Journal of Administrative and Economic Sciences • Vol 18, Issue 2 (2025) • p 145-166

The Impact of the Board's Characteristics and The Auditor Dispositional Optimism Bias on Internal Audit Quality: Evidence from Saudi Listed Firms

Renad Saleh Hamad AlFraih [1] Ezzeddine Ben Mohamed[2]*

[1,2] Department of Accounting, College of Business and Economics, Qassim University, P.O.Box: 6640, Buraidah, 51452, Saudi Arabia

* E-mail: E.benmohamed@qu.edu.sa

Abstract:

This study examines the combined influence of board characteristics and internal auditor dispositional optimism on the quality of internal audit in Saudi joint-stock companies. Grounded in agency theory, behavioral theory, and human capital theory, the research investigates how structural governance elements, such as board independence, size, CEO duality, and risk committee presence among others, interact with psychological traits of internal auditors to affect audit outcomes. Data were collected through interviews with 57 internal auditors from 19 Saudi listed firms and analyzed using the MICMAC method. The findings identify auditors dispositional optimism as a new determinant of internal audit quality. Other traditional variables such as board independence, auditors professional experience, and risk committee presence as key drivers of audit quality. Notably, the gender of auditor had no potential impact on internal audit quality. The study highlights the importance of integrating behavioral and structural factors in understanding internal audit effectiveness and offers insights relevant to governance reforms in emerging markets.

Keywords: Dispositional optimism; Board of directors; internal audit quality.

JEL classification: G30; G4; M42

Introduction

Internal audit plays a crucial role within organizations, serving as a cornerstone of the accounting and financial reporting process. An effective internal audit function not only enhances operational efficiency but also ensures the reliability and integrity of financial statements (Al-Matari et al., 2014). Additionally, it fosters trust in financial reporting, promotes transparency, and mitigates organizational risk (Abdullah et al., 2008). Consequently, the academic literature has increasingly focused on identifying the determinants of internal audit quality, commonly defined as the auditor's ability to detect and report material misstatements (DeAngelo, 1981).

Corporate governance mechanisms, particularly the characteristics of the board of directors, have long been recognized as key drivers of internal audit quality. A well-structured board, especially one that is independent and adequately sized, plays a critical role in strengthening oversight and enhancing the effectiveness of internal audit functions (Madhani, 2015; Elad et al., 2017). This relationship is firmly grounded in agency theory, which provides a theoretical framework for understanding how board attributes help align the interests of managers with those of shareholders (Jensen & Meckling, 1976). Effective board oversight can reduce information asymmetry and agency costs, thereby improving both financial reporting and internal audit outcomes (Vitolla et al., 2020).

From a behavioural accounting perspective, auditors, like other economic agents such as managers and entrepreneurs, are not entirely rational and are often influenced by cognitive and psychological biases. Among these, dispositional optimism is one of the most widely studied. In addition to structural governance mechanisms, this study introduces internal auditor optimism as a behavioural factor that may affect internal audit quality. While moderate optimism can enhance motivation and performance, excessive optimism, often reflected as overconfidence, may impair auditors' objectivity and lead to biased judgments (Schrand et al., 2012). This behavioural dimension aligns with behavioural theory, which highlights the influence of psychological biases on decision-making within organizations.

Despite increasing scholarly attention to both structural and behavioural dimensions of corporate governance, limited research has integrated these perspectives to explore their combined effect on internal audit quality, particularly within emerging markets. Most existing studies have examined governance mechanisms and behavioral traits in isolation. Moreover, empirical evidence from the Saudi context remains scarce, even though the country's unique regulatory environment and cultural dynamics may significantly shape both board behavior and internal auditor traits.

This study seeks to address these gaps by examining the combined influence of board characteristics and internal auditor dispositional optimism on internal audit quality, with a specific focus on Saudi joint-stock companies. It advances existing literature by integrating both corporate governance mechanisms and behavioral factors, such as internal auditor dispositional optimism, to examine their joint impact on internal audit quality. While most research has explored these factors in isolation, this study offers a novel perspective by focusing on Saudi Arabia, an emerging market with unique regulatory and cultural characteristics. By doing so, it not only enhances our understanding of internal audit quality in Saudi companies but also contributes broader insights applicable to other developing economies.

The following sections present a comprehensive literature review, outline the research methodology, report the empirical findings, and conclude with key contributions, limitations, and directions for future research.

2. Literature review and hypothesis development

2.1. Dispositional optimism and internal audit quality

Research consistently demonstrates that entrepreneurs, and by extension, organizational leaders, often exhibit high levels of optimism, expecting favorable outcomes even in the face of uncertainty. This pervasive optimism motivates the present study to examine its influence on organizational performance, with a particular focus on internal auditors. As defined by Scheier et al. (1985), optimism refers to a general tendency to expect positive outcomes across a range of situations, rather than being confined to specific behaviors or events.

Behavioral theory, which views organizations as coalitions of stakeholders, managers, employees, customers, and shareholders, emphasizes that each group pursues evolving goals shaped by internal and external organizational dynamics (Cyert et al., 1963). Within this framework, decision-making processes are vulnerable to psychological biases, particularly emotional and cognitive biases such as dispositional optimism.

Given the competing and shifting nature of organizational objectives, decision-making rarely follows a stable or predictable path (Surdu et al., 2021). One of the most salient behavioral biases in this context is managerial overconfidence, often referred to as an "optimistic personality." This reflects a tendency to hold unrealistically positive expectations about future outcomes (Weinstein, 1980). While individuals often exhibit excessive optimism (Teichman, 2011), human behavior does not always conform to such idealistic forecasts.

Managers, in particular, are more prone to optimism than the general population. This bias can lead to underestimating risks, over projecting cash flows, and inflating the value of investment opportunities. As a result, excessive CEO optimism may weaken internal controls and diminish board oversight, exacerbating agency problems.

However, effective corporate governance can moderate these biases. Ben Mohamed et al. (2012) found that robust governance mechanisms, including well-structured ownership and board systems, mitigate the adverse effects of managerial optimism. Later, Ben Mohamed (2020) further emphasized that such optimism may prevent firms from seizing optimal growth opportunities, leading to inefficiencies in strategy and investment.

Other scholars have highlighted the dual nature of optimism. While Setia et al. (2021) showed that optimism can support rational decision-making, Sivanathan et al. (2007) cautioned that power can amplify overconfidence, leading to suboptimal decisions, particularly in high-stakes negotiations.

In entrepreneurial contexts, the outcomes of optimism are mixed. Elhem et al. (2015) reported that excessive optimism negatively affected the operational capabilities of small firms, while Hmieleski et al. (2009) found a similar negative relationship between entrepreneurial optimism and startup performance, though mitigated by prior experience. Conversely, Lindblom et al. (2020) found that optimism could enhance entrepreneurial success when mediated by life satisfaction.

In the auditing context, internal auditor behavior is similarly affected by optimism bias. Baccar et al. (2013) found that governance mechanisms such as independent boards and the absence of CEO duality reduced managerial overconfidence. Khorrami et al. (2017) confirmed that CEOs ownership and board independence effectively restrained CEO optimism, while other governance factors showed limited impact.

