Development of the Cognitive Flexibility Framework of Auditors: A Qualitative Thematic Analysis Approach

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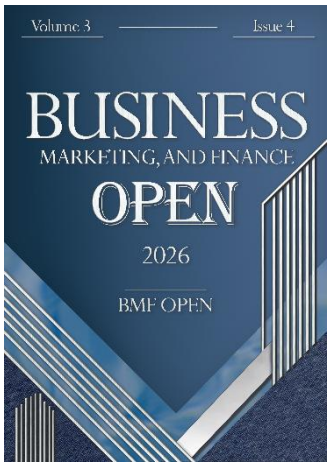

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Abstract: In the contemporary era, where rapid changes have challenged traditional decision-making rules, cognitive flexibility has emerged as the backbone of mental adaptability; a dynamic construct that redefines the boundary between static cognitive abilities and transformative competencies. By exploring the latent layers of this key concept, the present study provides a novel framework for understanding cognitive mechanisms in highly demanding professional environments; therefore, this research examines the cognitive flexibility of auditors through thematic analysis. From a methodological perspective, this study is exploratory in nature. Due to the absence of a coherent framework regarding auditors' cognitive flexibility, thematic analysis was employed to identify relevant themes through an in-depth review of prior research and expert interviews. Subsequently, the Delphi analysis method was utilized to assess the reliability of the identified dimensions, ultimately enabling the design of a cognitive flexibility model grounded in strategic management and stakeholder theory perspectives. The statistical population of the study consisted of 14 academic experts and auditing professors with recognized expertise and professional experience in auditing, as well as members of the Auditing Standards-Setting Committee in 2025, who were selected using purposive sampling with a snowball approach. The results of the study revealed three overarching themes (auditors' cognitive constructs, flexible mental frameworks, and professional cognitive requirements), eight organizing themes (analytical agility in auditing, adaptability in ambiguity, dynamism in professional judgments, flexibility in interpreting standards, transformation in control evaluation, evolution of evidence collection methods, team metacognitive capacities, and adaptive learning in auditing), and 48 basic themes. Furthermore, to evaluate the reliability of the identified organizing themes and to conceptualize them within the context of auditors' cognitive flexibility, Delphi analysis was conducted. Based on the evaluation of the mean scores from the first and second Delphi rounds, all dimensions were confirmed, leading to the development of the cognitive flexibility model. These findings not only enrich the existing literature on professional cognition but also represent a significant step toward establishing a systematic framework for understanding cognitive complexity in professional environments. The analysis of the identified themes provides a novel lens for understanding auditors' mental mechanisms and opens new avenues for interdisciplinary research at the intersection of cognitive psychology and professional auditing.

Keywords: Cognitive flexibility, cognitive constructs, mental frameworks, professional cognitive requirements.

1. Introduction

The auditing profession operates within an increasingly complex and dynamic environment characterized by rapid technological transformation, regulatory evolution, and heightened stakeholder expectations. Auditors are required to interpret vast volumes of financial and non-financial information, evaluate ambiguous evidence, and make high-stakes professional judgments under conditions of uncertainty and time pressure. These demands place significant cognitive burdens on auditors and require advanced mental capabilities beyond technical knowledge alone. In this context, cognitive flexibility has emerged as a critical cognitive capacity that enables professionals to adapt their thinking, revise analytical strategies, and respond effectively to changing situational demands. Cognitive flexibility refers to the ability to shift between cognitive sets, reframe mental representations, and adapt behavior in response to novel or complex environments [1-3]. This ability is increasingly recognized as a core component of adaptive expertise, enabling individuals to integrate diverse sources of information, resolve contradictions, and optimize decision-making in complex professional settings [4-6].

From a cognitive and neuropsychological perspective, cognitive flexibility is supported by executive control processes that enable individuals to inhibit rigid responses, update mental models, and shift attention across competing stimuli. These mechanisms allow professionals to adjust cognitive strategies dynamically when confronted with new evidence or unexpected changes in their environment [4, 7, 8]. Cognitive flexibility is not merely a passive trait but an active regulatory process involving metacognitive monitoring, adaptive learning, and the integration of experience into decision-making frameworks [1, 5]. Research has demonstrated that cognitive flexibility is closely associated with intelligence, adaptive reasoning, and effective problem-solving, particularly in environments characterized by uncertainty and complexity [9-11]. In professional domains such as auditing, where decision-making often involves incomplete information and competing interpretations, cognitive flexibility plays a vital role in ensuring analytical accuracy and professional reliability.

Auditing, by its very nature, is a cognitively demanding profession that requires continuous interpretation, judgment, and adaptation. Auditors must evaluate financial statements, assess internal controls, identify fraud risks, and provide assurance regarding financial integrity. These tasks require the ability to revise hypotheses, integrate new evidence, and balance skepticism with objectivity. Cognitive processes such as metacognitive awareness, cognitive control, and analytical adaptability directly influence the quality of audit judgments and professional performance [12-14]. Metacognitive capabilities allow auditors to monitor their own reasoning processes, identify cognitive biases, and adjust their analytical approaches accordingly [15-17]. These cognitive mechanisms are essential for ensuring that audit judgments remain objective, evidence-based, and resistant to error.

Empirical research has demonstrated that auditors' cognitive characteristics significantly influence audit quality, fraud detection, and professional skepticism. Cognitive styles, personality traits, and metacognitive beliefs shape how auditors interpret information, evaluate risks, and make professional judgments [18-20]. For example, metacognitive awareness has been shown to improve auditors' ability to evaluate evidence critically and reduce cognitive errors in judgment [13, 15]. Similarly, professional skepticism—an essential component of audit quality—is influenced by cognitive flexibility and adaptive reasoning, enabling auditors to question assumptions and detect anomalies in financial reporting [21, 22]. These findings highlight the central role of cognitive processes in ensuring audit effectiveness and professional accountability.

