

An Examination of the Applied Transformations of Artificial Intelligence in Cloud Accounting

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Abstract: The convergence of artificial intelligence and cloud technologies in the domain of accounting has gone beyond mere instrumental optimization and has resulted in a structural redefinition of information channels and the dynamics of financial decision-making. These applied transformations, through the transition from traditional processing toward automated cognitive systems, provide a new platform for predictive analytics and the enhancement of financial reporting quality. The aim of this study is to examine the application of artificial intelligence transformations in cloud accounting. Using a mixed-methods approach, the qualitative phase of the study, based on grounded theory analysis and interviews with experts, sought to develop a multidimensional theoretical framework in accordance with the approach proposed by Glaser (1992) through the stages of open, axial, and selective coding. Subsequently, in the quantitative phase of the study, the identified criteria were examined using structural equation modeling to determine their contextual applicability in terms of the structural goodness-of-fit of the proposed model. The findings of the qualitative phase, based on 14 expert interviews, resulted in the identification of 287 open codes, 29 basic themes, six organizing themes, and three global themes. In the quantitative phase, the generalizability of the dimensions derived from the qualitative phase was also confirmed through assessment of structural model fit using WarpPLS within the structural equation modeling process. The findings indicate that the transformations required in cloud accounting in the context of the rapid evolution of artificial intelligence are primarily associated with security mechanisms. Accordingly, artificial intelligence capabilities should be employed to enhance the cyber capacities of accounts hosted on defined cloud infrastructures so that accounting based on financial technologies can generate greater user trust and thereby increase the level of transactions conducted through such network-based mechanisms.

Keywords: cloud accounting, artificial intelligence, cybersecurity

1. Introduction

The accelerating digitalization of business processes has transformed the informational, operational, and strategic foundations of accounting. Accounting systems that were previously designed primarily for transaction recording, periodic reporting, and retrospective control are increasingly being reconfigured as interconnected digital infrastructures capable of supporting real-time data processing, continuous reporting, predictive analytics, and automated decision support. Among the technological developments shaping this transformation, cloud computing and artificial intelligence have emerged as two of the most influential forces. Cloud computing has altered the location, accessibility, scalability, and architecture of accounting information

systems, while artificial intelligence has expanded the analytical and cognitive capabilities embedded within these systems. Their convergence is therefore not merely a technological upgrade; rather, it represents a broader transformation in how accounting information is generated, processed, secured, interpreted, and communicated to organizational decision-makers and external stakeholders. In this context, cloud accounting is increasingly evolving from a remote-access accounting platform into a dynamic information ecosystem in which artificial intelligence can influence professional practices, institutional oversight, system architecture, cybersecurity, stakeholder-oriented reporting, and the broader digital accounting environment [1, 2].

Cloud computing provides the technological foundation for this transformation by enabling shared access to configurable computing resources, applications, storage capacity, networks, and processing services that can be rapidly provisioned with limited managerial effort. The widely accepted conceptualization of cloud computing emphasizes characteristics such as on-demand access, broad network availability, resource pooling, rapid elasticity, and measured service, all of which have direct implications for the design and operation of accounting information systems [3]. In accounting, these characteristics allow organizations to move beyond locally installed software and isolated databases toward integrated platforms through which financial information can be accessed and processed across locations and organizational units. Cloud accounting therefore enhances the flexibility of financial operations, reduces dependence on physical infrastructure, facilitates data integration, and supports the timely production of accounting information. These characteristics are particularly important in environments where organizations must process large volumes of transactions, coordinate geographically dispersed activities, and provide managers with rapid access to financial information. As cloud-based systems become embedded in accounting functions, the question is no longer limited to whether accounting activities can be transferred to the cloud, but increasingly concerns how the cloud environment itself must be redesigned to accommodate intelligent automation and advanced analytical technologies [1, 4].

The adoption of cloud accounting, however, is not a purely technical process. Research has shown that organizational, environmental, and human factors are central to the acceptance and successful implementation of cloud-based accounting systems. Variables related to technological readiness, organizational support, perceived usefulness, professional knowledge, environmental pressures, and user capabilities can significantly influence whether organizations successfully adopt such systems and derive value from them [5]. Evidence from small and medium-sized enterprises also indicates that the implementation of cloud accounting is shaped by factors including relative advantage, compatibility, complexity, managerial support, organizational readiness, security concerns, and external environmental conditions [6]. Recent evidence from micro, small, and medium-sized enterprises further demonstrates that adoption decisions are conditioned by the interaction between technological benefits and organizational constraints, highlighting that cloud accounting cannot be understood independently of users' perceptions, firm capabilities, and institutional conditions [7]. These findings imply that the next stage of cloud accounting development, especially under the influence of artificial intelligence, requires a multidimensional perspective that extends beyond software functionality and includes professional, managerial, organizational, and institutional transformations.

