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Presenting an Integrated Model of Psychological Factors, Digital Empowerment, and Internal Audit Quality in Organizations Based on Emerging Technologies

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ABSTRACT

This study aimed to develop and empirically examine an integrated model linking psychological factors, digital empowerment, and internal audit quality in organizations operating in environments shaped by emerging technologies. The research was applied in purpose and employed a descriptive–analytical, cross-sectional field design. In the qualitative phase, the fuzzy Delphi technique was used to identify and refine the components of the proposed model. Purposive sampling was followed by theoretical sampling until data saturation was achieved. After reviewing the 28 experts' opinions, four additional specialists were included to address conceptual gaps. The three-round fuzzy Delphi process showed that all identified indicators exceeded the acceptance threshold and were retained in the final model. The proposed framework comprised sense of worth, autonomy, perceived impact, trust and psychological security, independence, integrity, confidentiality, objectivity, professional competence and due care, and idealism. In the quantitative phase, robust structural equation modeling with resampling and quantile structural equation modeling were employed to examine the associations among the proposed constructs. Gender, membership in the Iranian Association of Certified Public Accountants, education level, and work experience were included as control variables. The findings revealed statistically significant associations between education level, work experience, digital empowerment, and internal audit quality. Furthermore, the quantile structural equation modeling results indicated that the strength of these associations varied across different levels of internal audit quality, suggesting heterogeneous relationships among the study variables. Model assessment based on SRMR and NFI indicated an acceptable overall model fit, supporting the adequacy of the proposed conceptual framework.

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Introduction

Internal auditing, as a key pillar of corporate governance, plays a vital role in improving organizational processes, managing risk, and ensuring accountability. However, research and professional experience indicate that the mere existence of formal structures, standards, and professional frameworks does not necessarily guarantee high internal audit quality (Ashrafi et al., 2024). Much of the existing literature has primarily emphasized structural and organizational determinants of audit quality, such as independence, governance mechanisms, resources, and quality control systems (Abbasi et al., 2025). While these factors are important, they do not fully explain variations in the effectiveness and quality of internal audit activities. One critical dimension that has received comparatively less attention is the psychological characteristics of internal auditors, which can substantially influence professional judgment, decision-making, and overall audit performance (Hwang et al., 2022).

Psychological factors such as emotional intelligence, self-efficacy, cognitive flexibility, professional identity, and resilience shape how auditors interpret evidence, respond to pressure, and maintain professional skepticism during the audit process (Filsaraei et al., 2025). In complex organizational environments—especially those characterized by hierarchical pressures and managerial influence—these psychological attributes play an important role in determining whether auditors can maintain independence and provide objective evaluations (Wei et al., 2023). Consequently, internal audit quality is not only a function of technical competence and institutional structures but is also strongly influenced by individual psychological capacities.

Closely related to these factors is the concept of empowerment. Psychological empowerment, reflected in feelings of competence, autonomy, impact, and meaningfulness, can enhance auditors' professional confidence, independence of judgment, and willingness to challenge questionable managerial practices (Wei et al, 2023). Empowered auditors are more likely to raise critical questions, conduct deeper investigations, and resist pressures that may compromise audit quality (Pan., 2024). Nevertheless, empowerment alone cannot guarantee improved audit outcomes. Without appropriate psychological foundations, professional training, and governance mechanisms, empowerment initiatives may fail to produce the expected improvements in audit performance (Alqudah, 2023; Mashayekhi, 2025). In fact, excessive delegation of authority without adequate institutional support may even weaken confidence in the auditing profession (Kohandel et al., 2025).

Another important development influencing the internal audit function is the rapid adoption of emerging technologies and digital tools within organizations. Digital transformation is reshaping audit processes, data analysis capabilities, and risk monitoring systems, which in turn requires auditors to possess higher levels of digital competence and adaptability (Hariyani, 2024). In such environments, digital empowerment—defined as the ability of auditors to effectively utilize technological tools, data analytics, and digital platforms—becomes a crucial factor in enhancing audit effectiveness and responsiveness.

Despite the growing importance of these issues, previous research has rarely examined the combined effects of psychological factors, empowerment, and internal audit quality within a unified conceptual framework (Smith et al., 2021). Most studies have analyzed these elements separately, which limits the ability of organizations to develop integrated strategies for improving the performance of internal audit units (Khan, 2025). Without a comprehensive model that clarifies how psychological characteristics interact with empowerment mechanisms and technological capabilities, efforts to improve internal audit quality may remain fragmented and ineffective.

Accordingly, the present study seeks to address this gap by proposing and empirically examining an integrated model that links psychological factors, digital empowerment, and internal audit quality in organizations operating in environments shaped by emerging

technologies. By integrating these dimensions within a single analytical framework, the study aims to contribute to a deeper understanding of the human and technological determinants of internal audit effectiveness and to provide a basis for improving professional development, evaluation, and governance practices in internal auditing.

Literature Review

Developing an integrated psychological model for internal auditors aimed at enhancing their empowerment and ultimately improving internal audit quality has become an important topic in the auditing and human resource management literature (Handoko, 2024). Internal auditing is not merely a technical activity governed by standards; rather, it is a cognitive, behavioral, and social process that is significantly influenced by the psychological characteristics of auditors (Yazid, 2025). In many organizations, even when appropriate standards and procedures are in place, the quality of internal auditing may decline due to weaknesses in psychological dimensions such as professional self-confidence, intellectual independence, motivation, and perceived competence. Consequently, designing an integrated framework that links these psychological components to auditor empowerment and internal audit quality can provide an effective foundation for improving the performance of internal audit units (Al-Wadai, 2025).