The increasing complexity of modern audit environments further amplifies the importance of cognitive flexibility. Advances in digital technologies, data analytics, and automated systems have transformed audit

procedures and introduced new forms of evidence and risk. Auditors must adapt to these technological changes, integrate advanced analytical tools, and interpret complex digital data structures. The transformation of audit processes, particularly in response to digitalization and external disruptions such as global crises, has required auditors to develop new cognitive and analytical capabilities [5, 23, 24]. These developments highlight the need for flexible cognitive frameworks that enable auditors to navigate technological complexity and maintain professional effectiveness.

Moreover, auditors operate within organizational and psychological contexts that influence their cognitive functioning and decision-making processes. Factors such as time pressure, workload, emotional stress, and professional expectations can significantly affect auditors' cognitive performance and judgment quality. Research has shown that time budget pressure, experience, and competence directly influence audit judgment and decision accuracy [25, 26]. Similarly, auditors' well-being, psychological resilience, and emotional stability play a crucial role in maintaining cognitive effectiveness and audit quality [27-29]. Cognitive flexibility serves as a protective mechanism that enables auditors to manage stress, adapt to workload demands, and maintain analytical clarity under pressure.

Personality traits and psychological characteristics also contribute to auditors' cognitive functioning and professional performance. Individual differences in personality, ethical orientation, and cognitive style influence auditors' ability to interpret evidence, maintain objectivity, and resist bias. Research indicates that professional competence, ethical awareness, and psychological characteristics significantly affect audit quality and professional judgment [30-32]. Dark personality traits and cognitive biases can impair auditors' ability to evaluate risks accurately, increasing the likelihood of judgment errors and ethical failures [33-35]. Cognitive flexibility helps mitigate these risks by enabling auditors to reconsider assumptions, update mental models, and engage in reflective reasoning.

Cognitive flexibility is also closely linked to learning, adaptation, and professional development. In dynamic professional environments, auditors must continuously update their knowledge, acquire new skills, and adapt to evolving standards and regulatory requirements. Adaptive learning processes enable auditors to refine their cognitive strategies and improve their decision-making capabilities over time [10, 11]. Multidisciplinary research has shown that cognitive flexibility enhances problem-solving ability, learning efficiency, and performance in complex professional contexts [1, 36, 37]. These capabilities are particularly important in auditing, where continuous learning and adaptation are essential for maintaining professional competence.

The role of cognitive flexibility in auditing is further reinforced by its relationship with metacognitive regulation and professional skepticism. Metacognitive processes enable auditors to evaluate their reasoning, detect errors, and adjust their analytical approaches in response to new information [12, 16]. Professional skepticism requires auditors to maintain a questioning mindset, evaluate evidence critically, and avoid premature conclusions. Cognitive flexibility supports these processes by enabling auditors to shift perspectives, reconsider assumptions, and integrate diverse sources of information [14, 22]. These cognitive mechanisms are essential for ensuring audit reliability and protecting stakeholders' interests.

Despite the recognized importance of cognitive flexibility in professional decision-making, existing research has largely focused on individual cognitive traits, metacognitive awareness, and professional judgment in isolation. Few studies have attempted to develop a comprehensive conceptual framework that integrates cognitive constructs, flexible mental frameworks, and professional cognitive requirements within the context of auditing. Most prior research has examined specific cognitive variables, such as metacognitive awareness, personality traits,

or professional skepticism, without addressing the broader cognitive architecture underlying auditors' adaptive capabilities [13, 18, 21]. Furthermore, while interdisciplinary research has explored cognitive flexibility in psychology and neuroscience, its application within auditing remains fragmented and underdeveloped [1, 4, 6].

This gap in the literature highlights the need for a systematic framework that conceptualizes cognitive flexibility as an integrated cognitive capability encompassing analytical adaptability, metacognitive regulation, and adaptive learning. Such a framework would provide a deeper understanding of the cognitive mechanisms underlying auditors' professional performance and support the development of training programs, audit methodologies, and professional standards designed to enhance cognitive effectiveness. By identifying the cognitive dimensions that enable auditors to adapt to complexity, uncertainty, and technological transformation, this research can contribute to both theoretical advancement and practical improvement in auditing practice [10, 23, 24].

Therefore, the aim of this study is to develop a comprehensive conceptual framework for auditors' cognitive flexibility by identifying and structuring its global, organizing, and basic themes using thematic analysis and expert validation.

2. Methodology

The methodological nature of the present study is classified as developmental in terms of outcome, because no prior study has attempted to provide a comprehensive framework for auditors' cognitive flexibility. Conducting this study can contribute to the conceptual integration of the phenomenon under investigation. Furthermore, based on its objective, this research falls within the category of exploratory studies, as it seeks to identify basic, organizing, and overarching themes related to auditors' cognitive flexibility through expert interviews and three-stage coding. Finally, from the perspective of data collection, this study combines both qualitative and quantitative analytical approaches. The philosophical foundation of the study is based on the intersection of voluntarism in the philosophy of reality and structuralism in the philosophy of science; therefore, the underlying philosophical orientation of the research adopts a combined inductive–deductive approach.

To collect data, semi-structured in-depth interviews were conducted, and the snowball sampling technique—one of the purposive sampling methods—was used to identify experts. The rationale for using semi-structured interviews is that, in addition to allowing for the exchange of ideas and perspectives, they enable the researcher to guide the discussion and interview topics toward achieving the research objectives. Moreover, during the interview process, it is possible to observe participants' emotional responses and gain insight into their beliefs and perceptions regarding the research topic.