The significance of cloud-based accounting information systems is particularly evident in their capacity to improve organizational information processing and performance. Cloud environments allow accounting data to be updated and accessed more rapidly, facilitate coordination between accounting and managerial functions, and support the integration of financial information into broader organizational decision-making processes. Evidence from small and medium-sized enterprises indicates that accounting information systems operating in cloud

computing environments can contribute to organizational performance by improving information quality, operational responsiveness, and decision support [8]. Similarly, cloud-based accounting information systems can contribute to broader economic and organizational development objectives by improving the efficiency of financial processes, facilitating data availability, and strengthening information infrastructures that support productive and sustainable organizational activities [9]. These developments demonstrate that cloud accounting has evolved into a strategic infrastructure rather than merely a mechanism for reducing information technology costs. Consequently, changes in the technological intelligence embedded within this infrastructure can have implications not only for accounting operations but also for competitiveness, governance, sustainable performance, and organizational resilience.

Artificial intelligence intensifies these developments by introducing capacities that traditional accounting systems do not possess. Machine learning, deep learning, natural language processing, intelligent automation, predictive modeling, and related technologies allow accounting systems to identify patterns, classify information, detect anomalies, support forecasting, automate repetitive tasks, and enhance decision-making. The growing literature on artificial intelligence in accounting and finance demonstrates that the field has shifted from early applications focused on rule-based automation toward more advanced systems capable of learning from large datasets and supporting complex professional judgments [2]. This transformation is especially relevant to cloud accounting because cloud platforms provide both the computational infrastructure and the data accessibility required for large-scale AI applications. In effect, cloud environments can provide the processing capacity, integration mechanisms, and scalable architecture needed to deploy artificial intelligence across accounting processes, while artificial intelligence can simultaneously enhance the functionality, adaptability, and intelligence of cloud accounting platforms.

One of the most important areas in which artificial intelligence is changing accounting is process automation. Contemporary accounting processes include numerous repetitive, rule-based, and data-intensive activities that are suitable for intelligent automation, including data entry, transaction classification, reconciliations, invoice processing, account coding, exception detection, and elements of financial reporting. Qualitative evidence indicates that artificial intelligence can substantially alter the design of accounting workflows by reducing manual intervention, increasing processing speed, improving consistency, and allowing accounting professionals to devote greater attention to analytical and interpretive tasks [10]. These transformations do not simply replace human labor with software; they also alter the competencies expected of accountants. As automated systems assume a greater role in routine processing, accounting professionals are increasingly required to develop technological literacy, analytical capabilities, data interpretation skills, and an understanding of AI-assisted decision systems. The emergence of intelligent cloud accounting therefore has direct implications for professional development and the future structure of accounting work.

The growing use of machine learning also illustrates how artificial intelligence can transform accounting from a largely historical discipline into a more adaptive and predictive information function. Machine learning and deep learning can be used to classify accounting transactions, support coding decisions, identify patterns within financial data, and reduce inconsistencies in data processing. The development of AI-based account code classification models demonstrates the potential of machine learning to standardize and automate important elements of accounting practice while contributing to more efficient and sustainable accounting processes [11]. Similarly, research on artificial intelligence in financial accounting forecasting shows that AI techniques can improve the capacity to analyze complex datasets and support predictions related to financial variables and future conditions

[12]. Such capabilities are highly compatible with cloud-based accounting environments because cloud systems facilitate continuous data availability and computational scalability. The integration of AI-driven classification and forecasting into cloud accounting may therefore transform accounting systems into proactive platforms capable of supporting anticipatory rather than merely retrospective financial management.

The acceptance of artificial intelligence within accounting, however, remains an important managerial issue. The effectiveness of AI-supported accounting depends not only on algorithmic performance but also on the willingness of accounting professionals and managers to trust, understand, and use such technologies. Research on artificial intelligence technology acceptance in managerial accounting suggests that perceived usefulness, ease of use, organizational support, and user confidence can influence adoption behavior [13]. This issue becomes particularly significant in cloud accounting because users are required to interact with systems that may operate remotely, process sensitive financial information, and generate recommendations through mechanisms that are not always transparent. Consequently, the transformation of cloud accounting under artificial intelligence requires the development of professional competencies and governance structures that allow users to understand system outputs, evaluate algorithmic recommendations, and retain appropriate levels of accountability.

At the same time, the integration of artificial intelligence with cloud computing creates new structural requirements. AI applications depend heavily on large-scale data processing, distributed computing, scalable storage, and increasingly sophisticated system architectures. Research in other technology-intensive sectors has demonstrated that the convergence of artificial intelligence and cloud computing can produce substantial benefits through enhanced automation, data analytics, resource optimization, and intelligent decision support, while simultaneously creating challenges related to interoperability, infrastructure readiness, and cybersecurity [14]. Although the sectoral context may differ, these technological principles are highly relevant to accounting. Cloud accounting systems must increasingly be capable of supporting intelligent processing, integrating diverse financial and nonfinancial data sources, and responding dynamically to changing informational requirements. This means that the evolution of cloud accounting under artificial intelligence is likely to require redesign at the level of information systems, transaction-processing mechanisms, data integration, application interfaces, and system scalability.