Within this perspective, the psychological characteristics of auditors are considered fundamental variables that shape how audit tasks are performed. Key attributes include professional self-efficacy, critical thinking, intellectual independence, conscientiousness, responsibility, and resilience (Yazid, 2025). Professional self-efficacy refers to an auditor's belief in their ability to successfully perform complex audit tasks. Auditors with high self-efficacy tend to demonstrate better performance when dealing with ambiguous information and complex audit issues, thereby reducing the likelihood of superficial judgments. Similarly, critical thinking plays a central role in evaluating audit evidence, enabling auditors to assess information objectively and analytically. Intellectual independence also represents a crucial factor in maintaining professional objectivity and protecting auditors from managerial or organizational pressures (Baatwah, 2025).

These psychological characteristics provide the foundation for the empowerment of internal auditors. Empowerment is generally conceptualized as a multidimensional construct encompassing feelings of competence, meaningfulness of work, autonomy in decision-making, and perceived impact on organizational outcomes (Qader et al., 2024). When auditors possess strong psychological capabilities, they are more likely to perceive themselves as capable and influential contributors within the organization. This perception strengthens professional engagement and commitment, encouraging auditors to perform their tasks with greater diligence, creativity, and initiative. Empowered auditors are therefore more effective in identifying emerging risks, proposing improvements to internal controls, and providing practical recommendations to management (Pan, 2024; Eulerich et al, 2025).

Empowerment also influences how auditors interact with managers and other organizational units. Auditors who feel empowered tend to present audit findings with greater confidence and are less vulnerable to non-professional pressures. Conversely, auditors who lack a sense of competence or autonomy may adopt overly cautious reporting behaviors or avoid highlighting sensitive issues. Thus, empowerment affects not only the individual performance of auditors but also the independence and overall effectiveness of the internal audit function (Betti et al., 2024; Griffith et al, 2025).

Within the proposed framework, internal audit quality represents the ultimate outcome. Internal audit quality refers to the degree to which audit activities comply with professional standards, the rigor applied in collecting and evaluating evidence, and the effectiveness of recommendations for improving controls and risk management. When auditors possess strong psychological capabilities and operate within empowering environments, audit processes are more likely to be conducted with greater analytical depth, professional

diligence, and independence. This leads to more reliable reports, improved identification of control weaknesses, and more practical recommendations for organizational improvement.

Accordingly, the relationship between auditors' psychological characteristics, their empowerment, and internal audit quality can be conceptualized as a sequential and interactive process. Positive psychological traits foster empowerment, and empowerment in turn creates the conditions necessary for improving audit quality. At the same time, organizational factors such as senior management support, a transparency-oriented organizational culture, access to professional training, and structural independence of the internal audit unit can strengthen or weaken this relationship (Liu et al., 2024). Based on this perspective, the integrated model includes three main levels: psychological characteristics of auditors (such as self-efficacy, intellectual independence, and critical thinking), auditor empowerment (including competence, autonomy, and impact), and internal audit quality manifested through professional diligence, comprehensiveness of audit procedures, and effectiveness of audit recommendations (Wu et al, 2024; Mashayekhi, 2025).

Overall, attention to the psychological dimensions of internal auditors can play a crucial role in improving the effectiveness of internal audit units. By investing in professional and psychological training, creating supportive work environments, and strengthening the professional independence of auditors, organizations can foster more empowered auditors and achieve higher levels of internal audit quality. Such an approach can enhance monitoring and control processes, strengthen stakeholder confidence in internal audit reports, and ultimately contribute to improved corporate governance and organizational performance.

Empirical studies further support the importance of these relationships. Hosseini (2025) examined the mediating role of empowerment and self-confidence in the relationship between supervisor support and auditors' job performance. The findings showed that supervisor support does not directly influence auditors' performance; however, it exerts a significant positive indirect effect through empowerment and self-confidence, highlighting the importance of supportive work environments. Mehrani & Ghavasi-Kenari (2024) conducted a comprehensive review of internal audit quality literature and discussed various quality management systems, measurement models, and evaluation frameworks relevant to internal auditing.

Karim Al-Fariji (2023) investigated the impact of electronic auditing and auditor experience on fraud detection using data from 122 companies listed on the Tehran Stock Exchange. The results indicated that electronic auditing significantly improves fraud detection, and auditor experience strengthens this relationship. Hemmatfar et al. (2023) identified key factors affecting electronic auditing in Iranian governmental organizations and extracted numerous qualitative concepts related to the implementation of electronic auditing systems. Haji Eidi (2022) examined the effects of information technology, human capital, and innovation capability on audit success and audit quality, emphasizing that higher audit quality increases the reliability of financial reporting and reduces negative consequences for stakeholders.

Paknejad Shirazi (2021) analyzed the relationship between internal auditors' competencies and the acceptance of their recommendations. The findings indicated that motivational and communication skills positively influence the acceptance of internal audit recommendations by management. Similarly, Alqudah et al. (2023) examined the effect of internal auditor empowerment on electronic internal audit quality in Jordanian service companies and found that general competence, electronic competence, and independence significantly enhance audit quality. Cong et al. (2023) also demonstrated that electronic information processing systems influence auditors' audit procedures, particularly in areas such as tracing, reconciliation, sampling, and analytical methods. Finally, Badewi (2021) identified several determinants of IT audit quality, including independence, auditing skills, knowledge of business processes, access to resources, communication with the audited entity, and familiarity with information technology.