The research data were collected using both documentary (library-based) methods and semi-structured interviews with experts. The use of semi-structured interviews allows not only the exchange of opinions and ideas but also enables the researcher to direct the conversation toward achieving the research objectives. In addition, during the interview process, researchers can examine participants' perspectives and gain access to their underlying beliefs regarding the research subject. Therefore, the statistical population in the qualitative phase consisted of academic experts and auditing professors with professional experience in auditing, as well as members of the Auditing Standards-Setting Committee. The sampling method employed was snowball sampling.

Accordingly, in the first stage, three individuals were selected from among the statistical population based on their published research in relevant areas or their recognized academic and professional expertise. In the second stage, each of the initial experts introduced other qualified individuals who, based on their expertise and experience, could contribute to the research. This process continued until theoretical saturation was achieved.

Ultimately, based on the information presented in Table 1, 14 experts participated in the study upon reaching theoretical saturation at the end of the interview process. Furthermore, to identify the general themes of cognitive flexibility dimensions, published articles and books were reviewed from databases such as the Scientific Information Database (SID) in Iran, the Iranian Journals Database, the Noor Specialized Islamic Sciences Computer Research Center (NOORSOFT), ScienceDirect, Emerald Insight, and Wiley Online Library.

The demographic characteristics of the research participants are presented in Table 1.

Table 1. **Demographic Characteristics of Research Experts**

Variable	Group	Frequency	Percentage
Gender	Male	11	0.79
	Female	3	0.21
	Total	14	1.00
Age	Up to 45 years	2	0.14
	46–55 years	4	0.29
	Above 56 years	8	0.57
	Total	14	1.00
Auditing Experience	10–20 years	3	0.21
	21–30 years	7	0.50
	More than 30 years	4	0.29
	Total	14	1.00
Education Level	PhD	14	1.00
	Master's degree	0	0.00
	Total	14	1.00
Organizational Position	Senior Auditor	6	0.43
	Audit Manager	5	0.36
	Board Member	3	0.21
	Total	14	1.00
Number of Publications	5–10 articles	5	0.36
	11–20 articles	6	0.43
	More than 20 articles	3	0.21
	Total	14	1.00

The analysis of the demographic characteristics of the research sample indicates an imbalanced gender distribution, with a notable predominance of male participants (79%) compared to female participants (21%), which may reflect the gender structure of senior-level auditing professionals. In terms of age distribution, more than half of the respondents (57%) were over 56 years old, while only 14% were under 45 years old. This age pattern, combined with substantial professional experience (50% with 21–30 years of experience and 29% with more than 30 years), indicates the predominance of highly experienced experts in the research sample.

A notable finding is the uniform doctoral-level education among all participants (100%), which emphasizes the high academic standing of the sample. Regarding organizational position, senior auditors represented the largest proportion (43%), followed by audit managers (36%) and board members (21%). In terms of scholarly output, the pattern of academic productivity indicates significant research engagement, with 43% having published between 11 and 20 articles and 21% having published more than 20 scientific articles. Overall, these demographic characteristics present a unique sample consisting of senior specialists with extensive professional experience and strong academic backgrounds in auditing.

To assess the validity of the study, evaluation methods appropriate for qualitative research were employed. Since qualitative research emphasizes subjectivity and interpretation rather than objectivity (Haqq et al., 2017),

validity and reliability in qualitative research are defined in terms of trustworthiness and confirmability. To achieve this objective, qualitative researchers employ a range of techniques—including interviews, observations, images, documents, and records—to systematically document their observations.

Guba and Lincoln (1985) proposed the concept of dependability instead of reliability in qualitative research. In the present study, internal validity was evaluated by ensuring alignment between findings and reality. Interviews were conducted over relatively extended durations (between 30 and 60 minutes). At the end of each question and after receiving responses, the researcher verified their interpretation by asking participants clarifying questions such as: "Do you mean that…?" If participants disagreed with the interpretation, they were asked to provide additional clarification to ensure accurate understanding. Furthermore, interviews were audio-recorded, which enhanced data credibility.

Researcher triangulation was employed to evaluate the credibility of the study. This approach involves using more than one researcher in the data collection, analysis, or interpretation process. To assess reliability, the level of agreement between coders (researchers) was examined. All interview and coding stages were conducted independently and in parallel by two researchers, resulting in consistent outcomes.

Additionally, approximately 20% of the interview data (four interviews) were recoded by a second researcher familiar with qualitative research methods and knowledgeable about the research topic. The percentage of agreement between coders was calculated, reflecting inter-coder reliability. The formula used was:

$$Reliability\ Percentage = \frac{2 \times Number\ of\ Agreements}{Total\ Number\ of\ Codes} \times 100$$

The results are presented in Table 2.

Table 2. Inter-Coder Reliability Calculation During the Interview Coding Phase

Interview Number	Total Number of Codes	Number of Agreements	Number of Disagreements	Inter-Coder Reliability (%)
3	37	17	3	89.91
4	31	13	5	87.83
8	34	16	2	94.12
12	38	18	2	94.74
Total	140	64	12	91.43

As shown in Table 2, the overall agreement rate among extracted codes was 91%, which exceeds the acceptable threshold of 60% and therefore indicates satisfactory coding reliability (Coyle, 1996). It should be noted that the number of extracted codes presented in the table pertains only to the subset of interviews selected for reliability evaluation using the researcher triangulation method.

3. Findings and Results

After collecting the data through interviews, the required analyses for contextualizing (localizing) the data were conducted using thematic analysis. Table 3 presents the process of thematic analysis and thematic network analysis in three phases, six steps, and twenty actions.

