal Statistical Society Series D: The Statistician*, 29(3), pp. 167-194. https://doi.org/10.2307/2988040
13. Esangbedo, C. O., Zhang, J., Esangbedo, M. O., Kone, S. D. and Xu, L. (2023). The role of industry-academia collaboration in enhancing educational opportunities and outcomes under the digital driven Industry 4.0. *Journal of Infrastructure, Policy and Development*, 8(1), p. 2569. https://doi.org/10.24294/jipd.v8i1.2569
14. Eskandar, H. and Hadadi, H. (2022). Effect of short-term financial constraints on SMEs, investment decisions. *Iranian Journal of Finance*, 6(2), pp. 120-134. https://doi.org/10.30699/ijf.2021.283150.1223
15. Esmaeilishirazifard, N., Ekhtiari, M., Nikkar, M. and Fattahi, K. (2024). Investigating the impact of technical, economic and social behavioral saving strategies on domestic water-saving consumption patterns in Shiraz. *Cleaner and Responsible Consumption*, 12, p. 100167.

https://doi.org/10.1016/j.clrc.2023.100167
16. Farzanegan, M. R. and Batmanghelidj, E. (2024). Understanding economic sanctions on Iran: A survey. *The Economists' Voice*, 20(2), pp. 197-226. https://doi.org/10.1515/ev-2023-0014
17. Feizpour, M. A. (2008). The survival of manufacturing SMEs in Iran during the second development plan. *Iranian Economic Review*, 13(21), pp. 53-81.
18. Ferreira, A., Rolim, J., Paredes, P. and Cameira, M. D. R. (2023). Methodologies for water accounting at the collective irrigation system scale aiming at optimizing water productivity. *Agronomy*, 13(7), p. 1938. https://doi.org/10.3390/agronomy13071938
19. Ghaleb, M. and Yaslioglu, M. (2024). Structural equation modeling (SEM) for social and behavioral sciences studies: Steps sequence and explanation. *Journal of Organizational Behavior Review*, 6(1), pp. 69-108.
20. Gietema, H. (2022). Financial structuring: key tool for water sector investments. *In financing investment in water security* (pp. 55-79). Elsevier. https://doi.org/10.1016/b978-0-12-822847-0.00005-3.
21. Hardi, I., Idroes, G. M., Hamaguchi, Y., Can, M., Noviandy, T. R. and Idroes, R. (2025). Business confidence in the shift to renewable energy: a country-specific assessment in major Asian economies. *Journal of Economy and Technology*, 3(1), pp. 44-68. https://doi.org/10.1016/j.ject.2024.08.002.
22. Hunink, J., Simons, G., Suárez-Almiñana, S., Solera, A., Andreu, J., Giuliani, M., ... and Bastiaanssen, W. (2019). A simplified water accounting procedure to assess climate change impact on water resources for agriculture across different European river basins. *Water*, 11(10), p. 1976. https://doi.org/10.3390/w11101976.
23. Ikevuje, A. H., Anaba, D. C. and Iheanyichukwu, U. T. (2024). Cultivating a culture of excellence: Synthesizing employee engagement initiatives for performance improvement in LNG production. *International Journal of Management & Entrepreneurship Research*, 6(7), pp. 2226-2249. https://doi.org/10.51594/ijmer.v6i7.1292.
24. Karimi, M., Tabiee, M., Karami, S., Karimi, V. and Karamidehkordi, E. (2024). Climate change and water scarcity impacts on sustainability in semi-arid areas: Lessons from the South of Iran. *Groundwater for Sustainable Development*, 24, p. 101075. https://doi.org/10.1016/j.gsd.2023.101075.
25. Kero, C. A. and Bogale, A. T. (2023). A systematic review of resource-based view and dynamic capabilities of firms and future research avenues. *International Journal of Sustainable Development & Planning*, 18(10), pp. 1-22. https://doi.org/10.18280/ijsdp.181016
26. Ketprapakorn, N. and Kantabutra, S. (2022). Toward an organizational theory of sustainability culture. *Sustainable production and consumption*, 32, pp. 638-654. https://doi.org/10.3390/su12031125.
