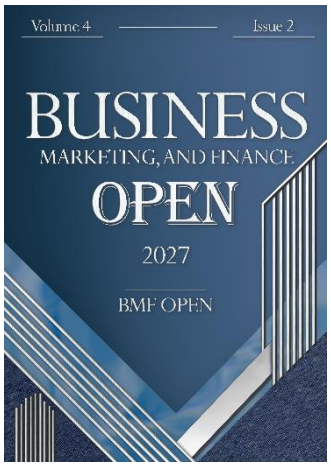
Providing a Framework for Auditors' Metacognitive Beliefs and Examining Their Impact on Ethical Decision-Making in the Auditing Profession



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Abstract: Metacognition, as a reflective mirror through which the mind examines itself, not only represents cognitive abilities but also serves as a guiding mechanism for navigating the complexities of decision-making in professional environments. In auditing, where each judgment can be consequential, metacognitive beliefs empower auditors not only to evaluate data but also to gain insight into their own thinking processes and make ethical and well-reasoned decisions. The objective of the present study was to develop a model of auditors' metacognitive beliefs and to examine its impact on ethical decision-making. In this study, using grounded theory and expert interviews, the components of auditors' metacognitive beliefs were identified. In the quantitative phase, the research hypothesis was tested using structural equation modeling with SmartPLS3 software. Data on auditors' metacognitive beliefs were collected through a researcher-developed questionnaire, and ethical decision-making was measured using a standardized questionnaire. This mixed-methods approach systematically examined the relationship between metacognitive beliefs and ethical decision-making. The qualitative findings revealed four categories (1. enhancement of auditors' professional self-awareness, 2. professional interactions and team coordination, 3. continuous learning and professional development, and 4. professional ethics and accountability), eleven main components (including the role of self-awareness in improving audit quality, risk management in a self-aware environment, enhancement of cognitive processes in professional settings, team coordination in a self-aware environment, professional responses to criticism and feedback, interaction with emerging technologies in professional environments, and auditors' professional development in self-aware contexts), and forty-three conceptual themes. Furthermore, the findings from the quantitative phase indicated that auditors' metacognitive beliefs have a positive and statistically significant effect on ethical decision-making. These results can assist audit firms and standard-setters in designing supportive work environments and effective training programs to enhance audit quality and increase public trust in the profession. Ultimately, by presenting a comprehensive model, this study provides a robust foundation for future research in the domain of metacognition and professional ethics in auditing and opens new avenues for examining the complex interaction between cognition, metacognition, and ethics in professional contexts.

Keywords: Metacognitive beliefs, self-awareness, audit quality, ethical decision-making

1. Introduction

Auditing is a profession in which the quality of judgment often determines not only the reliability of financial reporting but also the level of public trust in economic institutions. In contemporary business environments,

auditors are expected to process complex evidence, evaluate uncertainty, recognize fraud risks, resist organizational pressures, and make defensible ethical judgments under time and information constraints. As audit engagements become more technologically mediated, commercially pressured, and socially consequential, the cognitive foundations of professional judgment have attracted growing scholarly attention. Yet cognitive ability alone is insufficient for explaining why some auditors demonstrate more reflective, balanced, and ethically grounded judgment than others. Increasingly, researchers have argued that what matters is not only how auditors think, but also how they monitor, regulate, and evaluate their own thinking. This higher-order layer of cognition, generally conceptualized as metacognition, provides a promising foundation for understanding variations in audit judgment, skepticism, self-regulation, and ethical conduct [1-4].

Metacognitive beliefs refer to the assumptions individuals hold about their own cognitive processes, including beliefs about controllability of thought, confidence in judgment, awareness of bias, attention regulation, and the usefulness of reflective monitoring in decision contexts. In the auditing profession, such beliefs may influence how auditors appraise evidence, revise conclusions, resist premature closure, and respond to ambiguity or pressure. The theoretical roots of this concept can be traced to cognitive and self-regulatory perspectives emphasizing that attention, emotion, and performance are shaped not merely by external information but by internal beliefs about thinking itself [1]. When extended to organizational and professional settings, metacognitive beliefs become especially relevant in occupations where judgment quality is contingent on reflective awareness, disciplined skepticism, and ethical restraint. Because auditors constantly move between evidence collection, interpretation, risk assessment, and reporting, metacognitive beliefs may serve as an internal control mechanism that improves both judgment quality and ethical consistency [5-8].

A substantial body of auditing research has shown that professional judgment is not a purely technical output but the result of interactions among experience, skepticism, personality, organizational context, and cognitive regulation. Studies have demonstrated that metacognitive skills improve auditors' capacity for professional judgment by enabling them to scrutinize assumptions, question initial impressions, and reduce susceptibility to cognitive errors [2, 9]. Related work indicates that metacognitive awareness contributes to higher-quality decision-making in auditing because self-monitoring and reflective evaluation help auditors better process contradictory evidence and avoid judgmental shortcuts [7]. Research has also shown that metacognitive beliefs influence audit report quality and professional performance, suggesting that reflective cognition is not merely an individual psychological trait but a professionally consequential capability with measurable effects on audit outcomes [10, 11].

One of the strongest reasons for focusing on metacognitive beliefs in auditing is their relationship with professional skepticism. Skepticism is widely recognized as a cornerstone of audit quality because it compels auditors to critically evaluate evidence, remain alert to misstatement, and resist overreliance on client representations. However, skepticism itself is unevenly enacted in practice, partly because auditors differ in how they regulate doubt, confidence, and cognitive effort. Prior studies suggest that metacognitive beliefs strengthen professional skepticism by making auditors more attentive to the limitations of their own judgments and more willing to revisit their reasoning when uncertainty persists [6, 12, 13]. In this sense, metacognition can be understood as an antecedent mechanism that enables skepticism to operate effectively rather than superficially. Where skepticism is present without reflective cognitive control, auditors may become cynical, rigid, or selective; but where skepticism is supported by metacognitive awareness, judgment is more likely to remain disciplined, adaptive, and evidentially grounded [14-16].