Auditor optimism significantly influences audit behavior. Balkir (2000) found that optimistic auditors tend to maintain or slightly increase their audit effort during uncertain times, using analytical results as motivation. In contrast, pessimistic auditors often compensate by exercising greater caution. Akbarlou et al. (2022) observed that optimistic managers frequently use overly positive language in financial disclosures, selectively emphasizing favorable information, which can mislead stakeholders. Bigus (2016) warned that excessively optimistic auditors may overlook warning signs, increasing the risk of undetected misstatements. Similarly, Teye (2023) concluded that optimism can reduce professional skepticism, ultimately weakening audit quality. Optimism may bias auditor judgment, limiting the extent of analytical testing and thus reducing the overall quality of the internal audit function. On the other hand, a moderate level of dispositional optimism in auditors could have positive effects, such as lowering audit fees and shortening audit time. Based on these insights from the literature, we hypothesize that:

H_1: Auditor dispositional optimism bias has a significant impact on internal audit quality.

2.1.3 Board's characteristics and internal audit quality

Agency theory, as introduced by Jensen and Meckling (1976), addresses the conflict of interest between owners (principals) and managers (agents) by emphasizing the need for oversight and accountability. It conceptualizes this relationship as a contractual arrangement in which managers are entrusted to act in the best interests of the owners. The theory highlights the critical role of independent board members and effective internal auditing in enhancing risk management and ensuring efficient resource utilization. Within this framework, corporate governance is seen as a fundamental mechanism for resolving agency problems. In particular, the board of directors serves as the cornerstone of corporate governance and must possess specific characteristics to operate effectively (Jensen, 1993). Contemporary literature on internal audit quality extensively explores how various board attributes influence the quality of the audit function.

2.1.3.1 CEO duality and internal audit quality

CEO duality refers to the situation where the Chief Executive Officer also serves as the chairperson of the board of directors, thereby combining two powerful leadership roles within a company (Oak & Iyengar, 2009). This leadership arrangement has garnered significant attention in corporate governance research due to its potential to shape organizational outcomes, particularly the quality of internal audits (Voinea et al., 2022).

The effects of CEO duality on internal audit quality are nuanced and can be both advantageous and detrimental (Zhang et al., 2023). On the one hand, having a single individual in both roles can create a cohesive leadership vision and promote a corporate culture that values and supports robust audit practices. This streamlined leadership may facilitate better communication and alignment between management and the audit function, which can enhance audit quality.

On the other hand, CEO duality may undermine the independence of the audit committee, which is critical for maintaining objective oversight. When the CEO wields substantial influence as both the chief executive and board chair, it can impair the audit committee’s ability to act independently. This concentration of authority risks skewing decision-making processes, as audit committee members may feel pressured or reluctant to challenge the CEO’s decisions, ultimately weakening audit quality (Zhang et al., 2023). The excessive power held by the dual-role CEO may lead to

compromised audit committee judgments and reduced effectiveness in monitoring financial reporting and controls.

In essence, while CEO duality can reinforce leadership clarity and foster an environment conducive to high-quality audits, it simultaneously raises concerns about the erosion of audit committee autonomy and the integrity of audit decisions. This dual impact necessitates a balanced approach in evaluating CEO duality's role within corporate governance frameworks to safeguard internal audit quality.

H_2: CEO duality can largely influence internal audit quality.

2.1.3.2 Board size and internal audit quality

The size of a board can affect the quality of internal audits, as it plays a role in auditor selection. However, existing research on the relationship between board size and auditor choice remains varied and inconclusive. Some studies suggest that larger boards significantly influence audit quality and tend to favor Big-4 auditors to mitigate agency issues by ensuring reliable oversight (Alawaqleh et al., 2021). Additionally, companies facing higher agency conflicts are more likely to appoint reputable auditors to strengthen investor confidence in their governance and financial disclosures (Kadous and Zhou, 2019). Larger boards are also considered more capable of objectively selecting auditors and effectively negotiating terms of engagement, including fees and audit scope (Jiraporn et al., 2018).

H_3: Board size can influence internal audit quality.

2.1.3.4 Board independence and internal audit quality

Board independence is widely recognized as one of the most critical characteristics of the board of directors, with a significant influence on the overall effectiveness of corporate governance (Jensen, 1993; Ben Mohamed et al., 2014). Empirical research consistently supports a positive relationship between board independence and internal audit quality. Specifically, independent boards are more likely to select highly qualified and experienced auditors, thereby enhancing audit quality (Al-Najjar, 2018). In the context of Iraq, Khudhair et al. (2019) provide empirical evidence confirming this positive association.

H_4: Board independence can influence internal audit quality.

2.1.4 Auditor profile and internal audit quality

2.1.4.1 Auditor gender and internal audit quality

One of the key takeaways from recent research is the significant influence of an auditor's gender on the quality of financial reporting. Evidence suggests that the presence of women with accounting expertise on audit committees contributes positively to the credibility and reliability of financial disclosures (Rahman et al., 2024).

In a separate study, Yang et al. (2018) constructed a detailed metric for evaluating audit quality, incorporating both discretionary accruals and audit opinions. Drawing on empathy theory and gender role socialization theory, their research explored how auditor gender affects audit outcomes. By analyzing data from nearly 10,000 auditor-firm-year observations of Chinese A-share listed companies between 2011 and 2015, they found that male auditors generally delivered higher audit quality than their female counterparts, which contrasts with some earlier findings.

Additionally, Perry et al. (2023) examined audit practices in China, where audit engagements are co-led by two partners. Their findings indicate that gender-diverse leadership teams tend to produce higher audit quality than same-gender teams. This positive impact is particularly evident when both partners have similar levels of seniority, have worked together previously, or are engaged with clients operating in complex environments.

H_5: Auditor gender can influence internal audit quality.

2.1.4.2 Education and internal audit quality

Zhang et al. (2025) explored how auditors' educational background and training influence the quality of audits, using unique data collected from audit firms in China. Their analysis revealed that increased spending on training programs leads to a higher number of audit revisions, reflecting improved audit effectiveness. This positive impact is more evident in larger firms and in firms with less prior experience auditing listed companies. Furthermore, the effect is even stronger in audits involving clients with complex operations. The study emphasizes the critical role that investment in auditor development plays in enhancing audit outcomes and identifies the contexts where such investments are most beneficial. In this regard, continuous learning, through both structured courses and informal methods, is considered vital for auditors to keep their skills and knowledge current. Supporting this view, Futri and Juliarsa (2014) and Jurnaedi et al. (2014) found that a higher level of education significantly contributes to better audit performance. On the other hand, Napitupulu (2020) found no clear link between academic degrees and audit quality, suggesting that the practical relevance and application of training may matter more than formal education alone.

H_6: The education of an auditor can influence internal audit quality.