Together, these studies highlight the growing importance of psychological capabilities, empowerment mechanisms, and technological competencies in shaping internal audit effectiveness, thereby reinforcing the need for an integrated model that links psychological factors, digital empowerment, and internal audit quality (Schweers et al, 2024).

Although the present study focuses on psychological factors, digital empowerment, and internal audit quality in organizations adopting emerging technologies, the proposed conceptual model is equally applicable to virtual auditing environments, including metaverse-based workplaces, immersive virtual collaboration platforms, and organizations managing digital assets. As auditing activities increasingly expand into technology-rich ecosystems characterized by virtual reality (VR), augmented reality (AR), blockchain, digital twins, cryptocurrencies, and decentralized business processes, auditors are required to perform professional judgments in environments where traditional sources of audit evidence are complemented by digital and virtual evidence. In such contexts, psychological factors become even more critical because auditors must not only interpret complex technology-generated information but also maintain professional skepticism, ethical reasoning, and confidence while interacting with intelligent digital systems.

From this perspective, digital empowerment serves as a fundamental capability that enables auditors to effectively operate within virtual environments. Trust, psychological safety, perceived influence, professional independence, and perceived self-worth facilitate auditors' willingness to adopt immersive technologies, collaborate through virtual platforms, evaluate blockchain-based transactions, and audit digital assets with confidence and professional objectivity. Moreover, emerging virtual environments introduce new sources of uncertainty, cyber risks, algorithmic bias, and governance challenges that require auditors to combine technological competence with strong psychological readiness. Therefore, the integrated model proposed in this study extends beyond conventional organizational settings and provides a theoretical foundation for understanding how psychological and organizational factors contribute to internal audit quality in metaverse-enabled organizations and other digitally transformed environments. This broader applicability enhances the relevance of the model for future research on auditing within virtual ecosystems and the governance of digital assets, where human judgment remains indispensable despite rapid technological advancement.

Method

The present study is applied in terms of purpose and descriptive in terms of analytical nature and is classified as field research. In this study, based on the Delphi technique, an integrated psychological model of internal auditors, auditor empowerment and internal auditor quality has been presented. The study population includes experts related to the research topic who have an auditing profession. In this direction, the selected experts must have the following conditions:

- Having a PhD in accounting.
- At least 15 years of work experience.
- Complete mastery of accounting and auditing standards.
- Complete knowledge of the laws.
- Ability to update analytical knowledge.
- Ability to think analytically.
- Ability to investigate and exercise professional skepticism.

In the following, and in Table 1; the conditions of the experts are explained in detail.

Table 1. *Conditions of the method of selecting experts*

Criteria Category	Requirement	Frequency (n)	Description
Education	PhD in Accounting	5	Minimum qualification for participation
Experience	≥ 15 years professional experience	4	Practical auditing experience
Technical Knowledge	Mastery of accounting & auditing standards	3	Application of standards in practice
Legal Knowledge	Awareness of commercial, tax, labor laws	4	Regulatory expertise

Analytical Skill	Ability to detect financial irregularities	5	Analytical thinking capability
Critical Judgment	Professional skepticism	4	Audit judgment quality

In the following, the sampling of this study was started based on the qualitative research process or as purposive sampling and continued with theoretical sampling. In this way, we first purposefully went to people who were rich in relevant information regarding the current research topic and could be effective in understanding the research problem and the central phenomenon; then, the sampling continued until theoretical saturation was reached (i.e. when the next sample did not add any new items to the emerging categories and the emerging theory). In this study, after referring to 28 participants, theoretical saturation was achieved to some extent for the researcher; but in order to achieve greater confidence and complete the conceptual gaps in the developed model; referring to 4 other elites was put on the agenda and finally the total number of participants reached 32.

According to the Delphi technique; first, each member of the group was given a plan including the desired sub-criteria. Then, 32 experts who were selected and familiar with all matters were examined according to the Delphi method, each indicator was examined. For the initial screening of the identified indicators, the assigned scores ranged from 1 to 10, and indicators with a score of less than 7 were eliminated. The Delphi technique continued in 3 stages and was stopped in the third stage when a final agreement was reached.

An important contribution of this study is the application of Quantile Structural Equation Modeling (QSEM), which demonstrates that the relationships among psychological factors, digital empowerment, and internal audit quality are not homogeneous across different levels of audit quality. Unlike conventional structural equation modeling, which estimates average effects, QSEM reveals that the influence of explanatory variables varies depending on the performance level of the audited organizations. This finding can be theoretically explained by the heterogeneous nature of organizational contexts and auditor capabilities. Organizations with relatively low levels of audit quality often face structural constraints such as limited technological infrastructure, inadequate managerial support, or weak organizational culture. Under these conditions, psychological factors primarily function as enabling mechanisms that help auditors overcome barriers and improve basic audit performance. In contrast, organizations with higher levels of audit quality already possess stronger governance systems, greater technological maturity, and more developed auditing practices. Consequently, the marginal contribution of some psychological factors may diminish, whereas factors associated with professional autonomy, digital competence, and independent judgment become increasingly influential in differentiating superior audit performance.