The ethical dimension of auditing further amplifies the importance of metacognitive beliefs. Ethical decision-making in auditing involves more than recognizing formal rules; it requires the integration of professional standards, stakeholder consequences, independence requirements, and contextual moral intensity. Because many audit dilemmas involve ambiguity, competing incentives, and subtle pressures, ethical conduct depends heavily on the auditor's ability to monitor emotional responses, identify bias, and reflect on the implications of different courses of action. Empirical evidence indicates that metacognitive awareness is positively associated with ethical decision-making among auditors, as reflective professionals are better equipped to detect distortions in reasoning and maintain alignment with ethical principles [8, 17, 18]. Broader organizational ethics research also emphasizes that ethical decision-making is influenced by leadership, context, and moral intensity, which implies that individual reflective capacities may mediate how such forces are interpreted and acted upon in practice [19, 20].

The relevance of ethical judgment in auditing has become even more pronounced in light of rising concerns about fraud risk, dark personality traits, opportunistic conduct, and the commercialization of professional service firms. Recent studies have shown that auditors' personal dispositions and ethical characteristics shape their ability to detect fraud, exercise skeptical judgment, and maintain professional objectivity [21-23]. Research on dark personality traits and fraudulent tendencies suggests that dispositional features may compromise judgment quality unless counterbalanced by strong ethical and cognitive self-regulation mechanisms [24, 25]. Likewise, studies of commercialization and subjective well-being in audit firms have highlighted the possibility that market pressures may undermine reflective judgment and professional commitment, thereby increasing the importance of internal regulatory capacities such as metacognitive control [26]. In this context, a framework of auditors' metacognitive beliefs can offer a deeper explanation of why some professionals sustain ethical resilience under pressure while others become more vulnerable to judgmental distortion.

Another major reason for examining this topic is the changing operational environment of auditing. Audit work is increasingly affected by digitalization, remote procedures, ESG-related expectations, and heightened complexity in organizational reporting. For example, transformations in audit processes during and after the COVID-19 period revealed the need for more adaptive, reflective, and technologically integrated judgment practices [27]. Similarly, emerging evidence suggests that broader organizational performance dimensions, such as ESG-related conditions, may influence audit efficiency and timing, thereby placing new demands on auditors' evaluative processes [28]. In such environments, metacognitive beliefs may help auditors regulate attention, evaluate unfamiliar risks, and adapt cognitive strategies to new forms of evidence and engagement. This makes metacognition not simply a psychological topic, but an increasingly strategic issue in contemporary audit quality research [3, 4].

The literature also indicates that audit judgment is shaped by contextual pressures such as workload, time budget constraints, organizational climate, and role expectations. Time pressure and job pressure have repeatedly been shown to affect auditors' judgment quality, sometimes reducing the depth of evidence evaluation and increasing reliance on heuristics [29, 30]. While traditional audit research documents these contextual effects, a metacognitive perspective helps explain how individual auditors respond differently to the same pressures. Those with stronger metacognitive beliefs may be more capable of recognizing when time pressure is distorting their reasoning, reallocating attention, and preserving decision quality. Those with weaker metacognitive control may be more likely to engage in automatic, biased, or ethically compromised responses. Therefore, the study of metacognitive beliefs provides a bridge between structural work conditions and individual judgment performance [7, 9, 31].

Personality research in auditing offers an additional basis for this inquiry. Recent studies have examined the effects of auditor personality type, dark personality traits, and personality-related ethical characteristics on professional performance, fraud risk assessment, and skepticism [13, 23, 25, 32]. These findings suggest that professional judgment cannot be understood independently of the stable psychological dispositions auditors bring to their work. However, personality alone does not fully explain actual behavior in specific audit contexts. Metacognitive beliefs may function as an interpretive and regulatory layer through which personality tendencies are either reinforced or moderated. For instance, a person with strong confidence but low reflective awareness may become overassured, while a person with similar confidence and high metacognitive monitoring may channel it into careful and ethically responsive judgment. This integrative perspective is consistent with work linking personality, ethics, skepticism, and judgment quality in audit settings [15, 16, 21].

Professional development and learning processes also support the relevance of a metacognitive framework. Training, mentoring, and experiential learning have long been recognized as important mechanisms for developing accountants and auditors, not only in technical competence but also in adaptability, commitment, and professional growth [33-36]. More recent auditing studies argue that metacognitive skills can be explicitly strengthened through training interventions, with beneficial effects on professional judgment and development [9, 37]. If metacognitive beliefs are indeed malleable and trainable, identifying their dimensions among auditors becomes highly valuable for both theory and practice. It would allow professional bodies, audit firms, and educators to design interventions that improve self-awareness, reflective skepticism, emotional regulation, and ethical consistency. This potential for development makes the construct especially attractive in applied management and auditing research.

From a methodological standpoint, an important gap remains in the existing literature. Although prior studies have examined the effects of metacognition, skepticism, ethics, personality, and judgment quality, fewer studies have attempted to develop an integrated framework of auditors' metacognitive beliefs grounded in the lived experience of audit professionals and then empirically test its consequences for ethical decision-making. Much of the existing literature is variable-centered and often imports metacognitive constructs from psychology without sufficiently contextualizing them within the realities of auditing practice [5, 20]. Moreover, the auditing profession operates within institutional, social, and organizational structures that shape how beliefs are formed and enacted. Framework-building studies in broader management and public-sector contexts have shown the value of structurally identifying latent dimensions in complex social phenomena before moving to causal modeling [38]. A similar approach is needed in auditing to capture how self-awareness, team coordination, professional learning, and ethical responsibility are interrelated within auditors' metacognitive belief systems.