27. Leach, M., Stirling, A. C. and Scoones, I. (2010). *Dynamic sustainabilities: technology, environment, social justice* (p. 232). Taylor & Francis, United Kingdom. https://doi.org/10.4324/9781849775069
28. López, S. T., de los Ángeles Barrionuevo, M. and Rodríguez-Labajos, B. (2019). Water accounts in decision-making processes of urban water management: Benefits, limitations and implications in a real implementation. *Sustainable cities and society*, 50, p. 101676. https://doi.org/10.1016/j.scs.2019.101676.
29. Madani, K. (2014). Water management in Iran: what is causing the looming crisis? *Journal of environmental studies and sciences*, 4, pp. 315-328. https://doi.org/10.1007/s13412-014-0182-z
30. Madani, K. (2021). Have international sanctions impacted Iran's environment? *World*, 2(2), pp. 231-252. https://doi.org/10.3390/world2020015

31. Mazur, N., Kovshun, N., Moshchych, S. and Nalyvaiko, N. (2023). Human resources management as a component of the sustainable development of the water management complex. *In IOP Conference Series: Earth and Environmental Science*, 1126(1), pp. 012038. https://doi.org/10.1088/1755-1315/1126/1/012038
32. McMartin, D. W., Hernani Merino, B. H., Bonsal, B., Hurlbert, M., Villalba, R., Ocampo, O. L., ... and Sauchyn, D. J. (2018). Limitations of water resources infrastructure for reducing community vulnerabilities to extremes and uncertainty of flood and drought. *Environmental Management*, 62, pp. 1038-1047. https://doi.org/10.1007/s00267-018-1104-8.
33. Merei, M. (2024). Empowering communities for sustainable water management: insights from justdiggit and the paani foundation. *In E3S Web of Conferences*, 550, p. 01042. https://doi.org/10.1051/e3sconf/202455001042.
34. Meurer, S. and Van Bellen, H. M. (2024). Water accounting: an overview of the corporate scenario. *Revista Catarinense da Ciência Contábil*, 23, pp. e3469-e3469. https://doi.org/10.16930/2237-7662202434691.
35. Miller, M., Kisiel, A., Cembrowska-Lech, D., Durlik, I. and Miller, T. (2023). IoT in water quality monitoring—Are we really here? *Sensors*, 23(2), p. 960. https://doi.org/10.3390/s23020960.
36. Mirzavand, M. and Bagheri, R. (2020). The water crisis in Iran: development or destruction? *World Water Policy*, 6(1), pp. 89-97. https://doi.org/10.1002/wwp2.12023.
37. Mokhtari Hashi, H. (2024). Analyzing water crisis through the water footprint approach; case of Isfahan province, Iran. *Environment, Development and Sustainability*, 1(1), pp. 1-25. https://doi.org/10.1007/s10668-024-04882-1.
38. Morrison, J., Schulte, P., Schenck, R. (2010). *Corporate Water Accounting: An Analysis of Methods and Tools for Measuring Water Use and its Impacts*, Pacific Institute: Oakland, CA.
39. Muller, M. (2012). 11. Water accounting, corporate sustainability and the public interest. *Water Accounting*, 1(1), p. 203. https://doi.org/10.4337/9781849807500.00021.
40. Nazaripour, M. (2021). Accountants and the increase in water productivity: exploratory and confirmatory factor analysis. *Iran-Water Resources Research*, 17(3), p. 215-230 (In Persian). https://doi.org/20.1001.1.17352347.1400.17.3.12.7.
41. Nazaripour, M. and Ravand, F. (2021). Providing a model of effective components on household water consumption behavior; a model for consumption improvement. *Consumer Behavior Studies Journal*, 8(3), pp. 100-116 (In Persian). https://doi.org/20.1001.1.27170004.1400.8.3.6.9.