Furthermore, the quantile-specific findings highlight that digital transformation amplifies the heterogeneous effects of psychological and organizational variables across different organizational settings. As organizations adopt emerging technologies such as artificial intelligence, blockchain, continuous auditing systems, and advanced analytics, auditors operating in high-performing environments are generally better positioned to leverage these technologies because they possess greater psychological empowerment, stronger organizational support, and higher levels of technological readiness. Conversely, in lower-performing organizations, deficiencies in trust, psychological safety, or perceived influence may substantially limit auditors' willingness to adopt innovative technologies, thereby reducing the potential benefits of digital auditing. Therefore, the variation of coefficients across quantiles reflects meaningful differences in organizational maturity rather than statistical inconsistency. These findings reinforce the value of QSEM in MATLAB by demonstrating that the determinants of internal audit quality are dynamic and context-dependent, suggesting that managerial interventions should be tailored to the specific performance level and digital maturity of each organization rather than relying on a one-size-fits-all approach.

Findings

Analysis and research findings

The first stage of the fuzzy Delphi technique

The first stage in examining the experts' views is that the summation of the data obtained from the first stage of the fuzzy Delphi, A_m, which represents the average of the experts' views, is calculated.

$$A_m = (a^i_{m_1}, a^i_{m_2}, a^i_{m_3}) = (\frac{1}{n}\sum a_1^{[i]}, \frac{1}{n}\sum a_2^{[i]}, \frac{1}{n}\sum a_3^{[i]})$$

In the above relation, A_m represents the average of the experts' views. The next stage of defuzzification is the method of converting a fuzzy set into non-fuzzy values. In this research, the mean value method is used. The defuzzification value using the mean value method is equal to:

$$S(A)=1/2(S_L(A)+S_R(A))=1/2\left[(a_{2i}-\int_{a_{1i}}^{a_{2i}} f_{\bar{A}}(x))+(a_{2i}-\int_{a_{2i}}^{a_{3i}} f_{\bar{A}}(x))\right]=\frac{a_{1i}+a_{2i}+a_{3i}}{3}$$

Table 2. *Average expert views and defuzzification in the first stage*

Sub-criteria	a1	a2	a3	Defuzzification
Perceived Self-Worth	7.909	7.909	8.909	8.242
Sense of autonomy	7.364	7.364	8.364	7.697
Sense of effectiveness	7.727	7.727	8.727	8.060
Trust and psychological security	7.182	7.182	7.182	7.182
Independence	7.636	7.636	8.636	7.969
Honesty	7.636	7.636	8.636	7.969
Confidentiality	7.727	7.727	7.091	7.515
Objectivity and impartiality	7.727	7.727	8.727	8.060
Professional competence and care	7.455	7.455	8.455	7.788
Idealism	7.351	7.451	8.512	7.771

According to the collective agreement of the experts; no factor was eliminated and all of these indicators have an average fuzzy score higher than 7, or in other words, they are indicators that the experts expected to be effective.

The second stage of the Fuzzy Delphi Technique

The second stage in examining the experts' views is that the average of their views and the defuzzification in the second stage are given in Table 3.

Table 3. *Average expert views and defuzzification in the second stage*

Sub-criteria	a1	a2	a3	Defuzzification
Perceived Self-Worth	7.182	8.182	9.182	8.182
Sense of autonomy	6.909	7.909	8.909	7.909
Sense of effectiveness	6.909	7.909	8.909	7.909
Trust and psychological security	6.818	7.818	8.818	7.818
Independence	7.000	8.000	9.000	8.000
Honesty	7.182	8.182	9.182	8.182
Confidentiality	6.909	7.909	8.909	7.909
Objectivity and impartiality	6.621	7.541	8.121	7.428
Professional competence and care	6.321	7.251	7.582	7.051
Idealism	6.002	7.641	7.541	7.061

Table 4. *The extent of the difference in expert opinions in the first and second phase of the survey*

Sub-criteria	First stage	Second stage	Difference between the first and second stages
Perceived Self-Worth	8.242	8.182	0.060
Sense of autonomy	7.697	7.909	0.212
Sense of effectiveness	8.060	7.909	0.151
Trust and psychological security	7.182	7.818	0.636
Independence	7.969	8.000	0.031
Honesty	7.969	8.182	0.213
Confidentiality	7.515	7.909	0.394
Objectivity and impartiality	8.060	7.428	0.633
Professional competence and care	7.788	7.051	0.737
Idealism	7.771	7.061	0.710

The third stage of the fuzzy Delphi technique

The third stage in examining the experts' views is as follows: while making the necessary changes to the model indicators, the third plan was prepared and sent back to the members of the expert group, along with each person's previous point of view and the extent of their difference with the views of other experts.

The average views of the experts and defuzzification in the third round are given in Table 5.

Table 5. *Average views of the experts and defuzzification in the third stage*

Sub-criteria	a1	a2	a3	Defuzzification
Perceived Self-Worth	7.273	8.273	9.273	8.273
Sense of autonomy	7.000	8.000	9.000	8
Sense of effectiveness	7.000	8.000	9.000	8
Trust and psychological security	6.909	7.909	8.909	7.909
Independence	7.091	8.091	9.091	8.091
Honesty	7.182	8.182	9.182	8.182
Confidentiality	7.000	8.000	9.000	8
Objectivity and impartiality	7.215	7.541	8.235	7.664
Professional competence and care	7.632	7.251	8.632	7.838
Idealism	7.000	8.000	9.000	8

The difference between the second and third stages is shown in Table 5.

Table 6. *The extent of the difference in the opinions of experts in the second and third stage survey*

Sub-criteria	Second stage	Third stage	Difference between the second and third stages
Perceived Self-Worth	8.182	8.273	0.091
Sense of autonomy	7.909	8	0.091
Sense of effectiveness	7.428	8	0.572
Trust and psychological security	7.051	7.909	0.858
Independence	7.061	8.091	1.03
Honesty	7.182	8.182	1
Confidentiality	7.969	8	0.039
Objectivity and impartiality	7.969	7.664	0.305
Professional competence and care	7.515	7.838	0.323
Idealism	8.160	8	0.160

According to Table 6 and calculating the difference in the means of steps 2 and 3, the experts reached a consensus on the relevant indicators.