Table 3. Step-by-Step Process of Thematic Analysis and Thematic Network Analysis

Phase	Step	Action(s)

1. Text segmentation and description	Becoming familiar with the text	• Transcribing the data (if necessary) • Initial reading and repeated reading of the data • Writing initial ideas
1. Text segmentation and description	Generating initial codes and coding	• Proposing a coding framework and preparing the thematic template • Breaking the text into smaller segments • Coding interesting features of the data
1. Text segmentation and description	Searching for and identifying themes	• Mapping codes onto the thematic template • Extracting themes from coded segments of the text • Refining and reviewing themes
2. Text explanation and interpretation	Mapping the thematic network	• Examining and controlling coherence between themes and extracted codes • Organizing themes • Selecting basic, organizing, and global themes • Drawing thematic networks • Revising and validating thematic networks
2. Text explanation and interpretation	Analyzing the thematic network	• Defining and naming themes • Describing and explaining the thematic network • Summarizing the thematic network and presenting it concisely and clearly
3. Text synthesis and integration	Writing the report	• Extracting illustrative (interesting) data excerpts • Linking analysis results to research questions and theoretical foundations • Writing a scientific and specialized report of the analyses

As noted, this study applied a comprehensive and step-by-step process based on Attride-Stirling's thematic analysis approach, as described below.

1. Becoming familiar with the text: This step constitutes the backbone of the subsequent stages. The researcher must immerse themselves in the data to become fully acquainted with their depth and richness.
2. Generating initial codes and coding: This step is interpretively critical. The extracted codes were either stated explicitly by interviewees or were implicitly derived by the researcher from the interview texts.
3. Searching for and identifying themes: In this step, codes are analyzed, and attention is directed toward how different codes are combined and integrated to form a basic theme. Through further refinement and re-examination, efforts are made to ensure that themes are sufficiently broad, non-redundant, and distinctive.
4. Mapping the thematic network: In this step, the themes derived from the text are categorized into coherent and similar groups. The data within each theme must be conceptually and semantically consistent. Thematic networks are particularly useful for simultaneously focusing on different variables and reviewing analyzable information.
5. Analyzing the thematic network: After constructing the thematic networks, the researcher must return to the original text and interpret it using these networks (Attride-Stirling, 2001). The researcher selected specific labels for the themes. Theme naming was performed based on their content and the researcher's judgment.
6. Writing the report: The written report must provide adequate and appropriate evidence regarding the themes present in the data. The purpose is to revisit the research questions and the implicit theories embedded in them so that, through deep discussion and examination of the patterns obtained from text explanation, the main research questions can be answered (Attride-Stirling, 2001).

In this section, through an in-depth examination of similar studies, certain themes related to the auditors' cognitive flexibility model must first be specified via content screening. For this purpose, in three preliminary stages of content evaluation—title, content, and analysis—actions were taken to determine the extent of similar research. Accordingly, in order to identify global themes, a list of concepts that may be considered in identifying similar studies was first presented in Table 4, based on which studies were identified for determining overarching themes.

Table 4. Keyword Search Terms Used to Select Similar Studies

Persian term	English term

یادگیری انطباقی	Adaptive learning
شایستگی شناختی	Cognitive competence
راهبردهای کنترلی	Control strategies
ظرفیت‌های فراشناختی	Metacognitive capacities
انطباق پذیری هیجانی	Emotional adaptability
انطباق‌پذیری در ابهامات	Adaptability to ambiguity

Accordingly, based on the identified keywords for the auditors' cognitive flexibility model, domestic and international research databases and sources were used to locate similar studies for determining global themes. In total, 25 primary sources were initially identified; after several screening stages based on content, title, and analytic approach, 13 studies consistent with the content, title, and analytical processes of this research were selected.

At this stage, concepts had to be differentiated based on global themes, so that basic and organizing themes could be developed through interviews. In this analysis, and through a critical appraisal method with the participation of research experts, dimensions and propositional themes were determined based on criteria such as research objectives, methodological logic, research design, sampling, data collection, reflexivity, rigor of analysis, theoretical articulation, clarity of findings, and research value, as well as the research keywords presented above.

Table 5. Appraisal Process for the Confirmed Studies

Studies / Criteria	(Sachs & Widge, 2025)	(Goldin et al., 2025)	(Sanderbrink & Summerfield, 2024)	(Hauptman et al., 2024)	(Kopis & Odin, 2023)	(Andalib et al., 2023)	(Martínez & Gonçalves, 2022)	(Saputra et al., 2022)	(Berny & Beckman, 2022)	(Hygate & Shenk, 2021)	(Lin, 2021)	(Stink & Koop, 2020)	(Valvanis & Ponto, 2019)
Aim	3	4	2	3	4	4	3	4	2	3	2	3	1
Method	3	3	4	4	1	1	2	2	1	4	4	4	1
Design	4	1	4	3	2	2	4	4	2	4	4	1	1
Sampling	4	3	5	3	3	4	3	4	2	5	5	2	2
Data collection	3	2	2	4	1	3	4	4	1	2	2	4	3
Generalizability	3	4	2	4	3	3	4	2	1	2	3	2	2
Ethics	3	3	3	2	2	1	4	4	3	3	1	4	2
Analysis	3	4	4	2	4	1	3	3	3	4	2	4	2
Theoretical contribution	3	4	4	4	2	3	1	3	3	4	2	4	2
Value	4	4	3	4	2	1	4	3	3	3	2	4	2
Total	33	32	33	33	24	23	32	33	21	34	28	32	18

Based on the results of this analysis, four studies that did not achieve the required score (more than 30 points) were excluded from further review. Subsequently, to determine certain organizing themes of the auditors' cognitive flexibility model, the following scoring procedure was applied.