2.1.4.3 Professional experience and internal audit quality

Auditors' professional experience is a key factor in enhancing the quality of internal audits, as it contributes to the overall efficiency and reliability of the audit process. Handayani and Winarso (2025) provide empirical evidence supporting the positive impact of professional experience on audit quality, highlighting that both expertise and ethical conduct play a significant role in improving audit effectiveness. Complementing this, Diyan et al. (2019), in a study of public accounting firms in DKI Jakarta, demonstrate that work experience and auditor competence both positively influence audit quality. Their findings further suggest that professional ethics amplify the beneficial effects of experience and competence, reinforcing their importance in achieving high-quality audit outcomes.

H_7: Auditor's professional experience can influence internal audit quality.

2.1.5 Firm size and internal audit quality

Firm size is widely regarded as a key determinant influencing various corporate outcomes, including investment efficiency, risk-taking behavior, overall performance, and strategic decision-making. This perspective is rooted in the foundational work of Baumol (1959), who highlighted a positive correlation between firm size and profitability, primarily attributed to economies of scale. In the context of auditing, larger organizations are generally better positioned to maintain an efficient and robust audit function. Their access to skilled and experienced auditors, combined

with the ability to invest in advanced technologies, such as artificial intelligence-based auditing tools, can significantly enhance audit effectiveness and quality.

Moreover, as Francis et al. (2013) suggest, large firms are often subject to greater oversight from regulators and heightened expectations from stakeholders. This increased scrutiny incentivizes them to adhere to higher standards of corporate governance and financial transparency. As a result, such firms are more likely to engage top-tier audit firms, particularly those among the Big Four, to reduce the risk of material misstatements. Thus, firm size emerges as a significant factor in shaping audit quality, with larger companies benefiting from enhanced resources and reputational incentives to secure high-quality audit services.

H_8: Firm size can influence internal audit quality.

2.1.6 External auditing and internal audit quality

External auditors can play a vital role in shaping the effectiveness of internal audit processes. International auditing standards emphasize that external auditors may rely on the work of internal auditors, but only after evaluating the quality of that work.

A recent study conducted in 2024 gathered data through questionnaires completed by external auditors from banks operating in Iran and Iraq. Using Partial Least Squares Structural Equation Modeling (PLS-SEM) for analysis, the study found a positive correlation between the perceived quality of internal auditing and the competence and independence of external auditors (Mashayekhi and Mohammed, 2025).

Moreover, the perceived independence of external auditors strengthens trust in their evaluation of internal audit activities, thereby reinforcing the credibility of internal control systems (Aliu et al., 2018).

H_9: External auditing can influence internal audit quality.

2.1.7 Risk committee and internal audit quality

The existence of a dedicated risk committee is increasingly acknowledged as a key element of effective corporate governance practices, particularly in organizations dealing with complex and diverse risk profiles. This committee strengthens overall risk oversight and supports the improvement of internal controls and audit quality. Working in coordination with the audit committee, the risk committee adds a targeted layer of supervision over financial, operational, and compliance-related risks, which contributes to more effective audit processes and outcomes.

Research findings suggest that the presence of an independent risk committee positively influences both the quality of audits and the firm's financial performance. For example, Degenhart et al. (2017) report that companies with standalone risk committees tend to engage in less aggressive risk-taking and achieve higher firm value compared to those where audit and risk responsibilities are merged. Similarly, Bhuiyan et al. (2021) observed that Brazilian firms with established risk management committees experienced stronger economic outcomes than firms without such governance structures. Evidence from Australian firms further supports this, showing that those with formal risk committees have better performance in terms of financial stability, future growth prospects, and profitability, as measured by return on assets (Jia and Bradbury, 2021). These findings highlight the added value that a dedicated risk oversight body can bring to modern governance systems and to the audit quality.

H_{10}: The presence of an independent risk committee can influence internal audit quality.

3. Methodology

3.1 The Cognitive Mapping Technique

This study adopts a methodology based on cognitive mapping techniques, specifically the MICMAC (Matrix of Cross-Impact Multiplications Applied to Classification) analysis, to examine the interrelationships between various variables affecting internal audit quality. MICMAC has been widely used in literature,. with several studies applying this methodology to analyze the strength of driving and dependent factors.

Mandal et al. (1994) highlighted the primary objective of MICMAC analysis as assessing the driving and dependence strengths of variables. Similarly, Sindhwani et al. (2016) supported this by asserting that MICMAC aims to evaluate the power of both driving and dependence-related factors.

In line with this, Ahmad et al. (2019) employed MICMAC analysis to categorize variables into four types based on their driving and dependence strengths: autonomous factors (minimal dependence on other factors), dependent factors (heavily reliant on others), linkage factors (unstable, with significant influence), and independent factors (weaker influence but of higher interest due to their potential impact).

Mani et al. (2016) reinforced this categorization in their study, using MICMAC analysis to measure and classify factors into these four groups. Kumar et al. (2020) further detailed the MICMAC process, explaining how dependence and driving strengths are calculated based on the binary values of the adjacency matrix. They identified four categories based on the strength of dependence and driving influence: independent, dependent, autonomous, and linkage variables.

Jung et al. (2021) emphasized MICMAC's role in efficiently classifying factors based on their influence and dependence. Pimentel et al. (2022) extended this approach by applying MICMAC to understand the barriers to adopting reverse logistics in construction, classifying them based on driving and dependence strengths. Iqbal et al. (2023) highlighted the method's application in analyzing critical success factors (CSFs), grouping them into the same four categories: autonomous, dependent, linkage, and independent.

Additionally, Nazlabadi et al. (2023) described how MICMAC contributes to detecting the interdependencies and impacts of variables, particularly by considering both the "impact" and "time" dimensions. This methodology offers a comprehensive understanding of the relationships between variables, enhancing the clarity of their mutual interactions.

Wijaya et al. (2020) and Sharma et al. (2021) underscored the utility of MICMAC in simplifying the complexities of system analysis, enabling clearer insights into variable relationships. Chandrayan et al. (2023) demonstrated its effective role in identifying key enablers for digital transformation in small and medium enterprises. Moreover, Ariyani et al. (2019) outlined the systematic steps of MICMAC application, which include problem identification, classification of internal and external variables, and the analysis of relationships.

3.2 Study Population and Sample Selection

The study population comprises internal auditors employed by Saudi-listed companies across the sectors of basic materials, consumer services, pharmaceuticals, and food production. The sample consists of 57 internal auditors from 19 listed firms who will be interviewed to gather data.

3.3 Data Collection Methodology

Primary data will be collected through interviews with the 57 internal auditors from Saudi joint-stock companies listed on the Tadawul market. A set of questions was defined, starting with the concept of internal audit quality and the factors that affect it. A matrix was also presented to measure the impact of each variable on internal audit quality and the other variables of the study. These questions were reviewed by the Ethics Committee at Qassim University, and approval was granted to collect the data. The interviews lasted between 20 to 30 minutes, and the data collection period extended over six months.