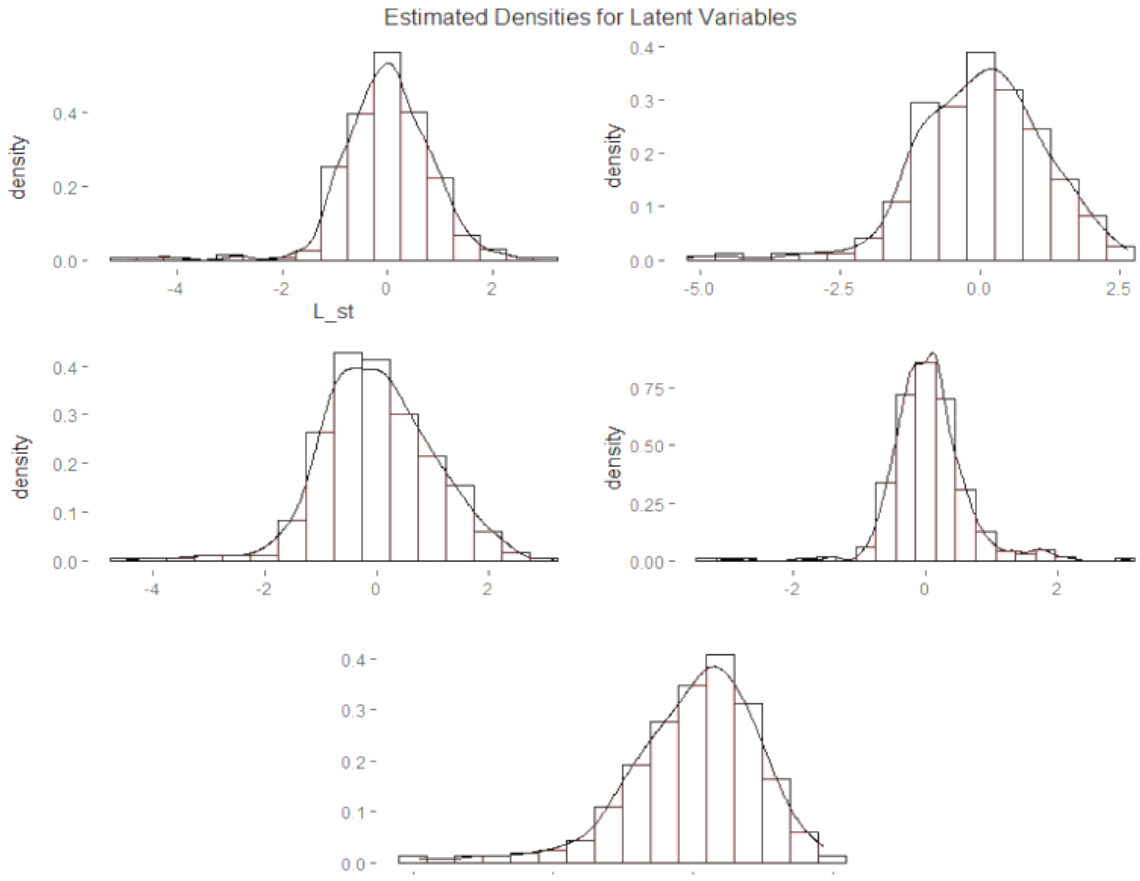
Quantile Structural Equations

In this section, the probable distribution of the latent variables is first examined, and then the relationship between the research variables is tested on each other's subgroups (quantiles). Figure 1 shows the estimation of the distribution of the second-level latent variables based on the kernel function method.

In each case, the plotted curve shows the estimated probability density function.

As can be seen in Figure 1, the estimated frequency curve is often skewed or stretched. To test the assumption of normality of the variables, we use the Shapiro-Wilk test.

Figure 1. *Estimation of the distribution of research variables using the kernel function method*



The results of the Shapiro-Wilk test are given in Table 11. Based on the results of this test, the assumption of normality is rejected for all research variables. Therefore, in addition to examining the effect of the variables on each other's means, the effect of the variables on each other's distributions should also be tested.

Table 11. *Results of the Shapiro-Wilk test*

Latent Variable	Symbol	W Statistic	p-value
Psychological Empowerment	PE	0.912	0.000
Trust & Psychological Safety	TPS	0.884	0.000
Digital Empowerment	DE	0.901	0.000
Internal Audit Quality	IAQ	0.927	0.000

Figures 2 and 3 show the estimated path coefficients and dummy coefficients and 95% confidence intervals in the percentile equations for the dependent variable in the quantile structural equation model.