The present topic is particularly significant in the Iranian and broader regional context, where recent studies have emphasized professional judgment, personality characteristics, fraud-related tendencies, and ethics as salient determinants of audit quality and performance [13, 22, 24, 25, 30, 32]. These studies reveal a fragmented but important body of evidence suggesting that auditors' internal psychological and ethical resources matter greatly for audit effectiveness. Nevertheless, without a coherent metacognitive model, it remains difficult to explain how these different traits and judgments cohere within a broader system of reflective professional functioning. By conceptualizing auditors' metacognitive beliefs as a structured, multidimensional construct, research can move beyond isolated predictors toward a more comprehensive understanding of ethical decision-making in auditing.

The integration of metacognition and ethical decision-making is also theoretically compelling because it connects cognitive self-regulation with moral agency. Ethical failures in auditing are rarely caused by lack of technical knowledge alone; they often emerge when auditors misread situational cues, discount risks, rationalize conflicts of

interest, or fail to critically monitor their own assumptions. Metacognitive beliefs may reduce such failures by encouraging conscious review of evidence, awareness of emotional and contextual influences, and disciplined reconsideration of initial judgments [17, 18, 20]. In this respect, ethical decision-making is not merely the outcome variable of interest but a domain through which the functional value of metacognitive beliefs can be directly observed. If auditors with stronger metacognitive beliefs make more ethical decisions, the profession gains a theoretically justified and practically actionable basis for improving audit quality through reflective capability development [11, 39].

Given these considerations, the need for a comprehensive study is clear. The literature supports the importance of metacognition, skepticism, personality, training, and ethical judgment, but it also reveals the absence of a robust framework tailored specifically to auditors' metacognitive beliefs and their role in ethical decision-making. A study that first identifies the components of these beliefs through qualitative inquiry and then tests their effect quantitatively can make a dual contribution: it can enrich theory by clarifying the internal architecture of reflective professional cognition in auditing, and it can inform practice by identifying leverage points for training, supervision, and standard setting [10, 16, 23, 37]. The aim of the present study is to develop a framework for auditors' metacognitive beliefs and examine their effect on ethical decision-making in the auditing profession.

2. Methodology

This study is classified as an applied-developmental research in terms of its outcome, as it seeks both to design a model of auditors' metacognitive beliefs and to examine their impact on ethical decision-making. From the perspective of research purpose, the study is exploratory due to the emerging nature of the phenomenon under investigation, aiming to identify the components of auditors' metacognitive beliefs through qualitative inquiry. In terms of data type, the study adopts a mixed-methods design, integrating qualitative and quantitative approaches. In the qualitative phase, grounded theory based on the emergent approach proposed by Glaser (1992) was employed to identify the components of auditors' metacognitive beliefs. The statistical population in this phase consisted of academic experts, auditing scholars with professional experience, and members of auditing standard-setting committees. Sampling was conducted using a combination of purposive and snowball techniques, continuing until theoretical saturation was achieved, defined as the point at which no new categories or relationships emerged. Initially, three experts were purposively selected based on their academic publications and professional experience in auditing. Subsequently, additional participants were introduced through snowball sampling, resulting in a total of fifteen interviewees.

In the quantitative phase, the statistical population included auditors working in the Audit Organization and private audit firms during the study period. Due to the absence of precise population statistics, the population was considered infinite. The sample size was determined using Cochran's formula for an unknown population, yielding an estimated sample size of 384 participants. To enhance the reliability of the findings, 450 questionnaires were randomly distributed, of which 409 were returned, and 392 valid responses were retained for analysis. The final analytical sample therefore consisted of 392 auditors, providing an adequate basis for statistical inference.

Data collection in the qualitative phase was conducted through in-depth, unstructured interviews with experts, given the lack of a coherent and integrated framework for auditors' metacognitive beliefs. Interviews were conducted using an open-ended format, allowing participants to elaborate on their experiences and perspectives. The interview process evolved from unstructured to semi-structured and, in some cases, structured formats as initial themes emerged. Questions were continuously refined based on interview dynamics and expert feedback to

ensure alignment with the core phenomenon under investigation. The process involved iterative probing and reciprocal questioning, enabling the extraction of rich and nuanced data.

Following the qualitative phase, the identified components of auditors' metacognitive beliefs were subjected to Delphi analysis to assess their reliability based on criteria such as mean scores, agreement coefficients, and standard deviation. Based on the validated components, a researcher-developed questionnaire was designed to measure auditors' metacognitive beliefs. For the measurement of ethical decision-making, a standardized questionnaire developed by Thiel et al. (2018) was employed. This instrument consists of eight items measured on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The combined use of a researcher-developed instrument and a standardized questionnaire ensured both contextual relevance and measurement validity.

Data analysis in the qualitative phase followed the systematic procedures of grounded theory, including open coding, axial coding, and selective coding. After each interview, data were immediately analyzed to identify initial codes, which were subsequently grouped into categories and higher-order themes. This concurrent data collection and analysis process allowed for continuous refinement of emerging concepts and facilitated the identification of relationships among categories. Open coding was used to extract primary themes from the data, axial coding to organize these themes into coherent components, and selective coding to integrate the components into overarching categories, ultimately leading to the development of a theoretical framework for auditors' metacognitive beliefs. Theoretical saturation was achieved when no new concepts emerged, which occurred around the fourteenth interview, with subsequent interviews confirming the stability of the identified categories.

In the quantitative phase, the reliability of the extracted components was first confirmed through Delphi analysis. Subsequently, structural equation modeling (SEM) using the partial least squares (PLS) approach was employed to test the research hypothesis and examine the effect of auditors' metacognitive beliefs on ethical decision-making. The analysis was conducted using SmartPLS3 software, which is particularly suitable for complex models and exploratory research contexts. This methodological integration enabled a comprehensive and systematic examination of both the structure of metacognitive beliefs and their impact on ethical decision-making among auditors.

3. Findings and Results

To provide an overview of the characteristics of the statistical sample, the demographic information of the research participants is presented in Table 1.