Cognitive mapping will be employed to analyze the data in relation to auditor's dispositional optimism bias, the board's characteristics and study's other variables. According to Sharlin et al. (2009), cognitive mapping represents an individual's mental model of their environment, mapping out the relationships between cause and effect. This technique is utilized to identify the impact of changes in one or several elements on the entire system (Koulouriotis et al., 2003).

The MICMAC method, which helps reduce complexities in analyzing systems, will be used in this study to analyze the cognitive maps. Fatma et al. (2021) emphasized the strength of cognitive mapping in overcoming biases and psychological partialities in participants' responses. This methodology involves constructing impact matrices and applying mathematical classification methods. The study will utilize centrality analysis and the influences-dependence chart to understand how these variables, including auditor dispositional optimism and board characteristics, affect internal audit quality.

3.4 MICMAC Analysis

The MICMAC (Matrix of Cross-Impact Multiplications Applied to Classification) analysis will be employed to explore the relationships among various factors that influence internal audit quality in Saudi joint-stock companies. The analysis involves constructing cognitive maps and adjacency matrices, which help visualize and quantify the relationships between key variables.

Cognitive maps illustrate how different variables are interrelated, while adjacency matrices provide a numerical representation of these relationships. Each cell in the matrix represents the strength of the relationship between two variables, with values ranging from 0 (no relationship) to 3 (strong relationship) (Fatma et al., 2021). For this study, a 10x10 adjacency matrix has been constructed, representing ten critical variables influencing internal audit quality. These variables include auditor optimism, board independence, board size, external auditing, risk management committee, CEO duality, firm size, gender, education, and professional experience. The matrix was populated with data collected from internal auditors at Saudi joint-stock companies, providing insights into the interactions between these variables.

3.1.4.1 Influence-Dependence Chart

To deepen the analysis, the study also uses an influence-dependence chart, based on the framework developed by Arcade et al. (1999). The chart classifies the variables into four categories: determinant (influential) variables, relay variables, dependent (outcome) variables, and excluded variables.

- **Determinant (Influential) Variables**: These variables have a significant influence but a low dependence on other factors. They are primary drivers in the system, exerting a strong impact on internal audit quality.
- **Relay Variables**: These variables are both highly influential and highly dependent, meaning changes in these variables will affect other factors. They serve as key connectors within the system and can be categorized as "stake" or "target" variables. Stake variables are unstable and have a high potential to influence the system, while target variables are more dependent and can be shaped over time.
- **Dependent (Outcome) Variables**: These variables are highly dependent on other factors but have minimal influence on the system. They represent the outcomes of internal audit processes and are sensitive to changes in more influential variables.
- **Excluded Variables**: These variables have low influence and low dependence, making them irrelevant to the system and thus excluded from further analysis.

4. RESULTS

4.1 The aggregated matrix

From a methodological standpoint, the analysis method will depend on drawing individual mind maps. Afterward, the study will use one of the mathematical methods to obtain a mind map whose goal is to obtain the opinion of all respondents that sheds light on a particular case or particular issue (Ezzeddine et al., 2024). In this study, as mentioned previously, interviews were conducted with internal auditors in Saudi joint stock companies listed on Tadawul. Through their responses, the researcher filled in the matrix that contains variables that have previously been shown to have a potential effect on internal audit function and quality. A matrix of (10x10) was designed, where the matrix contains all the variables which were formerly debated in the theoretical framework with the aim of determining the variables associated with the internal audit quality. The average aggregated matrix for all Saudi joint stock companies through which data were collected is shown in Table (1).

An adjacency matrix is a square matrix that incorporates all variables of the study to represent the perceived influence of each variable on internal audit quality, as well as on other variables within the system. Based on internal auditors' perceptions, the matrix captures the direction and strength of relationships among variables. Specifically, a score of 0 indicates no influence of variable i on variable j; 1 denotes a weak influence; 2 indicates a moderate influence; and 3 represents a strong influence. This structured approach allows for a systematic assessment of both direct and indirect interdependencies among the variables, forming the foundation for subsequent MICMAC (Cross-Impact Matrix Multiplication Applied to Classification) analysis.

Table 1: *Average Matrix of Saudi Joint Stock Companies from Collected Data*

	IAQ	Opt.	Board Ind.	Board Size	External Auditor	Risk Com	*CEO Dual*	Firm Size	Gender	Edu	Professional Exp
IAQ	0	2	3	1	2	3	2	2	0	3	3
Opt.	2	0	1	1	1	1	1	1	0	2	2
Board Ind	2	1	0	2	3	3	1	2	0	2	3
Board Size	1	1	1	0	1	2	1	2	0	2	2
External Auditor	2	1	2	1	0	2	1	2	0	2	3
Risk Com	2	2	2	1	2	0	1	2	0	2	3
CEO Duality	2	1	1	1	1	1	0	1	0	2	2
Firm Size	1	1	1	2	1	2	1	0	0	2	2
Gender	0	0	0	0	0	0	0	0	0	0	1
Education	3	2	2	1	2	2	1	2	0	0	2
Professional Exp	3	2	2	2	2	3	1	2	0	3	0

IAQ: internal audit quality; Opt: auditor dsipositional optimism bias ; Board Ind: the board independence; Board size: the board of directors size; External auditor: the presence of independent external auditor; Risk Com.: the presence of independent risk committee; CEO duality: the separation between CEO and the chairman of the board of drectors; Firm size: the size of company; Gender: the auditor gender; Education: the auditor education; Professional Exp: the professional experience of auditors.

4.1 Centrality analysis

4.1.1 Direct influences

MICMAC creates a classification in which we will use the degree of influence of each factor. We can classify the variables with respect to their capability to affect other variables associated with the internal audit quality. By looking at Table (2), it appears that the top of the list reflects the most significant factors that can govern the dependent variable of the study which is the internal audit quality. These involve the board's independence, the professional experience, the existence of a risk management committee, the role acted through the external auditor, the education, and the board's size. Moreover, the firm's size, the optimism of the internal auditor, the duality of the CEO, and gender occupy the last parts of the classification list.

This means that board independence is the most important factor among the proposed variables for explaining internal audit quality. This finding supports existing theories that emphasize the positive role of board independence in improving internal audit quality. It also aligns with Jensen's (1993) conclusion that board independence is a key trait that greatly enhances the effectiveness of the board.

Table 2 *Centrality Analysis on the Basis of Variables' Influences.*

Rank	Variables
1	Board Independence
2	Professional Experience
3	Risk Management Committee
4	External Auditor
5	Education
6	Board Size
7	Firm Size
8	Auditor Optimism
9	CEO Duality
10	Gender

4.1.2 Direct dependences

Another significant classification method of the suggested factors can be reached. This classification depends on the degree of dependence for each of the variables. Therefore, when looking at Table (3), it is evident that the most significant factors that govern the internal audit quality are professional experience, education, the existence of a risk management committee, the firm's size, the role played by the external auditor, the board's independence, and the internal auditor optimism. In contrast, the board's size, CEO duality, and gender occupy the last parts of the classification list.