Under this procedure, all sub-criteria extracted from the text of the confirmed articles were written in a table column, and the names of the authors of the confirmed studies were placed in each row. Based on whether each researcher addressed a given sub-criterion, a "✓" mark was assigned. Then, scores in each sub-criterion column were summed, and scores higher than the mean of the reviewed studies were selected as research components.

Table 6. Extraction of Research Components

Organizing Themes	(Sachs & Widge, 2025)	(Goldin et al., 2025)	(Sanderbrink & Summerfield, 2024)	(Hauptman et al., 2024)	(Martínez & Gonçalves, 2022)	(Saputra et al., 2022)	(Hygate & Shenk, 2021)	(Stink & Koop, 2020)
Adaptive learning	✓	–	–	✓	✓	–	✓	✓
Cognitive competence	–	–	–	–	✓	✓	–	–
Control strategies	✓	–	–	–	–	✓	–	–
Metacognitive capacities	–	✓	–	✓	–	✓	✓	✓
Emotional adaptability	–	–	–	✓	✓	✓	–	–
Adaptability to ambiguity	–	–	✓	✓	✓	✓	✓	–

Given the confirmation of five studies in the critical appraisal stage, the principal dimensions that appeared in more than half of the confirmed studies were identified as the most salient organizing themes of the auditors' cognitive flexibility model, in order to refine the interview questions and facilitate the derivation of overarching and basic themes. Accordingly, the themes of cognitive competence, control strategies, and emotional adaptability were removed because they obtained scores below the mean. The following section therefore examines the results of the reviewed studies, the expert interviews, and the comprehensive identification of overarching, organizing, and basic themes. Information on the basic, overarching, and organizing themes is presented in Table 7.

Table 7. **Identification and Extraction of Global (Overarching), Organizing, and Basic Themes**

Global (Overarching) Themes	Organizing Themes	Basic Themes
Auditors' cognitive constructs	Analytical agility in auditing	Revising procedures based on new evidence
		Adjusting plans in line with dynamic risks
		Multidimensional evaluation of financial documents
		Detecting hidden relationships in data
		Adapting to changing standards
		Applying modern analytical tools
	Adaptability to ambiguity	Rapid response to reporting changes
		Cognitive adjustment in document inconsistencies
		Maintaining efficiency under time pressure
		Managing contradictions in evidence
		Adapting to unexpected constraints
		Balancing speed and accuracy
	Dynamism in professional judgments	Integrating quantitative and qualitative evidence
		Calibrating professional skepticism based on complexity
		Integrating non-financial findings
		Adjusting the approach based on materiality/importance
		Assessing variables in the operating environment
		Integrating dispersed information
Flexible mental frameworks	Flexibility in interpreting standards	Adapting principles to specific circumstances
		Identifying the boundaries of materiality
		Redefining materiality criteria
		Interpreting standards in special cases
		Adjusting criteria in dynamic environments
		Flexibly evaluating deviations
	Transformation in control evaluation	Identifying weaknesses in traditional controls

		Designing alternative tests
		Evaluating undocumented controls
		Adapting to automation systems
		Revising evaluation frameworks
		Aligning methods with new technologies
	Evolution of evidence-collection methods	Adaptive sampling in large-scale projects
		Integrating advanced analytical methods
		Adapting to new protocols
		Applying new confirmation techniques
		Using data mining in audit evidence
		Aligning methods with electronic documentation
Professional cognitive requirements	Team metacognitive capacities	Adjusting supervision level based on complexity
		Optimal distribution of cognitive attention
		Cognitive management of team members
		Adjusting leadership style based on needs
		Continuous assessment of team performance
		Adapting to diversity in team skills
	Adaptive learning in auditing	Updating knowledge in response to developments
		Aligning skills with new challenges
		Learning from complex audit engagements/cases
		Transferring experiential knowledge within the team
		Continuous review of learning processes
		Adapting to new training/learning patterns

Unlike the thematic template approach, thematic networks are presented graphically—similar to a web—to eliminate any assumption of hierarchical ordering among them. These networks are purely analytical tools rather than the analysis itself (Attride-Stirling, 2001).

Delphi analysis is considered the linking mechanism between qualitative and quantitative analysis because, by evaluating the reliability of the designed model dimensions, it enables the operationalization of model components as measurement instruments to be used within the target population in the quantitative phase. In this study, Delphi analysis was used to assess the reliability of the model themes. This analysis was based on two criteria: the agreement coefficient and the mean score. To conduct this assessment, the research components were first organized into a seven-point questionnaire and distributed among the panel members. Through multiple rounds of questionnaire iteration, the reliability level of the research components was evaluated.

Table 8. Delphi Analysis of the Identified Themes

Global (Overarching) Themes	Organizing Themes	Delphi Round 1 Mean	Delphi Round 1 Agreement Coefficient	Delphi Round 2 Mean	Delphi Round 2 Agreement Coefficient	Result
Auditors' cognitive constructs	Analytical agility in auditing	6.22	0.89	5.88	0.91	Confirmed
	Adaptability to ambiguity	5.32	0.74	6.11	0.89	Confirmed
	Dynamism in professional judgments	5.44	0.89	6.03	0.91	Confirmed
Flexible mental frameworks	Flexibility in interpreting standards	5.30	0.65	5.40	0.71	Confirmed
	Transformation in control evaluation	5.41	0.61	5.23	0.88	Confirmed

	Evolution of evidence-collection methods	5.25	0.89	6.03	0.90	Confirmed
Professional cognitive requirements	Team metacognitive capacities	6.03	0.82	5.74	0.84	Confirmed
	Adaptive learning in auditing	5.33	0.67	5.40	0.72	Confirmed

Based on the two criteria of mean score and agreement coefficient, it was determined that all main themes related to the auditors' cognitive flexibility model were confirmed. In other words, since the mean of the core components was 5 or higher, and because the obtained agreement coefficient exceeded 0.50, it can be concluded that all themes identified in the qualitative phase were validated. Figure 1 presents the auditors' cognitive flexibility framework, which can be used as a visual interpretive mechanism to make the derived results transparent and understandable for researchers.