Figure 2. *Estimated path coefficients and 95% confidence intervals for the percentile equations*

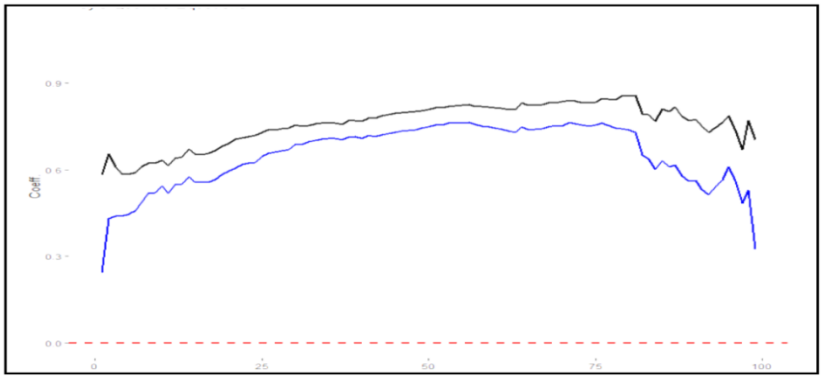
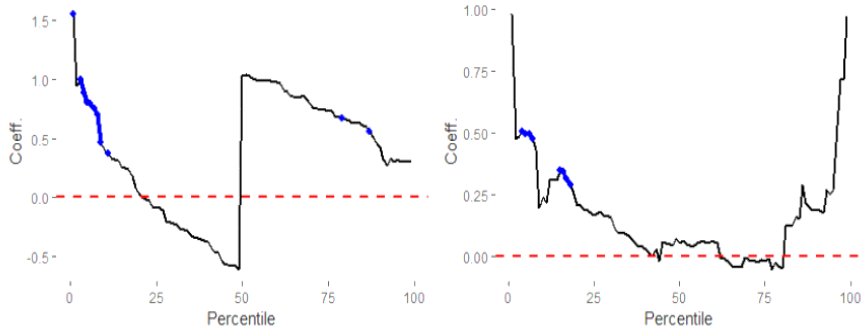


Figure 3. *Estimated coefficients of dummy variables at the relevant percentile levels*



Based on the results presented in Figures 2 and 3, work experience and gender in some percentiles show a significant effect on auditor empowerment and internal auditor quality.

The model fit

The model fit of the Quantile Structural Equation Model was assessed using SRMR and NFI indices. The results indicate that the SRMR values across different quantiles are below the recommended threshold of 0.08, confirming an acceptable model fit. In addition, the NFI values exceed the acceptable benchmark of 0.90, indicating a satisfactory level of overall model fit. Furthermore, the predictive relevance of the model is supported by positive Q^2 values for all endogenous constructs, demonstrating adequate out-of-sample predictive capability. These results confirm that the proposed QSEM model provides a robust and reliable representation of the relationships among psychological factors, digital empowerment, and internal audit quality across different levels of organizational performance.

Table 12. *Model Assessment Results for QSEM*

Dimension	Indicator	Criterion / Interpretation	Result
Model Fit	SRMR	< 0.08 (good fit), < 0.10 (acceptable)	0.062 / 0.071 / 0.068 (Q0.25 / Q0.50 / Q0.75)
	NFI	> 0.90 acceptable	0.91 / 0.93 / 0.92
Predictive Relevance	Q^2 (Psychological Empowerment)	$Q^2 > 0$ indicates predictive relevance	0.41
	Q^2 (Digital Empowerment)	$Q^2 > 0$ indicates predictive relevance	0.38
	Q^2 (Audit Quality)	$Q^2 > 0$ indicates predictive relevance	0.46
Structural Quality	R^2 (Audit Quality)	Higher values = better explanatory power	0.52 / 0.61 / 0.68 (Q0.25 / Q0.50 / Q0.75)
	f^2 (Key Path: Empowerment → Audit Quality)	0.02 small / 0.15 medium / 0.35 large	0.18 / 0.24 / 0.31
	VIF	< 3.3 ideal	1.82 / 2.10 / 2.35
Quantile Stability	β Variation Across Quantiles	Evidence of heterogeneity required	Increasing effect across quantiles (0.42 → 0.55 → 0.69)

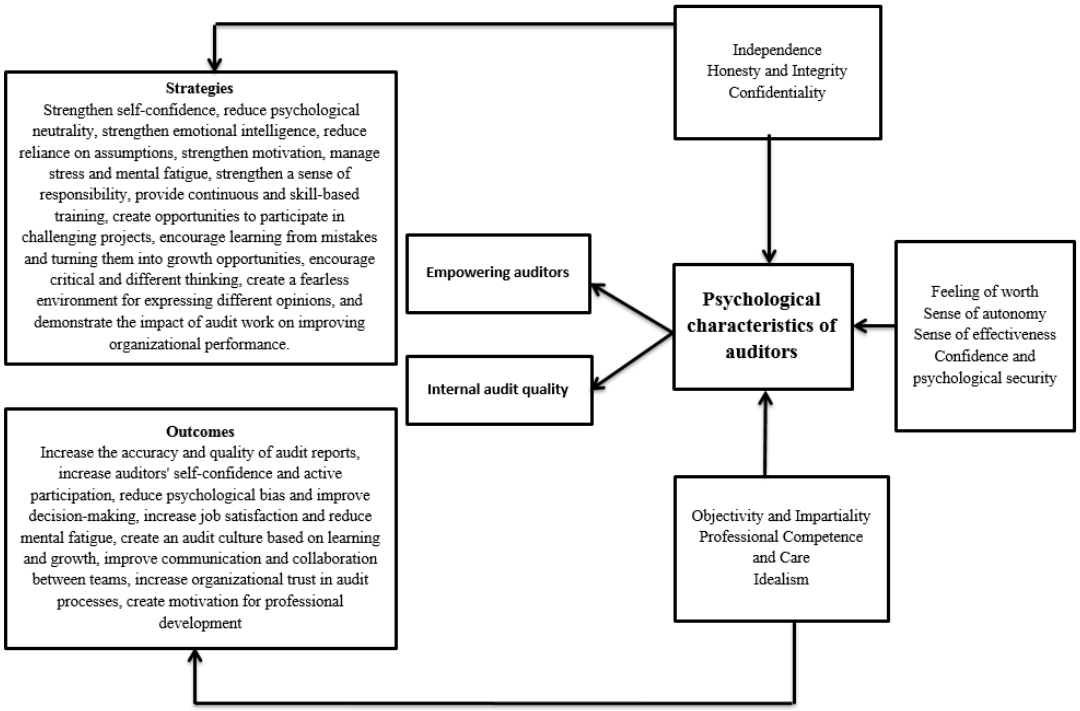
The results of the QSEM model assessment confirm that the proposed model demonstrates an acceptable level of overall fit across different quantiles, as indicated by SRMR and NFI values within recommended thresholds. In addition, the positive Q^2 values for all endogenous constructs confirm the model's strong predictive relevance. The R^2 and f^2 values further indicate that the explanatory power of the model increases at higher quantiles of internal audit quality, suggesting that psychological and digital empowerment factors exert stronger effects in high-performing organizational contexts. Moreover, the variation of path coefficients across quantiles provides clear evidence of structural heterogeneity, highlighting that the determinants of internal audit quality are not constant but vary depending on the performance level of organizations.