Table 3 *Centrality Analysis on the Basis of Variables' Dependences*

Rank	Variable
1	Professional Experience
2	Education
3	Risk Management Committee
4	Firm Size
5	External Auditor
6	Board Independence
7	Auditor Optimism

8	Board Size
9	CEO Duality
10	Gender

4.2 Direct Influence/Dependence Map and Chart

MICMAC can create an influence/dependence graph. Actually, this map can be acquired through using the direct effects matrix (Fatma et al., 2021). We obtained a graph consisting of four regions, as shown in Figure (1). It appears that CEO duality can be retained as a variable affecting the quality of internal audit, but it has less explanatory power compared to the other three variable areas in the chart. In fact, it is located low in the region of influential variables, so it has little and limited explanatory power.

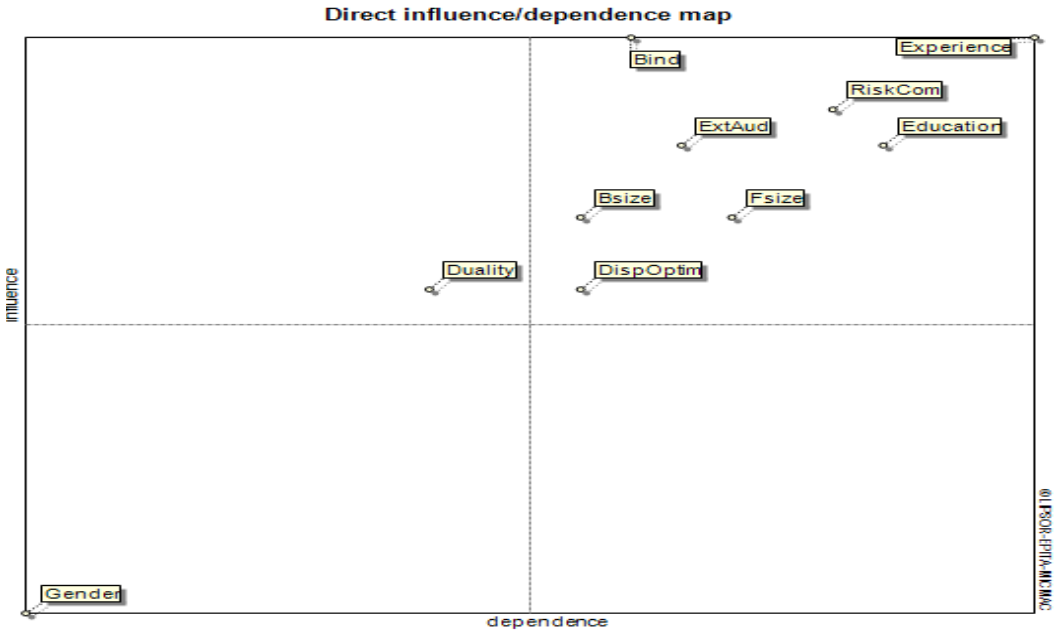

Figure 1 *Direct Influence/Dependence Map*

Professional experience, board independence, risk management committee, education, the presence of independent external auditors, the board size, the firm size, and the optimism of the internal auditor play a crucial role and can explain the differences of internal audit quality levels between firms. In fact, these variables are classified as relay variables that have a strong effect on the internal audit quality. These variables are viewed as influential and dependent variables at the same time. The gender of the internal auditor is located at the extreme point in the region of excluded variables and is therefore considered an excluded variable for internal audit quality. This

means that the internal auditor's gender does not have a role in influencing the internal audit through its quality.

Our result especially highlights the important role that can be played by auditor dispositional optimism level on internal audit quality. In the best of our knowledge, this is the first study that discusses and empirically validates the impact of this psychological bias on internal audit quality. From the direct influence/dependence map, the dispositional optimism bias should be considered as a crucial relay variable that could influence other variables affecting internal audit quality. This result confirms our theoretical prediction about the ability of this psychological bias to influence audit quality level and corroborate results of previous studies that find that this bias is primordial in decision making (Ben Mohamed et al., 2025).

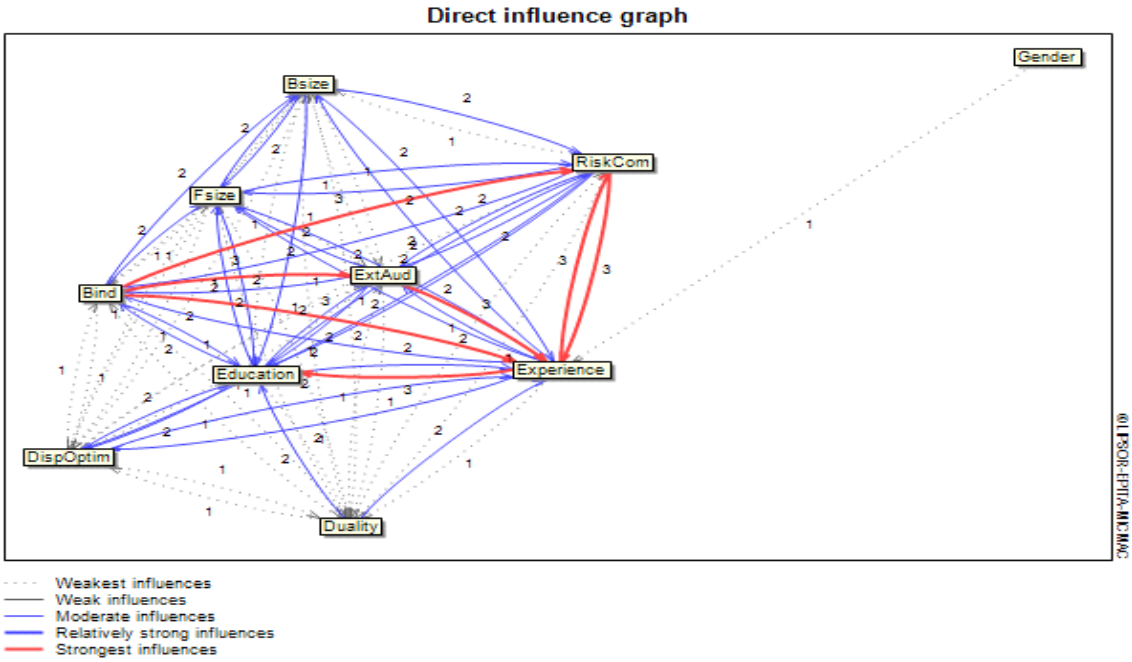

Figure 2 *Direct Influence/Dependence Graph*

The effects/dependencies graph clearly presents that the variable of internal auditor gender was excluded from the relationships between the variables. Therefore, gender is considered one of the variables that does not have an effect on internal audit through its quality, while the rest of the proposed factors are considered appropriate and can contribute to explaining the relationship associated with the internal audit quality (Figure 2).

4.3 Indirect Influence/Dependence Map and Chart

The chart in Figure (3) is a matrix diagram of indirect effects. This graph agrees with the chart of the matrix of direct effects that was previously mentioned. It narrates that professional experience and board independence are one of the relay variables, which considered to have the highest influential and dependent variables in the system.