Table 1. Demographic Information of the Study

Variable	Qualitative Section			Quantitative Section		
	Criteria	Frequency	Percentage	Criteria	Frequency	Percentage
Gender	Male	12	80%	Male	318	81.12%
	Female	3	20%	Female	74	18.88%
	Total	15	100%	Total	392	100%
Age	Up to 45 years	2	13%	Up to 45 years	38	9.69%
	46 to 55 years	4	27%	46 to 55 years	289	73.72%
	Above 56 years	9	60%	Above 56 years	65	16.58%
	Total	15	100%	Total	392	100%
Work Experience	Less than 10 years	4	26.67%	Less than 10 years	138	35.20%
	More than 10 years	11	73.33%	More than 10 years	254	64.80%
	Total	15	100%	Total	392	100%

In the qualitative phase, grounded theory analysis was initially employed to identify the components of auditors' metacognitive beliefs. Accordingly, through three stages of open coding, axial coding, and selective coding, an attempt was made to identify the dimensions of the phenomenon under study within a theoretical framework. The results are presented in Table 2.

Table 2. Identification of Components of Auditors' Metacognitive Beliefs

Main Category	Categories	Main Components	Conceptual Themes
Auditors' Metacognitive Beliefs	Enhancement of auditors' professional self-awareness	Role of self-awareness in improving audit quality	Impact of self-awareness on reporting accuracy; Enhancement of professional judgment in a self-aware context; Reduction of cognitive errors in the auditing process
		Risk management in a self-aware environment	Identification of complex risks; Decision-making under uncertainty; Maintaining quality under difficult conditions; Stress management in complex environments
		Improvement of cognitive processes in professional settings	Evaluation of mental processes; Control of cognitive errors; Strengthening self-awareness; Learning from past experiences; Enhancement of cognitive skills
	Professional interactions and team coordination	Team coordination in a self-aware environment	Effective interaction with audit teams; Increased team efficiency; Management of intra-team conflicts; Acceptance of constructive criticism; Use of feedback for performance improvement
		Professional response to criticism and feedback	Acceptance of constructive feedback; Use of feedback for improvement; Enhancement of professional flexibility; Adaptation to changing environments
		Interaction with emerging technologies	Adaptation to advanced technologies; Optimal use of technology; Improvement of accuracy; Increased team efficiency
	Continuous learning and professional development	Professional development in a self-aware environment	Professional training; Enhancement of cognitive skills; Learning from past experiences; Adaptation to changing environments
		Flexibility in organizational changes	Adaptation to changing standards; Flexibility toward new regulations; Adaptation to dynamic environments; Maintaining quality under pressure
	Professional ethics and accountability	Maintaining independence and objectivity	Strengthening independence; Managing conflicts of interest; Maintaining objectivity in reporting
		Social responsibility of auditors	Enhancing accountability; Increasing public trust; Strengthening transparency
		Managing professional pressures	Performance under time pressure; Stress management; Maintaining quality; Decision-making under uncertainty

Based on the analysis and coding of the conducted interviews, four categories, eleven components, and forty-three conceptual codes were identified through the three-stage coding process. Subsequently, the theoretical definitions of the identified categories are presented in Table 3.

Table 3. Definitions of the Categories of the Auditors' Metacognitive Beliefs Model

Category	Definition
Enhancement of auditors' professional self-awareness	This refers to increasing auditors' ability to recognize and understand their strengths and weaknesses, emotions, and their influence on auditing processes. It includes the capacity to evaluate performance, identify cognitive biases, and understand environmental and social influences on decision-making, ultimately improving audit quality and professional judgment.
Professional interactions and team coordination	This refers to communication and collaboration processes among audit team members aimed at improving group performance. It includes information exchange, feedback, and alignment of goals and responsibilities, leading to higher efficiency and reduced conflict.
Continuous learning and professional development	This refers to the ongoing process through which auditors update and enhance their skills, knowledge, and experiences through training, workshops, and continuous education, enabling them to adapt to evolving standards and technologies.
Professional ethics and accountability	This refers to adherence to ethical principles such as integrity, transparency, objectivity, and responsibility toward stakeholders. It includes avoiding conflicts of interest and maintaining professional credibility and public trust.

Subsequently, to assess the reliability of the identified components for questionnaire development, the Delphi analysis process was employed, the results of which are presented in Table 4. The Delphi method serves as a bridge between qualitative and quantitative approaches by enabling the transformation of qualitative components into measurable quantitative indicators through expert consensus and validation. In this study, Delphi analysis was conducted based on two criteria: mean and agreement coefficient. The components were organized into a seven-point questionnaire and distributed among panel members, and through multiple iterative rounds, the reliability of the components was assessed.

Table 4. Delphi Analysis of Identified Components

Category	Component	First Round Mean	First Round Agreement	Second Round Mean	Second Round Agreement	Result
Enhancement of professional self-awareness	Role of self-awareness in audit quality	5.84	0.91	6.04	0.92	Confirmed
	Risk management in self-aware environment	6.05	0.85	5.69	0.84	Confirmed
	Improvement of cognitive processes	5.40	0.70	6.00	0.80	Confirmed
Professional interactions and team coordination	Team coordination	5.30	0.65	5.50	0.75	Confirmed
	Response to feedback	6.01	0.82	5.74	0.84	Confirmed
	Interaction with technology	5.82	0.90	6.11	0.87	Confirmed
Continuous learning and development	Professional development	6.05	0.85	5.69	0.79	Confirmed
	Organizational flexibility	5.40	0.73	6.03	0.83	Confirmed
Professional ethics and accountability	Independence and objectivity	5.30	0.65	5.45	0.81	Confirmed
	Social responsibility	6.01	0.88	5.76	0.79	Confirmed
	Managing professional pressures	5.30	0.67	5.44	0.85	Confirmed

Based on the two criteria of mean and agreement coefficient, all components of the auditors' metacognitive beliefs model were confirmed. In other words, since the mean values of the main components were equal to or greater than 5, and the agreement coefficients exceeded 0.50, all components identified in the qualitative phase

were validated. Therefore, with the confirmation of reliability, the theoretical framework of auditors' metacognitive beliefs can be presented accordingly.