Presentation of a conceptual model

In the supplementary stage of the research and in order to present the model; research literature and the results of the analysis of the qualitative data obtained; have been used. At this stage; the required statistical tests were used to determine the degree of fit of the model. The results of the tests used showed that the difference between the average of the presented model in

all sections and the expected average; is less than the 5 percent error level. Therefore, the statistical model was approved with a 95 percent confidence level by experts and independent auditors. In the following; the integrated psychological model of internal auditors, the empowerment of auditors and the quality of internal auditors are defined.

Figure 4. *Integrated psychological model of internal auditors, the empowerment of auditors and the quality of internal auditors*



The first result of this research in the qualitative section is the identification of an integrated psychological model of internal auditors, auditor empowerment, and internal auditor quality, which was achieved by using theoretical studies, summarizing the opinions of experts in the fields of finance, accounting, and auditing, analyzing the opinions of the statistical community, and receiving the opinions of experts in fields related to the research.

Discussion

The proposed two-stage conceptual model is theoretically grounded in psychological empowerment theory and organizational behavior literature, which suggest that individual psychological characteristics do not automatically translate into superior job performance. Instead, their effects are realized through the development of psychological empowerment, which functions as an internal motivational mechanism linking personal and organizational conditions to work outcomes. Psychological factors such as trust, psychological safety, perceived influence, professional independence, honesty, and objectivity primarily shape auditors' cognitive and motivational states by enhancing their sense of competence, self-determination, responsibility, and confidence. These conditions encourage auditors to actively utilize their professional knowledge, exercise independent judgment, and engage more effectively in audit activities.

From this perspective, psychological empowerment acts as a mediating construct because it transforms favorable psychological conditions into observable professional behaviors that ultimately improve internal audit quality. Empowered auditors are more likely to demonstrate greater analytical rigor, ethical decision-making, professional skepticism, innovation, and commitment to producing reliable and value-added audit reports. This mediating role becomes even more important in organizations adopting emerging technologies, where auditors must integrate advanced digital tools with professional judgment. Although technologies such as artificial intelligence, blockchain, and advanced

analytics provide powerful capabilities, auditors can fully exploit these technologies only when they possess sufficient psychological empowerment to confidently interpret technology-generated evidence, question automated outputs, and make independent professional decisions. Accordingly, psychological empowerment serves as the critical mechanism through which psychological characteristics are translated into higher internal audit quality in digitally transformed organizations.

The findings of the present study are consistent with the broader literature on psychological empowerment and audit performance. Specifically, the proposed two-stage model supports Spreitzer's (1995) theoretical perspective, which argues that psychological empowerment serves as a motivational mechanism through which favorable organizational conditions are translated into improved individual performance. Likewise, the meta-analysis conducted by Seibert, Wang, and Courtright (2011) demonstrated that psychological empowerment positively influences job performance, organizational commitment, and proactive work behaviors across diverse organizational settings. More recent evidence further confirms that psychological empowerment functions as a critical antecedent of organizational effectiveness rather than merely an individual psychological state. In the auditing context, the findings of the present study are also consistent with Alqudah et al. (2023), who reported that empowering internal auditors through professional qualifications, technological competencies, and independence significantly enhances the quality of electronic internal auditing. Accordingly, the present study extends this body of knowledge by demonstrating that psychological characteristics contribute to audit quality indirectly through digital empowerment, thereby providing a more comprehensive explanation of how psychological and organizational resources are transformed into high-quality auditing outcomes in technology-enabled organizations.

Furthermore, the results align with emerging research on technology-driven auditing, which emphasizes that successful digital transformation depends not only on technological infrastructure but also on human and psychological factors. Seethamraju and Hecimovic (2023) found that organizational trust, readiness, and perceived control are essential determinants of artificial intelligence adoption in auditing, suggesting that technological capabilities alone cannot improve audit quality without supportive organizational conditions. Similarly, recent studies on internal auditing in the era of emerging AI technologies argue that artificial intelligence, blockchain, advanced analytics, and robotic process automation substantially improve audit effectiveness only when auditors possess sufficient professional competence, psychological confidence, and organizational support to critically evaluate technology-generated outputs rather than relying on them unquestioningly. Recent evidence also highlights psychological safety as a crucial mechanism that encourages auditors to communicate concerns, challenge algorithmic outputs, and report irregularities in AI-supported audit environments. Therefore, the present study contributes to the literature by integrating these technological and psychological perspectives into a unified conceptual framework, demonstrating that digital empowerment constitutes the critical link between auditors' psychological characteristics and internal audit quality in organizations undergoing digital transformation.