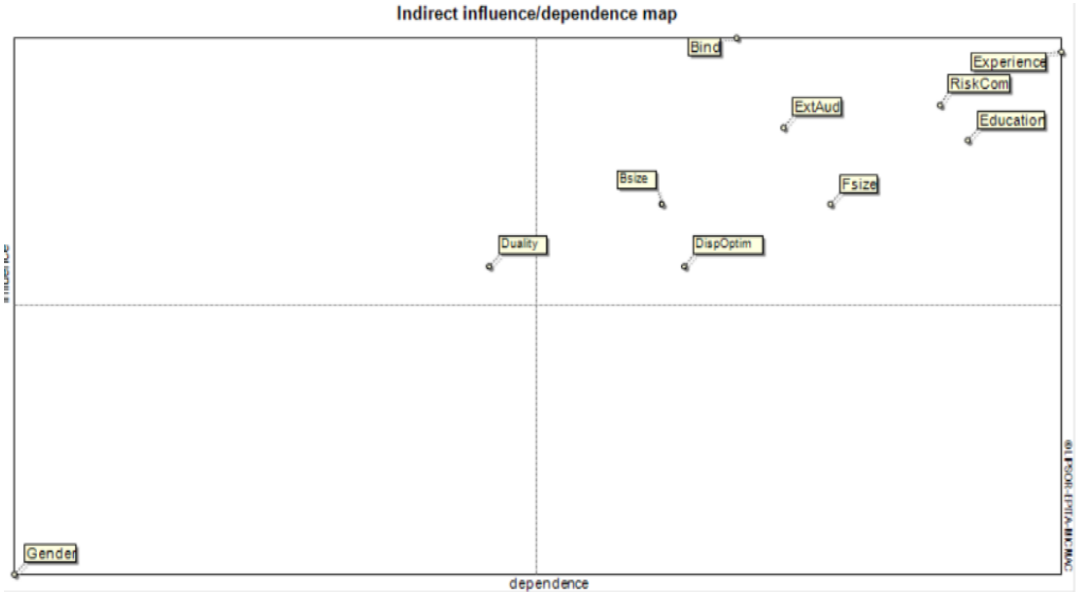

Figure 3 *Indirect Influence/Dependence Map*

The relationship becomes clear when looking at the graph (Figure 4). Therefore, it is the main characteristic that has a strong impact on the quality of internal auditing. There is also the possibility of keeping CEO duality as one of the influential variables, but it has less explanatory power compared to the areas of the other three variables present in the chart, in addition to the fact that it is not relied upon. In fact, it is located low in the region of influential variables.

Although it retains some influence over internal audit quality, its position in both the direct and indirect influence/dependence maps suggests that its impact is marginal compared to the more dominant variables. This may be attributed to the governance reforms implemented in recent years, particularly in emerging markets like Saudi Arabia, which have aimed to reduce the negative implications of CEO duality through stronger regulatory frameworks and oversight mechanisms.

Therefore, it has little and limited explanatory power. Additionally, the direct and indirect effects matrix diagram agrees about the gender of the internal auditor does not have a role in influencing the internal audit quality.

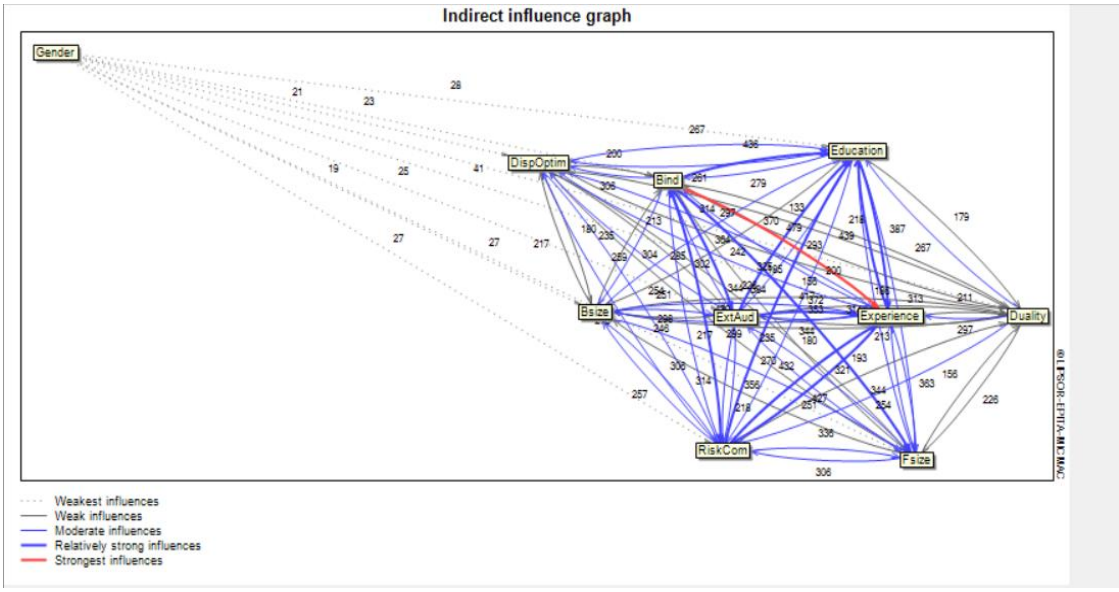

Figure 4 *Indirect Influence/Dependence Graph*

5. Discussion, policy and managerial implications

The findings of this study offer new insights into the complex relationships among structural, organizational, and individual factors affecting internal audit quality in Saudi-listed firms. Using MICMAC analysis, the results reveal that internal audit quality is governed by a network of interrelated variables, with board independence, professional experience, risk management committees, education, external auditor involvement, and board size emerging as the most influential. These variables not only exert direct influence but also demonstrate interdependence, reinforcing their centrality in the internal audit system.

A particularly novel result is the identification of internal auditor dispositional optimism as a significant factor. Positioned as a relay variable, optimism appears to influence both audit judgment and interaction with other governance elements. This psychological trait, though previously underexplored in audit literature, proves to be a meaningful contributor to audit quality and should be taken into account when assessing internal audit effectiveness. This aligns with emerging research emphasizing the role of individual-level characteristics in shaping professional behavior and decision-making quality.

Conversely, CEO duality shows limited explanatory power and appears marginal in both influence and dependence. This suggests that while duality may present a governance concern, its impact on internal audit quality is less significant when other mechanisms are in place. More notably, the gender of the internal auditor was excluded from the influence/dependence system altogether, indicating no discernible impact on audit quality in this context.

From a managerial perspective, these findings highlight the importance of investing in experienced, well-educated internal auditors and ensuring strong governance structures, especially independent boards and active risk management committees. Organizations should also consider

psychological attributes, such as optimism, in recruitment and training practices, as these may affect the judgment and performance of audit staff. Furthermore, the marginal role of CEO duality suggests that firms may focus more on board independence and committee effectiveness than solely on leadership structure.