The stages of structural equation modeling were carried out in such a way that the model fit was first examined, including the fit of the measurement models, the structural model fit, and the overall model fit, and then the research hypothesis was tested. In evaluating the measurement models, three criteria were used: reliability, convergent validity, and discriminant validity. To assess the reliability of the research measurement model, factor loadings, Cronbach's alpha coefficients, and composite reliability were employed.

The predictive capability of the model was also evaluated using the nonparametric Stone–Geisser test. Examination of the Q^2 values in Table 6 shows that none of the Q^2 values were negative and that the minimum required values for predictive relevance were satisfied.

Table 5. Goodness-of-Fit Indices

Dimensions	CV.Redundancy (Q^2)	CV.Communality (Q^2)
Professional ethics and accountability	0.852	0.773
Auditors' metacognitive beliefs	……	0.667
Ethical decision-making	0.778	0.807
Professional interactions and team coordination	0.725	0.600
Auditors' professional self-awareness	0.544	0.510
Continuous learning and professional development	0.795	0.500

After establishing the fit of the measurement and structural parts of the present research model, a criterion entitled GOF was used to assess the overall model fit. Three values of 0.01, 0.25, and 0.36 have been introduced as weak, moderate, and strong values for this index, respectively. This criterion is calculated through Equation (1):

$$\mathbf{GOF = \sqrt{(\overline{(Communalities)} \times \overline{(R^2)})}}$$

Here, $\overline{(Communalities)}$ represents the mean of the communality values of the latent variables in the study, and $\overline{(R^2)}$ represents the mean coefficient of determination values of the endogenous variables in the model.

Table 6. Communalities and R^2 Values

Latent Variables	Communality	R^2
Ethical decision-making	0.763	0.561

Table 7. Results of the Overall Model Fit

$\overline{(Communality)}$	$\overline{(R^2)}$	GOF
0.743	0.504	0.733

Given the obtained GOF value of 0.504, the very good fit of the overall model is confirmed. To assess the validity of the measurement instrument, convergent validity and discriminant validity were examined using confirmatory factor analysis and the average variance extracted (AVE). The confirmatory approach evaluates the consistency of the data with a specified factor structure. In fact, confirmatory factor analysis examines the adequacy of the items selected to represent a construct or latent variable. Confirmatory factor analysis is, in essence, an extension of conventional factor analysis and one of the important aspects of structural equation modeling, in which specific hypotheses regarding the structure of factor loadings are tested. According to the criterion proposed by Fornell and Larcker (1981), factor loadings greater than 0.50 indicate acceptable validity. In addition, the average variance extracted among constructs should also be greater than or equal to 0.50. Based on the results of the present study, all factor loadings were at least 0.70. Therefore, the convergent validity of the data in this section is fully confirmed.

Furthermore, the t-statistic values for all variables were greater than 1.96, indicating their significant effect on the corresponding construct.

Table 8. Factor Loadings and t-Statistics of the Questionnaire Items

Variables	Components	Factor Loading	t-Statistic
Metacognitive beliefs	Enhancement of auditors' professional self-awareness	0.924	87.732
		0.933	12.784
		0.788	35.950
	Professional interactions and team coordination	0.888	41.955
		0.920	77.220
		0.945	19.468
	Continuous learning and professional development	0.939	92.970
		0.943	14.482
	Professional ethics and accountability	0.986	52.757
		0.972	30.686
		0.981	54.498
Ethical decision-making		0.955	97.661
		0.961	44.463
		0.967	85.275
		0.973	98.870
		0.963	93.975
		0.960	29.728
		0.825	27.890
		0.970	53.057

As shown in Table 8, the average variance extracted for all variables was above 0.50 and at an acceptable level. Therefore, the convergent validity of the constructs in this section is also confirmed. Furthermore, the composite reliability and Cronbach's alpha coefficients obtained for all constructs indicate that the internal consistency of the construct measurement models is at a desirable level.

Table 9. Convergent Validity and Reliability

Dimensions	Cronbach's Alpha	Rho	Composite Reliability	AVE
Professional ethics and accountability	0.979	0.979	0.986	0.959
Auditors' metacognitive beliefs	0.968	0.973	0.972	0.763
Ethical decision-making	0.984	0.986	0.986	0.899
Professional interactions and team coordination	0.907	0.914	0.941	0.843
Auditors' professional self-awareness	0.857	0.857	0.914	0.782
Continuous learning and professional development	0.871	0.871	0.939	0.885

To examine discriminant validity, the Fornell and Larcker (1981) method was used. According to this method, if the square root of the average variance extracted (AVE) for each construct is greater than the correlation values between that construct and the other constructs, discriminant validity is confirmed. Table 11 presents the results of the average variance among constructs test (discriminant validity assessment). The diagonal values are the square roots of the AVE values.

Table 10. Average Variance Among Constructs (Assessment of Discriminant Validity)

Constructs	1	2	3	4	5	6
Professional ethics and accountability	0.979					
Auditors' metacognitive beliefs	0.970	0.873				
Ethical decision-making	0.973	0.965	0.948			
Professional interactions and team coordination	0.899	0.955	0.936	0.918		
Auditors' professional self-awareness	0.776	0.860	0.747	0.736	0.884	
Continuous learning and professional development	0.945	0.968	0.947	0.942	0.748	0.941

As shown in Table 10, the R^2 values for the latent variables of the model indicate the extent to which the dependent variables are affected by the independent variable. Accordingly, 56.1% of the variance in ethical decision-making is explained by auditors' metacognitive beliefs.