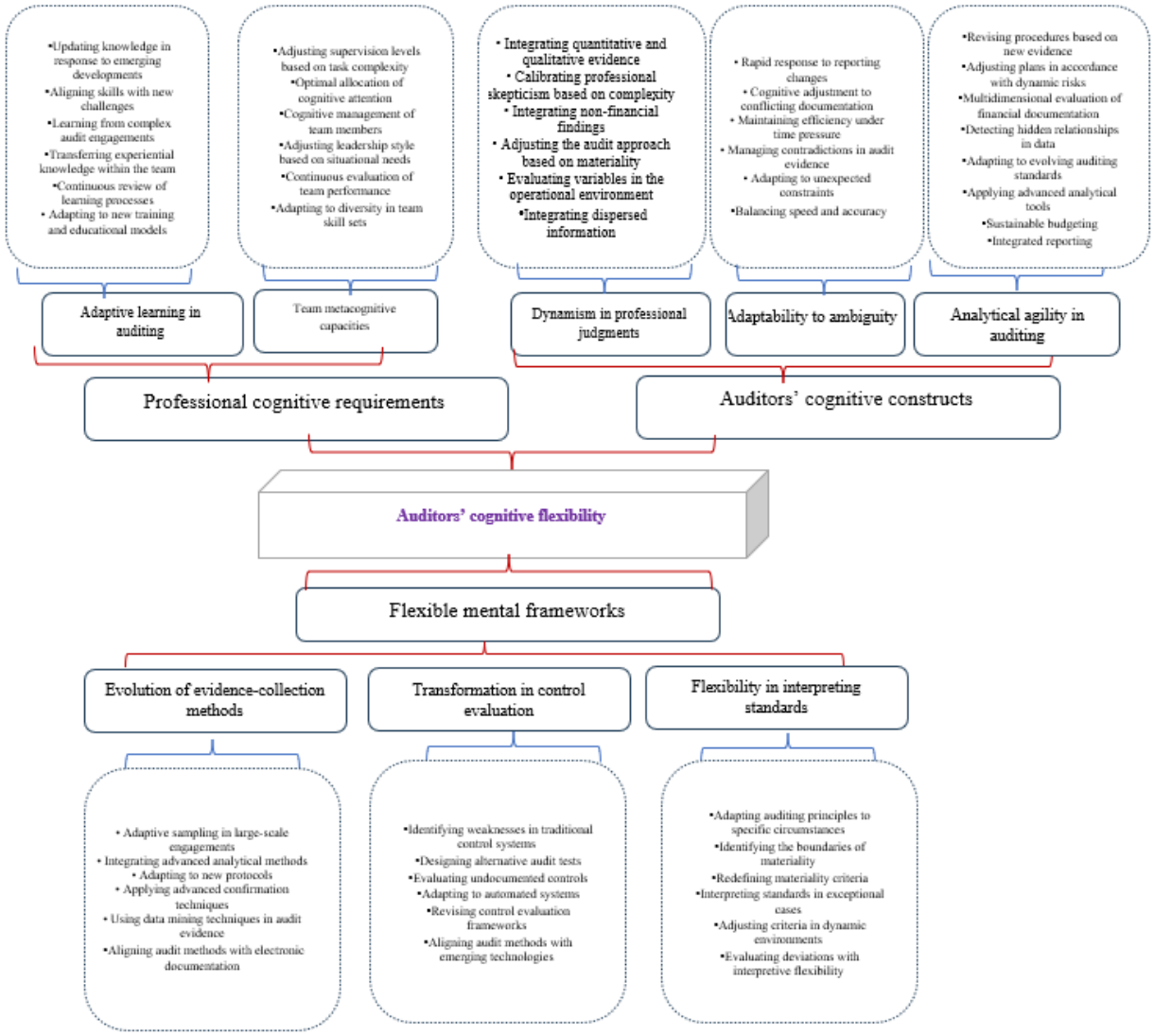

Figure 1. Auditors' Cognitive Flexibility Framework

In the following, a conceptual definition of each overarching theme is provided (Table 9).

Table 9. Conceptual Definition of the Global (Overarching) Themes and Their Analytical Dimensions

Global (Overarching) Themes	Deep and Systematic Definitions	Related Organizing Themes	Analytical Dimensions
Auditors' cognitive constructs	Dynamic mental architectures that enable auditors to redefine their analytical patterns when confronted with the complexities of the audit environment. These constructs represent a combination of technical knowledge, operational experience, and metacognitive capabilities for processing information under conditions of uncertainty.	Analytical agility in auditing; Adaptability to ambiguity; Dynamism in professional judgments	• Analytical flexibility • Cognitive resilience • Capacity to reframe mental paradigms
Flexible mental frameworks	Dynamic evaluative systems that enable multi-layered interpretation of auditing standards, internal controls, and audit evidence. These frameworks are grounded in the ability to distinguish stable principles from variable methods when responding to professional innovations.	Flexibility in interpreting standards; Transformation in control evaluation; Evolution of evidence-collection methods	• Methodological adaptability • Interpretive creativity • Systems perspective on evidence
Professional cognitive requirements	Macro-level mental requirements that distinguish the auditing profession from other occupations; including specialized capacities such as cognitive management of teams, adaptive learning, and maintaining a balance between professional skepticism and fairness under organizational pressure.	Team metacognitive capacities; Adaptive learning in auditing	• Cognitive leadership • Learning self-regulation • Integration of distributed knowledge