Our empirical results align with and support several of the study's hypotheses. For example, the strong influence of board independence and risk management committees on internal audit quality confirms our developed hypothesis, reinforcing agency theory's argument that effective oversight reduces information asymmetry. The significance of internal auditor dispositional optimism , which is our main hypothesis, supports emerging literature in behavioral accounting (Alsalamah and Ben Mohamed, 2024); highlighting how psychological traits shape professional judgment. Conversely, the marginal effect of CEO duality and the exclusion of gender diverge from some prior findings, suggesting that in the Saudi context, structural governance mechanisms carry more weight than leadership concentration or demographic factors. These results strengthen the theoretical integration by illustrating how both structural and behavioral dimensions interact within emerging market governance systems.

For policymakers, the results suggest that regulations promoting board independence, auditor competence, and risk oversight are likely to yield the greatest improvements in internal audit quality. Encouraging psychological awareness in professional training may also enhance audit performance, especially as soft skills and behavioral factors become more prominent in audit roles. Conversely, the findings indicate that gender quotas or leadership structure reforms alone may not directly improve audit quality unless accompanied by broader structural enhancements.

6. Conclusion

This study aimed to explore the impact of board characteristics , internal auditor optimism and other personal traits such as gender and education on internal audit quality, focusing on Saudi joint-stock companies listed on the Tadawul market. The primary goal was to determine whether these two factors, board characteristics and auditor optimism, affect internal audit quality by testing the relevant hypotheses.

The researcher collected data through interviews with internal auditors from 19 Saudi joint-stock companies listed on the Tadawul market. Using the cognitive map (MICMAC) technique, the study analyzed board characteristics and auditor optimism, testing the effects of various factors on internal audit quality. A variety of analysis methods has been conducted to clearly explore the impact of the proposed variables on internal audit quality through auditors perception analysis.

The findings revealed that most of the variables tested, such as internal auditor optimism, professional experience, board independence, external auditor presence, board size, firm size, and the presence of a risk management committee, have a significant impact on internal audit quality. These variables were identified as relay variables meaning they are both influential and dependent within the system. Notably, professional experience and board independence emerged as the most influential factors. Although CEO duality was found to have a significant impact on internal audit quality, it was also considered unreliable as a standalone variable. The study also concluded that the gender of the auditor did not play a significant role in influencing internal audit quality.

References

Abdullah, W. Z., Ismail, S., & Jamaluddin, N. (2008). The Impact of Board Composition, Ownership and CEO Duality on Audit Quality: The Malaysian Evidence. Malaysian Accounting Review, 7(2), 17-28.

Ahmad, M., Tang, X. W., Qiu, J. N., & Ahmad, F. (2019). Interpretive structural modeling and MICMAC analysis for identifying and benchmarking significant factors of seismic soil liquefaction. Applied Sciences, 9(2), 233.

Akbarlou, E., Zeynali, M., Alinezhad Sarokolaei, M., & Baradaran Hasanzadeh, R. (2022). The effect of behavioral strains of managers on optimistic tone of financial reporting. Journal of Development and Capital, 7(2), 111-130.

Alawaqleh, Q. A., Almasria, N. A., & Alsawalhah, J. M. (2021). The effect of board of directors and CEO on audit quality: Evidence from listed manufacturing firms in Jordan. The Journal of Asian Finance, Economics, and Business, 8(2), 243-253.

Aliu, M., Okpanachi, J., & Mohammed, N. (2018). Auditor's independence and audit quality: An empirical study. Accounting and Taxation Review, 2(2), 15–27.

Al-Matari, E. M., Al-Swidi, A. K., & Fadzil, F. H. B. (2014). The effect of the internal audit and firm performance: A proposed research framework. International Review of Management and Marketing, 4(1), 34-41.

Alsalamah, A., and Ben Mohamed, E. (2024). Voluntary CSR Disclosure: Expanding the Determinants with Behavioral Insights. International Journal of Business & Management Studies, vol 5, issue 12, pp: 2694-1449.

Ariyani, N., & Fauzi, A. (2019). Analysis of strategic variables for ecotourism development; an application of Micmac. South Asian Journal of Social Studies and Economics, 3(3), 1-12.

Baccar, A., Ben Mohamed, E., & Bouri, A. (2013). Managerial optimism, overconfidence, and board characteristics: towards a new role of corporate governance. Australian journal of basic and applied sciences, 7(7), 287-301.

Balkir, I. H. (2000). Effects of analytical review results, optimism and patterns-for-coping on audit effort of accounting estimates. PhD thesis, Concordia University.

Ben Mohamed, E. , Garoui, N., & Naoui, K. (2020). Do optimistic managers destroy firm value?. Journal of Behavioral and Experimental Finance, 26, 100292.

Ben Mohamed, E., Baccar, A., Fairchild, R., & Bouri, A. (2012). Does corporate governance affect managerial optimism? Evidence from NYSE panel data firms. International Journal of Euro-Mediterranean Studies, 5(1), 41-56.

Ben Mohamed, E., Ramadani, V., Fatma, E. B., Elleuch, S., & Dana, L.-P. (2025). A new lens on opportunity recognition: The impact of dispositional optimism and human capital. The International Journal of Entrepreneurship and Innovation, 0(0). https://doi.org/10.1177/14657503251346414

Bigus, J. (2016). Optimism and auditor liability. Accounting and Business Research, 46(6), 577–600. https://doi.org/10.1080/00014788.2015.1133275.

Chandrayan, B., Gupta, S., Kumar, R., Dangayach, G. S., & Jagtap, S. (2023). Modelling and analysis of key enablers of digital transformation in food SMEs using ISM and MICMAC approach. International Journal of Intelligent Enterprise, 10(4), 419-444.

Cyert, R. M., & March, J. G. (1963). A behavioral theory of the firm. Englewood Cliffs, NJ: Prentice-Hall.

DeAngelo, L. E. (1981). Auditor Size and Audit Quality. Journal of Accounting and Economics 3(3), 183-199.

Diyan, P. Ramadhanti, W. Puspasari, N. (2019). Effect of Independence, Work Experience and Competence on Audit Quality with Professional Ethics as Moderating Variable. Jurnal Akuntansi Aktual. 5. 223-233.

Elad, F., Wong, M. N., & Bongbee, N. (2017). The Role of board characteristics in effective corporate governance: The case of Airbus Group. Available at SSRN 2902928.

Elhem, B. F., Ezzeddine, B. M., & Boudabbous, S. (2015). Does entrepreneur dispositional optimism bias affect small firms' technical efficiency. International Journal of Entrepreneurship and Small Business, 24(3), 302. https://doi.org/10.1504/ijesb.2015.067467.

Ezzeddine, B. M., Jarboui, A., Garoui, N., Ibrahim, S., M.Alsalman, A., & Abbassi, W. (2024). The determinants of the responsible use of pesticides among date farmers in Qassim region, Saudi Arabia, Cogent Food & Agriculture. Cogent Food & Agriculture, 10(1), 2314238, https://doi.org/10.1080/23311932.2024.23142

Fatma, E. B., Mohamed, E. B., Dana, L. P., & Boudabbous, S. (2021). Does entrepreneurs' psychology affect their business venture success? Empirical findings from North Africa. International Entrepreneurship and Management Journal, 17(2), 921-962.