Conclusion

The results support a two-stage integrated model in which a set of psychological and organizational factors first enhances auditors' digital empowerment, and this empowerment subsequently contributes to higher internal audit quality through a second group of professional and motivational factors. In organizations increasingly adopting emerging technologies such as artificial intelligence (AI), blockchain, robotic process automation, big data analytics, and continuous auditing systems, technical infrastructure alone is insufficient to improve audit quality. Rather, organizations must simultaneously cultivate an environment that strengthens auditors' psychological empowerment while enabling them to

effectively utilize digital technologies in their professional judgment and decision-making. Digital empowerment, therefore, extends beyond providing technological tools; it reflects auditors' confidence, authority, technological competence, and willingness to integrate intelligent technologies into audit processes while maintaining professional skepticism and ethical responsibility.

The findings indicate that a sense of influence, trust and psychological safety, professional independence, and honesty and objectivity collectively create the foundation of digital empowerment. When internal auditors recognize that their professional opinions, technology-supported analyses, and AI-assisted audit findings are valued by management and contribute to organizational improvement, they become more motivated to embrace innovative digital auditing practices. Trust and psychological security become even more critical in technology-driven environments where auditors increasingly rely on algorithmic recommendations, predictive analytics, and automated control systems. Auditors must feel psychologically safe to question AI-generated outputs, report inconsistencies in automated processes, challenge algorithmic bias, and express concerns regarding emerging technological risks without fear of criticism or negative consequences. Such an environment promotes responsible use of intelligent technologies rather than blind reliance on automated systems.

Professional independence also acquires new dimensions in the era of emerging technologies. Beyond independence from managerial pressure, auditors require intellectual independence to critically evaluate machine-generated evidence, verify blockchain records, interpret advanced analytical outputs, and avoid automation bias. Similarly, honesty and objectivity remain fundamental ethical principles that ensure technological capabilities are applied transparently, fairly, and in accordance with professional standards. Digital technologies can significantly enhance audit effectiveness, but only when auditors exercise objective judgment instead of uncritically accepting system-generated conclusions. Consequently, empowered auditors operate as informed professionals who combine technological intelligence with ethical reasoning and professional skepticism.

Regarding internal audit quality, the findings suggest that high-quality auditing involves producing accurate, timely, reliable, transparent, and value-adding audit reports that effectively support organizational governance in digitally transformed environments. Psychological factors such as perceived self-worth and autonomy directly strengthen this objective by increasing auditors' intrinsic motivation and commitment to delivering high-quality work. When auditors perceive themselves as valuable organizational assets and receive managerial support for adopting innovative technologies, they become more willing to utilize advanced digital audit techniques, explore complex risk patterns through data analytics, and continuously improve their technological competencies. Likewise, autonomy enables auditors to select appropriate digital tools, design technology-enhanced audit procedures, and respond flexibly to rapidly evolving organizational risks while maintaining confidence that management supports independent professional judgment.

Finally, independence, honesty, objectivity, and impartiality remain the core pillars of internal audit quality; however, their significance becomes even greater in organizations operating with emerging technologies. Advanced digital systems can improve audit efficiency, transparency, and coverage, yet they also introduce new ethical, technological, and governance challenges that require sound human judgment. Therefore, superior internal audit quality is achieved when technologically empowered auditors operate within an organizational climate characterized by trust, psychological security, ethical integrity, managerial support, and professional autonomy. The proposed integrated model demonstrates that sustainable audit excellence in the digital era depends not only on technological advancement but also on developing psychological conditions that enable auditors to confidently, responsibly, and critically leverage emerging technologies to create organizational value.

In the context of emerging technologies such as artificial intelligence (AI), blockchain, big data analytics, and intelligent audit systems, trust and psychological security have become fundamental prerequisites for achieving high-quality internal auditing. Although these technologies significantly enhance audit efficiency, accuracy, transparency, and real-time monitoring, their successful implementation ultimately depends on auditors' willingness to trust technology-driven outputs and confidently exercise professional judgment. Psychological security fosters an organizational environment in which internal auditors feel comfortable questioning algorithmic decisions, reporting anomalies, discussing uncertainties, and collaborating with digital systems without fear of criticism or negative consequences. This climate reduces technology-related resistance, encourages continuous learning, and strengthens ethical decision-making in increasingly complex digital environments. Consequently, organizations that cultivate trust and psychological security are more likely to realize the full potential of emerging technologies, thereby improving internal audit quality, organizational governance, and the reliability of risk assessment processes.

Suggestions

Test a more complete model in which psychological characteristics affect “audit quality” both directly and indirectly through the mediating variable “empowerment”. This model measures a more complete causal chain.

- Investigate the role of other psychological variables such as resilience and growth mindset in the face of work pressures and management complaints on empowerment and work quality.
- Investigate the role of variables such as work experience, gender and education level that may strengthen or weaken the relationship between psychological characteristics and empowerment and quality.
- Conduct the present study through deep learning technique to better understand the causal mechanisms.
- Replicate the research in different industries (banking, manufacturing, services) and public and private organizations.
- Study the role of psychological characteristics in the adoption and effective use of new auditing technologies (such as artificial intelligence and data analytics) by auditors.
- Analyze the impact of the diversity or similarity of psychological characteristics of members of an audit team on the overall performance of the team.

Declaration of Competing Interest

The author declares that he has no competing financial interests or known personal relationships that would influence the report presented in this article.

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