Table 11. R^2 Values of the Research Model

Dimensions	Coefficient of Determination	Adjusted Coefficient of Determination
Ethical decision-making	0.561	0.560

After examining the fit of the measurement models and the structural model and confirming the acceptable fit of the overall model, and with reference to Figures 1 and 2, the results of the research hypothesis test were examined. These results are presented in Table 12.

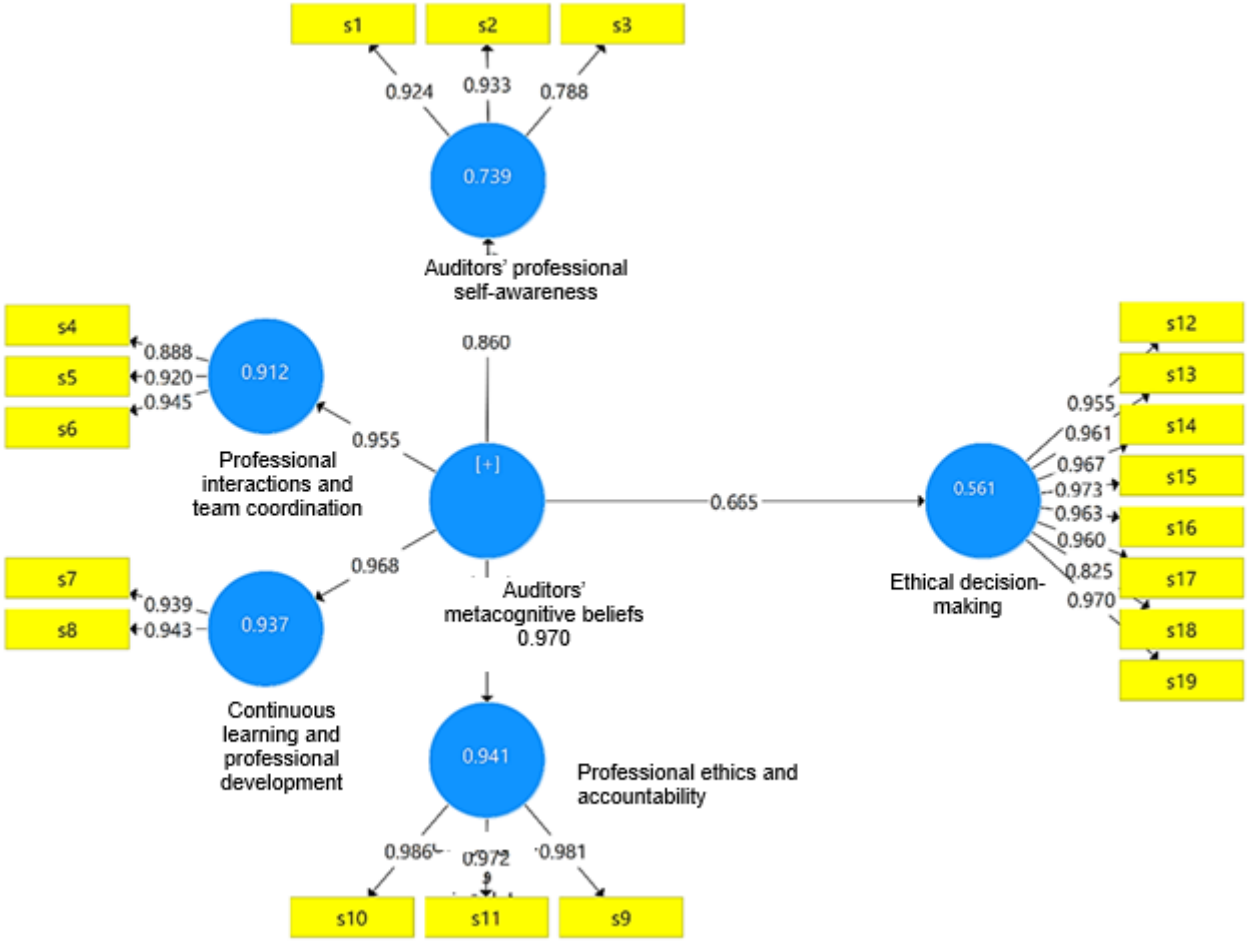

Figure 1. Structural model of the research hypothesis with factor loading coefficients