Hmieleski, K. M., & Baron, R. A. (2009). Entrepreneurs' optimism and new venture performance: A social cognitive perspective. Academy of management Journal, 52(3), 473-488.

Iqbal, M., Ma, J., Ahmad, N., Ullah, Z., & Hassan, A. (2023). Energy-Efficient supply chains in construction industry: An analysis of critical success factors using ISM-MICMAC approach. International Journal of Green Energy, 20(3), 265-283.

J. Jia and M. E. Bradbury, "Risk management committees and firm performance," Aust. J. Manag., vol. 46, no. 3, pp. 369– 388, 2021

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305–360.

Jung, S., Lee, S., & Yu, J. (2021). Identification and prioritization of critical success factors for off-site construction using ISM and MICMAC analysis. Sustainability, 13(16), 8911

Khorrami, D., & Gholami J. R. (2017). Corporate Governance Mechanisms and Managerial Optimism. Journal of Accounting Knowledge, 7(27), 159-182. https://doi.org/10.22103/jak.2017.1564

Koulouriotis, D. E., Diakoulakis, I. E., Emiris, D. M., Antonidakis, E. N., & Kaliakatsos, I. A. (2003). Efficiently modeling and controlling complex dynamic systems using evolutionary fuzzy cognitive maps. International Journal of Computational Cognition. 1, 41-65.

Kumar, S., Giri, T. K., & Gogoi, B. J. (2020). Determinants of rural livelihood interventions: an ISM-MICMAC approach. Journal of Indian Business Research, 12(3), 343-362

L. Degenhart, M. Leite, A. da Silva, M. Zanievicz, and F. C. Fernandes, "Relação entre presença de comitê de gestão de risco e desempenho econômico em empresas brasileiras," Rev. Port. e Bras. Gestão, vol. 16, no. 1, pp. 4–21, 2017.

Lindblom, A., Lindblom, T., & Wechtler, H. (2020). Dispositional optimism, entrepreneurial success and exit intentions: The mediating effects of life satisfaction. Journal of business research, 120, 230-240.

M. B. U. Bhuiyan, M. A. Cheema, and Y. Man, "Risk committee, corporate risk-taking and firm value," Manag. Financ., vol. 47, no. 3, pp. 285–309, 2021.

M. S. Beasley, B. C. Branson, and B. V Hancock, "Rising expectations," J. Account., vol. 205, no. 4, p. 44, 2008

Madhani, P. M. (2015). The impact of board characteristics on corporate governance and disclosure practices of firms listed in Indian Stock Exchange. The IUP Journal of Corporate Governance, 14(4), 14-46.

Mani, V., Agrawal, R., & Sharma, V. (2016). Impediments to social sustainability adoption in the supply chain: An ISM and MICMAC analysis in Indian manufacturing industries. Global Journal of Flexible Systems Management, 17, 135-156.

Mashayekhi, B., & Mohammed, Y. (2025). Perceived Internal Audit Quality and External Auditors' Attributes in Iranian and Iraqi Banks. Journal of Risk and Financial Management, 18(1), 3.

Nazlabadi, E., Maknoon, R., Moghaddam, M. R. A., & Daigger, G. T. (2023). A novel MICMAC approach for cross impact analysis with application to urban water/wastewater management. Expert Systems with Applications, 230:120667. https://doi.org/ 10.1016/j.eswa.2023.120667

Perry, Y.Z Bin Srinidhi, Zhifeng Yang; Gender Diversity and Audit Quality: Evidence from the Pairing of Audit Partners. AUDITING: A Journal of Practice & Theory 1 November 2023; 42 (4): 81–104.

Pimentel, M., Arantes, A., & Cruz, C. O. (2022). Barriers to the adoption of reverse logistics in the construction industry: a combined ISM and MICMAC approach. Sustainability, 14(23), 15786.

Rahman, S. Ahmad, I., Madureira, L., & Shafqat, M. M. (2024). The impact of auditors' gender on the quality of financial reporting: a comparative study of auditors with accounting expertise. Cogent Business & Management, 11(1).

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. Health Psychology, 4(3), 219–247. https://doi.org/10.1037/0278-6133.4.3.219

Schrand, C. M., & Zechman, S. L. (2012). Executive overconfidence and the slippery slope to financial misreporting. Journal of Accounting and economics, 53(1-2), 311-329.

Setia, S., Krägeloh, C., Bandyopadhyay, G., & Subramaniam, K. (2021). Inculcating Dispositional Optimism for Prevention of Mental and Substance Use Disorders Throughout and After the Coronavirus Disease-19 Pandemic. Alternative and Complementary Therapies, 27(2), 68-78.

Sharma, S., & Bumb, A. (2021). Marketing at the Bottom of the Pyramid: Overcoming the Challenges through MICMAC Analysis. Journal of Global Marketing, 34(4), 292-307.

Sindhwani, R., & Malhotra, V. (2016). Modelling and analysis of agile manufacturing system by ISM and MICMAC analysis. International Journal of System Assurance Engineering and Management, 8(2), 253–263. https://doi.org/10.1007/s13198-016-0426-2.

Sivanathan, N., & Galinsky, A. D. (2007). Power and overconfidence. In IACM 2007 Meetings Paper.

Surdu, I., Greve, H. R., Benito, G. R. G. (2021). Back to basics: Behavioral theory and internationalization. Journal of International Business Studies, 52(6), 1047-1068. https://doi.org/10.1057/s41267-020-00388-w

Teichman, D. (2011). The optimism bias of the behavioral analysis of crime control. U. Ill. L. Rev., 1697.

Teye, P. (2023). Behavioral Biases and Nudges in Auditing (Doctoral dissertation, Université Jean Moulin Lyon 3).

Vitolla, F., Raimo, N., & Rubino, M. (2020). Board characteristics and integrated reporting quality: an agency theory perspective. Corporate Social Responsibility and Environmental Management, 27(2), 1152-1163.

Weinstein, N. D. (1980). Unrealistic optimism about future life events. Journal of personality and social psychology, 39(5), 806-820.

Wijaya, P., Kawiana, I., Suasih, N., Hartati, P., & Sumadi, N. (2020). SWOT and MICMAC analysis to determine the development strategy and sustainability of the Bongkasa Pertiwi Tourism Village, Bali Province, Indonesia. Decision Science Letters, 9(3), 439-452

Zhang, L., Ma, Y., & Hu, Y. (2023). Does CEO duality worsen or fosters audit quality: evidence from Chinese firms?. Economic research-Ekonomska istraživanja, 36(1), 687-707.

Zhang, Y., Zhou, J., & Zhou, N. (2007). Audit committee quality, auditor independence, and internal control weaknesses. Journal of Accounting and Public Policy, 26(3), 300–327.