The proposed overarching themes constitute the core of the auditors' cognitive flexibility model. Cognitive constructs, as the underlying mental substrate, enable auditors to employ flexible analytical mechanisms when facing informational contradictions (e.g., discrepancies between documentary evidence and observational evidence). These constructs are manifested in organizing themes such as dynamism in professional judgments, which requires integrating quantitative dimensions (e.g., financial ratios) and qualitative dimensions (e.g., assessments of management integrity). The cognitive resilience dimension within this theme ensures the maintenance of analytical precision under time constraints. Flexible mental frameworks reflect the auditor's capacity to move beyond rigid, rule-bound interpretations of standards. For example, in the organizing theme of transformation in control evaluation, the interpretive creativity dimension enables auditors in digital organizations to assess the effectiveness of automated controls through modern analytical tests rather than focusing solely on paper-based documentation. These frameworks require a systems perspective in which dispersed evidence (e.g., employee interview data and system-generated reports) is integrated and analyzed holistically. Professional cognitive requirements focus on broader, higher-order aspects; accordingly, the adaptive learning theme requires the dimension of learning self-regulation. This feature enables auditors to revise their cognitive patterns after encountering audit errors in a particular industry (e.g., common errors in construction contract accounting). Moreover, cognitive leadership within audit teams implies the optimal allocation of tasks based on team members' cognitive strengths (e.g., assigning complex data analysis to an individual with strong analytical capabilities). Collectively, these factors provide an integrated model of cognitive flexibility that aligns closely with the dynamic challenges of the auditing profession.

4. Discussion and Conclusion

The present study aimed to develop a comprehensive framework of auditors' cognitive flexibility by identifying its global, organizing, and basic themes using thematic analysis and Delphi validation. The findings revealed that auditors' cognitive flexibility consists of three overarching dimensions: auditors' cognitive constructs, flexible mental frameworks, and professional cognitive requirements, each supported by multiple organizing and basic themes. These findings provide empirical support for the view that cognitive flexibility is a multidimensional

construct encompassing adaptive reasoning, metacognitive regulation, and adaptive learning, which together enable auditors to respond effectively to complex and uncertain professional environments. This result aligns with cognitive and neuropsychological research emphasizing that cognitive flexibility is not a single isolated ability but a systemic process involving executive control, adaptive reasoning, and the dynamic restructuring of mental representations in response to environmental demands [1, 4, 7]. The identification of these integrated dimensions confirms that auditors' effectiveness depends not only on technical competence but also on cognitive adaptability, which allows them to adjust analytical approaches, evaluate conflicting evidence, and maintain judgment accuracy in uncertain contexts.

One of the central findings of the study is the identification of auditors' cognitive constructs as a foundational dimension of cognitive flexibility, encompassing analytical agility, adaptability to ambiguity, and dynamism in professional judgment. These results highlight the importance of adaptive analytical processes that allow auditors to revise mental models, integrate diverse sources of evidence, and respond to evolving audit environments. This finding is consistent with prior research demonstrating that cognitive flexibility enhances adaptive reasoning, problem-solving efficiency, and decision-making accuracy in complex professional settings [9-11]. The presence of analytical agility and adaptability to ambiguity reflects the role of executive cognitive processes in enabling auditors to shift between alternative interpretations, revise risk assessments, and adjust audit procedures in response to emerging evidence. These capabilities are particularly important in auditing, where auditors must continuously evaluate incomplete, ambiguous, and sometimes contradictory information. Previous studies have shown that auditors' cognitive styles and metacognitive awareness significantly influence their ability to assess fraud risk and interpret financial information accurately [12, 13, 18]. The findings of the present study extend this literature by demonstrating that cognitive constructs represent an integrated system that enables auditors to maintain analytical precision and professional reliability.

The identification of dynamism in professional judgment as an organizing theme further emphasizes the adaptive nature of auditors' cognitive processes. Professional judgment requires auditors to evaluate both quantitative financial data and qualitative contextual information, such as management behavior, organizational culture, and risk indicators. This finding aligns with prior research indicating that metacognitive awareness and professional skepticism play critical roles in enhancing audit judgment quality and reducing cognitive errors [14, 16, 19]. Cognitive flexibility enables auditors to integrate diverse forms of information, reconsider initial assumptions, and adjust conclusions when confronted with new evidence. This adaptive reasoning process is essential for ensuring audit accuracy and protecting stakeholders' interests. Furthermore, the findings support the argument that cognitive flexibility enhances auditors' ability to resist cognitive biases and maintain objectivity in professional judgment [17, 24, 35]. These results confirm that cognitive flexibility is a critical determinant of audit quality and professional performance.

The second overarching dimension identified in the study, flexible mental frameworks, reflects auditors' ability to interpret standards, evaluate controls, and collect audit evidence using adaptive and context-sensitive approaches. This finding highlights the importance of cognitive adaptability in enabling auditors to move beyond rigid, rule-based interpretations of auditing standards and apply professional judgment in complex and dynamic environments. This result is consistent with research demonstrating that cognitive flexibility enhances individuals' ability to adapt cognitive strategies, reinterpret information, and respond effectively to novel and uncertain situations [5, 6, 8]. In the auditing context, flexible mental frameworks allow auditors to evaluate emerging risks, integrate new forms of digital evidence, and adapt audit procedures to evolving technological and regulatory

environments. The increasing digitalization of audit processes and the use of advanced data analytics require auditors to continuously update their cognitive strategies and adopt flexible analytical approaches [23, 24]. The findings of the present study confirm that flexible mental frameworks are essential for enabling auditors to maintain professional effectiveness in technologically advanced audit environments.