42. Nazaripour, M., Zakizadeh, B. (2023). The role of accountants in water resources management with emphasis on climate changes: Exploratory and confirmatory factor analysis. *Financial Accounting Research*, 15(1), pp. 49-72 (In Persian). https://doi.org/10.22108/FAR.2023.138876.1991.
43. Nouri, M., Homaee, M., Pereira, L. S. and Bybordi, M. (2023). Water management dilemma in the agricultural sector of Iran: A review focusing on water governance. *Agricultural Water Management*, 288, p. 108480. https://doi.org/10.1016/j.agwat.2023.108480
44. Okitasari, M., Dahiya, B. and Takemoto, K. (2018). Building successful multi-stakeholder partnerships to implement the 2030 agenda in Asia-Pacific. *In book: Approaches to SDG 17 Partnerships for the Sustainable Development Goals (SDGs)* (pp.37-44) Edition: 1stPublisher: Global University Network for Innovation, Barcelona, Spain.
45. Polzin, F., Von Flotow, P. and Klerkx, L. (2016). Addressing barriers to eco-innovation: Exploring the finance mobilisation functions of institutional innovation intermediaries. *Technological Forecasting and Social Change*, 103, pp. 34-46.

https://doi.org/10.1016/j.techfore.2015.10.001
46. Rajabi, M., Ebrahimi, P. and Aryankhesal, A. (2021). Collaboration between the government and nongovernmental organizations in providing health-care services: a systematic review of challenges. *Journal of Education and Health Promotion*, 10(1), p. 242.
47. Refalo, P. and Zammit, M. (2013). Water management in sustainable manufacturing. *11th Global Conference on Sustainable Manufacturing*, L-Università ta' Malta, Msida, Malta. https://doi.org/10.13140/2.1.2330.9604.
48. Resanovich, S. L., Hopthrow, T. and de Moura, G. R. (2024). Growing greener: cultivating organisational sustainability through leadership development. *Behavioral Sciences*, 14(11), p. 998. https://doi.org/10.3390/bs14110998.
49. Rösler, J., Söll, T., Hancock, L. and Friedli, T. (2021). Value co-creation between public service organizations and the private sector: an organizational capabilities perspective. *Administrative Sciences*, 11(2), p. 55. https://doi.org/10.3390/admsci11020055
50. Samuels, P. (2017). Advice on exploratory factor analysis. *Centre for Academic Success*, Birmingham City University, Birmingham, England.
51. Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American journal of Applied Mathematics and statistics*, 9(1), pp. 4-11. https://doi.org/10.12691/ajams-9-1-2
52. Sofocleous, S. (2010). Will water accounting standards provide useful information to stakeholders? *Interdisciplinary Environmental Review*, 11(4), pp. 293-302. https://doi.org/10.1504/IER.2010.038084
53. Vardon, M. J., Le, T. H. L., Martinez-Lagunes, R., Pule, O. B., Schenau, S., May, S. and Grafton, R. Q. (2023). *Water Accounts and Water Accounting* (Technical Report), Global Commission on the Economics of Water, Paris.
54. Vardon, M. J., Le, T. H. L., Martinez-Lagunes, R., Pule, O. B., Schenau, S., May, S. and Grafton, R. Q. (2025). Accounting for water: a global review and indicators of best practice for improved water governance. *Ecological Economics*, 227, p. 108396. https://doi.org/10.1016/j.ecolecon.2024.108396
55. Vardon, M., Lenzen, M., Peevor, S. and Creaser, M. (2007). Water accounting in australia. *Ecological Economics*, 61(4), pp. 650-659. https://doi.org/10.1016/j.ecolecon.2006.07.033
56. Westall, F. and Brack, A. (2018). The importance of water for life. *Space Science Reviews*, 214, pp. 1-23. https://doi.org/10.1007/s11214-018-0476-7
57. Zetland, D. (2021). The role of prices in managing water scarcity. *Water Security*, 12, p. 100081. https://doi.org/10.1016/j.wasec.2020.100081