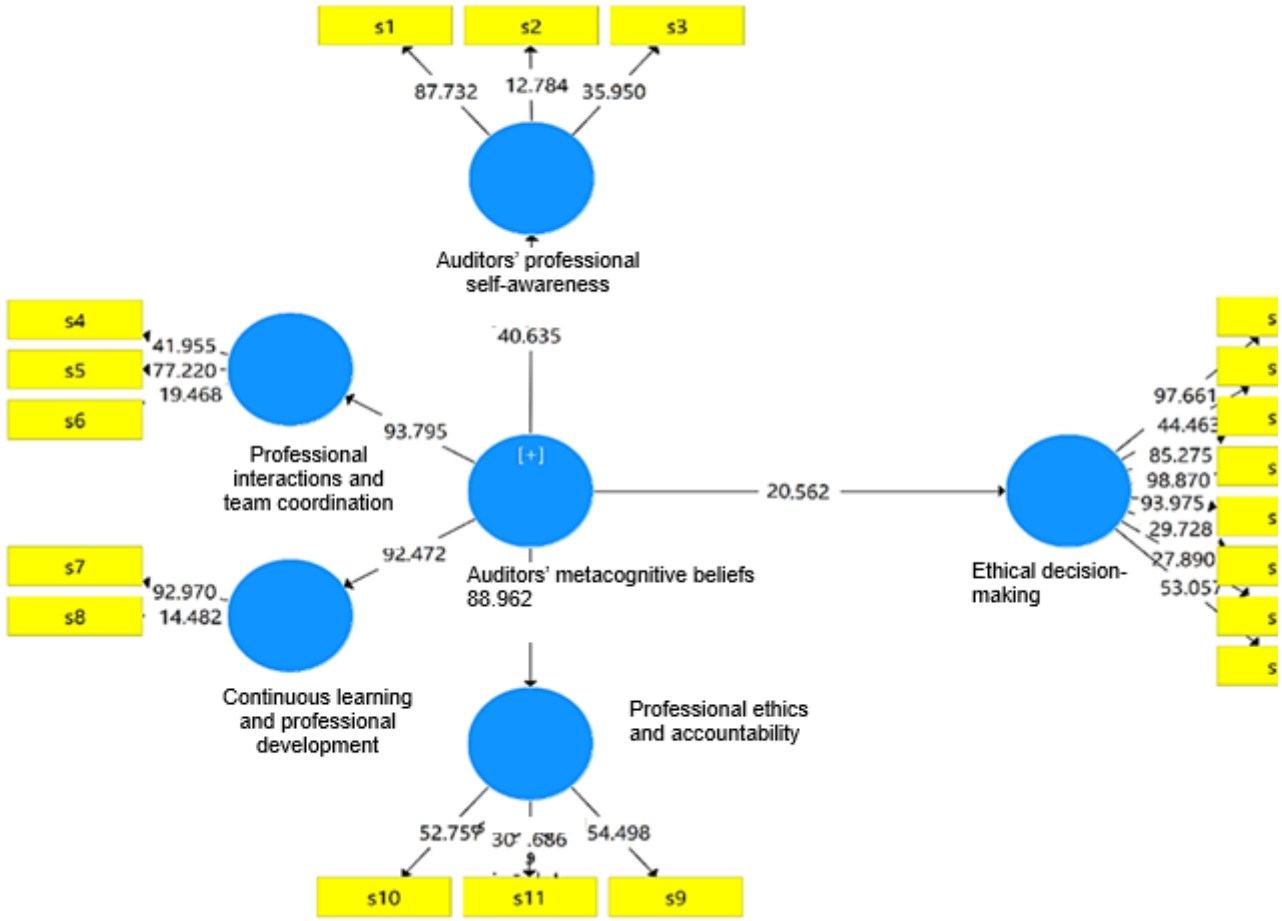

Figure 2. Structural model of the research hypothesis with t-statistic values

Based on the structural model and factor loading coefficients, the result of the research hypothesis test can be observed in Table 12.

Table 12. Results Related to the Test of the Research Hypothesis

Research Hypothesis	Description	Path Coefficient (β)	Significance (T-Value)	Test Result
Research hypothesis	Auditors' metacognitive beliefs have a significant effect on ethical decision-making.	0.665	20.562	Hypothesis confirmed

According to Figures 1 and 2, the standardized coefficient (path coefficient) indicates that auditors' metacognitive beliefs have a positive and significant effect on ethical decision-making, since the path coefficient is 0.665 and the t-statistic is 20.562. Given that this value is greater than 1.96, the research hypothesis is confirmed.

4. Discussion and Conclusion

The findings of the present study provide strong empirical support for the central proposition that auditors' metacognitive beliefs exert a positive and statistically significant effect on ethical decision-making. The structural model results indicated that metacognitive beliefs explain a substantial proportion of the variance in ethical decision-making, confirming that higher levels of reflective awareness, cognitive monitoring, and self-regulation are associated with more ethically grounded professional judgments. The magnitude of the path coefficient and the high t-statistic demonstrate not only statistical significance but also practical relevance, suggesting that

metacognitive beliefs are a core determinant of how auditors navigate complex ethical dilemmas in professional contexts. These results align with the conceptualization of auditing as a cognitively intensive and ethically sensitive profession, in which decision quality depends heavily on the ability to critically evaluate one's own reasoning processes.

The qualitative findings further enrich this interpretation by identifying four overarching categories—enhancement of professional self-awareness, professional interactions and team coordination, continuous learning and professional development, and professional ethics and accountability—that collectively constitute the structure of auditors' metacognitive beliefs. The emergence of these categories indicates that metacognition in auditing is not limited to individual cognitive monitoring but extends to interpersonal, developmental, and ethical dimensions of professional practice. In particular, the prominence of self-awareness highlights the importance of auditors' ability to recognize their own cognitive biases, emotional responses, and judgmental limitations. This finding is consistent with prior research emphasizing that metacognitive awareness improves decision quality by enabling auditors to detect and correct cognitive errors [7, 14]. It also supports the argument that reflective cognition enhances professional judgment by fostering deliberate reasoning rather than automatic responses [2, 9].

The role of professional interactions and team coordination as a key dimension of metacognitive beliefs suggests that reflective thinking in auditing is socially embedded. Auditors do not operate in isolation; rather, they engage in collaborative environments where judgments are discussed, challenged, and refined. The findings indicate that effective interaction with team members, openness to feedback, and the ability to integrate diverse perspectives contribute to the development of metacognitive awareness and, consequently, to ethical decision-making. This result is consistent with prior studies highlighting the importance of communication, feedback mechanisms, and team dynamics in enhancing audit quality and judgment accuracy [18, 27]. Moreover, the acceptance of constructive criticism and the use of feedback for performance improvement reflect a metacognitive orientation that encourages continuous evaluation of one's reasoning processes, thereby strengthening ethical consistency in decision-making.

The identification of continuous learning and professional development as a core category underscores the dynamic nature of metacognitive beliefs. Auditors who actively engage in learning processes, update their knowledge, and reflect on past experiences are more likely to develop adaptive cognitive strategies and maintain high standards of ethical conduct. This finding aligns with research demonstrating that training and professional development programs can enhance metacognitive skills and improve judgment quality in auditing contexts [9, 37]. It also resonates with broader literature on career development and professional growth, which emphasizes the role of learning orientation in fostering adaptability, resilience, and effective decision-making [33-35]. By linking continuous learning to metacognitive beliefs, the present study provides a theoretical explanation for why ongoing professional development contributes to ethical decision-making beyond mere technical competence.