The organizing theme of transformation in control evaluation further illustrates the importance of cognitive flexibility in adapting audit procedures to changing organizational environments. Traditional audit approaches often rely on static evaluation methods that may not fully capture the complexity of modern organizational systems. The findings indicate that auditors must adapt their evaluation methods to incorporate automated controls, digital systems, and advanced analytical tools. This result is consistent with prior research emphasizing the need for adaptive cognitive processes in evaluating complex organizational systems and integrating new forms of evidence [4, 5]. Moreover, the findings support the argument that auditors' cognitive adaptability enhances their ability to detect anomalies, assess risks accurately, and ensure audit reliability [21, 22]. These results reinforce the importance of developing cognitive flexibility as a core professional competency in auditing.

The third overarching dimension identified in the study, professional cognitive requirements, highlights the importance of metacognitive capacities and adaptive learning in supporting auditors' cognitive flexibility. Metacognitive capacities enable auditors to monitor their cognitive processes, evaluate the effectiveness of their analytical strategies, and adjust their reasoning in response to new information. This finding is consistent with research demonstrating that metacognitive awareness enhances decision-making quality, professional judgment, and ethical behavior in auditing [12, 13, 17]. The presence of adaptive learning as an organizing theme further emphasizes the role of continuous learning in maintaining cognitive flexibility. Adaptive learning enables auditors to refine their cognitive strategies, acquire new knowledge, and adapt to evolving professional requirements. Previous research has shown that cognitive flexibility enhances learning efficiency, professional competence, and adaptive performance in dynamic work environments [1, 10, 36]. These findings confirm that adaptive learning is a critical component of auditors' cognitive flexibility.

The findings also highlight the importance of team-level cognitive processes, particularly team metacognitive capacities, in supporting auditors' cognitive flexibility. Auditing is often conducted in team-based environments, where collaboration, communication, and cognitive coordination are essential for effective performance. The ability to distribute cognitive tasks, integrate team members' expertise, and adapt leadership styles enhances team effectiveness and audit quality. This finding aligns with research demonstrating that psychological and cognitive factors significantly influence professional performance and well-being in organizational settings [27, 29, 37]. Furthermore, personality traits, professional competence, and psychological characteristics influence auditors' cognitive functioning and professional effectiveness [30-32]. The results of the present study extend this literature by demonstrating that cognitive flexibility operates at both individual and team levels, enabling auditors to coordinate cognitive processes and maintain professional effectiveness.

Another important implication of the findings is the role of cognitive flexibility in mitigating the negative effects of psychological biases and personality-related risks. Research has shown that cognitive biases, personality traits, and psychological pressures can impair auditors' judgment and increase the risk of professional errors [20, 33, 34]. Cognitive flexibility enables auditors to recognize biases, reconsider assumptions, and adjust analytical strategies, thereby enhancing professional objectivity and reducing the risk of judgment errors. This finding reinforces the argument that cognitive flexibility serves as a protective mechanism that enhances auditors' resilience and professional reliability.

Overall, the findings of this study provide strong empirical support for the theoretical view that cognitive flexibility is a critical determinant of auditors' professional effectiveness, judgment quality, and adaptive performance. The identification of integrated cognitive dimensions, including cognitive constructs, flexible mental frameworks, and professional cognitive requirements, demonstrates that cognitive flexibility operates as a systemic cognitive capability that enables auditors to respond effectively to complex and dynamic professional environments. These findings contribute to the advancement of auditing research by providing a comprehensive conceptual framework that integrates cognitive, metacognitive, and adaptive learning processes into a unified model of auditors' cognitive flexibility.

Despite its contributions, this study has several limitations that should be acknowledged. First, the qualitative nature of the research, while appropriate for exploratory model development, limits the generalizability of the findings. The identified themes and framework are based on expert perceptions and thematic analysis rather than large-scale empirical testing. Second, the sample consisted primarily of highly experienced auditing professionals and academic experts, which may limit the applicability of the findings to less experienced auditors or different organizational contexts. Third, the study relied on self-reported expert insights, which may be influenced by subjective interpretations and professional biases. Finally, the study focused on conceptual and cognitive dimensions without directly measuring the behavioral or performance outcomes associated with cognitive flexibility.

Future research should focus on empirically validating the proposed cognitive flexibility framework using quantitative research designs. Structural equation modeling and psychometric validation techniques can be used to assess the relationships between cognitive flexibility dimensions and audit performance outcomes. Longitudinal studies can examine how cognitive flexibility develops over time and how it influences auditors' professional growth. Future studies should also explore the relationship between cognitive flexibility and emerging audit technologies, including artificial intelligence and data analytics. Additionally, cross-cultural research can examine whether cognitive flexibility operates differently across diverse regulatory and organizational environments. Experimental research designs can also be used to investigate the causal effects of cognitive flexibility training on auditors' professional judgment and decision-making quality.

Audit firms should incorporate cognitive flexibility development into professional training programs to enhance auditors' adaptive reasoning and decision-making capabilities. Training programs should focus on developing metacognitive awareness, adaptive learning strategies, and analytical reasoning skills. Audit firms should also promote organizational environments that encourage cognitive adaptability, continuous learning, and knowledge sharing among team members. Leadership development programs should emphasize cognitive leadership and adaptive management strategies to enhance team-level cognitive effectiveness. Additionally, audit methodologies should incorporate flexible analytical frameworks that enable auditors to adapt to evolving technologies, regulatory requirements, and organizational complexities. These practical interventions can enhance audit quality, professional reliability, and organizational effectiveness.

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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