The category of professional ethics and accountability represents the normative dimension of metacognitive beliefs and highlights the integration of cognitive and moral processes in auditing. The findings indicate that auditors who exhibit higher levels of independence, objectivity, and social responsibility are more likely to engage in ethical decision-making. This result is consistent with prior studies demonstrating that ethical orientation and professional responsibility are critical determinants of audit judgment and fraud detection capabilities [21-23]. Furthermore, the emphasis on managing professional pressures, such as time constraints and organizational demands, suggests that metacognitive beliefs enable auditors to maintain ethical standards even under challenging conditions. This finding supports the view that metacognitive awareness acts as a buffer against the negative effects of job pressure on judgment quality [29, 30].

The quantitative results confirming the positive relationship between metacognitive beliefs and ethical decision-making are consistent with a growing body of empirical evidence in the auditing literature. Studies have shown that metacognitive awareness enhances auditors' ability to evaluate evidence critically, reduces susceptibility to biases, and improves the overall quality of audit judgments [7, 10]. Similarly, research has demonstrated that metacognitive beliefs influence ethical behavior by promoting reflective thinking and moral reasoning [8, 18]. The present study extends these findings by providing a comprehensive model that integrates multiple dimensions of metacognition and empirically validates their collective impact on ethical decision-making.

The results also highlight the mediating role of ethical decision-making in the relationship between metacognitive beliefs and professional judgment, as suggested in previous studies. For example, it has been argued that metacognitive beliefs enhance professional judgment indirectly by improving ethical decision-making processes [20]. In this regard, the present study provides empirical support for the theoretical linkage between cognitive self-regulation and ethical outcomes, reinforcing the notion that ethical decision-making is not merely a function of external rules but also of internal cognitive mechanisms. This perspective is particularly relevant in auditing, where ethical dilemmas often involve ambiguity and require auditors to rely on their judgment rather than explicit guidelines.

Another important implication of the findings is the interaction between metacognitive beliefs and personality characteristics. Prior research has shown that personality traits, including dark personality traits, can influence auditors' judgment and susceptibility to fraud-related behaviors [24, 25]. The present study suggests that metacognitive beliefs may moderate these effects by providing a mechanism for self-regulation and bias correction. In other words, auditors with strong metacognitive beliefs may be better equipped to manage the influence of their personality traits on decision-making, thereby enhancing ethical outcomes. This interpretation is consistent with studies linking personality, skepticism, and professional judgment in auditing [13, 15, 32].

The findings also have implications for understanding the role of professional skepticism in auditing. Metacognitive beliefs are closely related to skepticism, as both involve critical evaluation of evidence and resistance to premature conclusions. Research has shown that metacognitive beliefs enhance skepticism by increasing awareness of cognitive limitations and encouraging thorough analysis of information [6, 12]. The present study supports this view by demonstrating that auditors with higher metacognitive awareness are more likely to engage in ethical decision-making, which often requires skeptical evaluation of evidence and consideration of alternative explanations. This suggests that metacognitive beliefs and skepticism are complementary constructs that jointly contribute to audit quality.

In addition, the results can be interpreted in light of recent developments in the auditing environment, including increased complexity, technological advancements, and heightened regulatory expectations. Studies have shown that factors such as ESG performance, audit process transformations, and digitalization are reshaping the nature of auditing and placing new demands on auditors' cognitive and ethical capabilities [27, 28]. The present study suggests that metacognitive beliefs can help auditors adapt to these changes by enhancing their ability to process complex information, evaluate risks, and make informed decisions. This highlights the relevance of metacognition as a strategic capability in modern auditing practice.

Finally, the study contributes to the broader literature on decision-making by demonstrating the importance of integrating cognitive and affective factors in understanding professional behavior. Research in affective neuroscience has emphasized the role of emotions in decision-making, suggesting that cognitive processes are influenced by emotional states and contextual factors [3]. The present study extends this perspective by showing

that metacognitive beliefs enable auditors to regulate both cognitive and emotional influences, thereby improving ethical decision-making. This integrative approach provides a more comprehensive understanding of how auditors make decisions in complex and uncertain environments.

One limitation of the present study is that it relies on self-reported data collected through questionnaires, which may be subject to social desirability bias and may not fully capture actual behavior in real audit settings. Another limitation relates to the cross-sectional design of the quantitative phase, which restricts the ability to draw causal inferences over time. Additionally, although the qualitative phase provided rich insights into the components of metacognitive beliefs, the sample size was relatively limited, which may affect the generalizability of the findings. Finally, the study was conducted within a specific institutional and cultural context, and the results may not be fully applicable to other countries or auditing environments.

Future research can build on the findings of this study by employing longitudinal designs to examine how metacognitive beliefs develop over time and how they influence ethical decision-making in dynamic contexts. Experimental studies could also be conducted to test the causal effects of metacognitive training interventions on auditors' judgment and behavior. Furthermore, future studies may explore the interaction between metacognitive beliefs and other variables, such as organizational culture, leadership style, and technological adoption, to provide a more comprehensive understanding of audit quality. Comparative studies across different cultural and regulatory contexts could also offer valuable insights into the generalizability of the proposed model.

From a practical perspective, the findings of this study suggest that audit firms and professional bodies should place greater emphasis on developing auditors' metacognitive skills as part of their training and development programs. This may involve incorporating reflective practices, critical thinking exercises, and feedback mechanisms into professional education. Organizations can also foster supportive work environments that encourage open communication, collaboration, and continuous learning, thereby enhancing auditors' metacognitive awareness. Additionally, policymakers and standard-setters may consider integrating metacognitive competencies into auditing standards and guidelines to promote ethical decision-making and improve audit quality.

Authors' Contributions

Authors equally contributed to this article.

Ethical Considerations

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

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Conflict of Interest

The authors report no conflict of interest.

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