Security represents another critical dimension of this transformation. Accounting information is among the most sensitive forms of organizational data because it may include financial statements, transaction records, tax information, payroll data, bank account details, shareholder information, and other confidential records. Cloud-based storage and processing can expand accessibility and efficiency, but it also increases exposure to cyber threats, unauthorized access, data leakage, identity theft, and system vulnerabilities. These concerns have consistently been identified as important factors in cloud accounting adoption [6, 7]. As artificial intelligence becomes more deeply embedded in cloud accounting, security mechanisms must evolve accordingly. AI can strengthen cybersecurity through anomaly detection, behavioral analysis, automated monitoring, intelligent authentication, and rapid identification of suspicious activities, but the same technological complexity may also create new vulnerabilities. Therefore, the development of intelligent cloud accounting requires more advanced authentication systems, secure identity management, electronic signatures, hardware-based security mechanisms, access control protocols, and continuous monitoring of cloud environments.

These security requirements are closely related to governance and institutional oversight. Accounting systems do not operate in isolation from professional standards, regulatory requirements, corporate governance mechanisms, and institutional expectations. As cloud accounting becomes more automated and AI-assisted,

regulators, standard setters, audit committees, and professional bodies may need to adapt their oversight frameworks to address questions concerning data integrity, algorithmic accountability, system reliability, information ownership, and compliance. The capacity of organizations to benefit from cloud accounting may therefore depend partly on the extent to which institutional controls evolve alongside technological change. Existing research on cloud accounting adoption has already shown that environmental and institutional conditions influence implementation decisions [5]. The increasing involvement of AI is likely to intensify the importance of oversight because algorithmic systems can influence how accounting information is classified, interpreted, and communicated.

The integration of AI and cloud accounting also has important implications for shareholders and other users of financial information. The value of an accounting information system ultimately depends on its ability to provide reliable, timely, relevant, and decision-useful information. Cloud-based accounting systems can improve the speed and accessibility of information, while AI can enhance analytical depth, personalization, and predictive capacity. These developments may allow companies to provide users with more responsive information services and may improve the ability of shareholders to access and interpret financial information. However, such benefits require safeguards relating to privacy, authentication, anti-money-laundering compliance, know-your-customer procedures, and secure digital interactions. In increasingly digital capital markets, the protection of shareholder interests cannot be separated from the technological design of accounting systems. Cloud accounting must therefore evolve in a manner that balances accessibility and automation with the protection of user rights and financial information.

A further consequence of the convergence between artificial intelligence and cloud accounting is the emergence of an ecosystem perspective. Modern digital accounting systems are increasingly interconnected with banking platforms, enterprise resource planning systems, tax systems, payment networks, digital identity services, data analytics applications, the Internet of Things, and other financial technologies. Artificial intelligence can intensify this integration by allowing different applications to communicate, process information autonomously, and generate coordinated outputs. Cloud infrastructure provides the environment in which these applications can operate at scale. This creates the possibility of an accounting ecosystem characterized by automation, robotics, machine learning, scalable computing, integrated applications, and real-time information exchange. The digital transformation of accounting is therefore moving beyond individual applications toward interconnected technological ecosystems in which accounting becomes one component of a larger intelligent financial architecture [1, 4].

The organizational consequences of this development are substantial. Firms that successfully integrate artificial intelligence into cloud accounting may achieve improvements in speed, accuracy, resource utilization, information availability, forecasting, and decision-making. These capabilities can contribute to operational efficiency and may also support competitive advantage by enabling firms to respond more rapidly to market conditions and stakeholder information needs. Research linking cloud-based accounting information systems to organizational performance reinforces the strategic significance of such technological capabilities [8]. Similarly, evidence concerning the contribution of cloud accounting systems to broader economic and sustainable development objectives suggests that technological accounting infrastructures can have effects extending beyond internal bookkeeping functions [9]. Accordingly, intelligent cloud accounting can be understood as part of a broader organizational transformation in which accounting technologies influence strategic responsiveness, governance quality, stakeholder relations, and sustainable value creation.

Despite the rapid expansion of research on cloud computing and artificial intelligence, important conceptual gaps remain. A substantial portion of the cloud accounting literature has concentrated on adoption factors, technological readiness, perceived usefulness, organizational conditions, and implementation barriers [5-7]. In parallel, research on artificial intelligence in accounting has focused on automation, forecasting, technology acceptance, machine learning applications, and the broader evolution of advanced technologies in accounting and finance [2, 11-13]. Although these streams of research provide important insights, they do not fully explain how the rapid expansion of artificial intelligence may reshape the internal architecture and multidimensional functioning of cloud accounting itself. In particular, insufficient attention has been paid to how AI-driven change may simultaneously affect professional skills, institutional monitoring, systemic mechanisms, cybersecurity, shareholder-oriented mechanisms, and ecosystem capabilities.

This gap is particularly important because technological convergence often produces qualitative changes that cannot be understood by examining individual technologies separately. Cloud computing changes where and how accounting information is stored and accessed, whereas artificial intelligence changes how that information is processed, interpreted, predicted, and used. When combined, these technologies can create new accounting functions, new risk structures, new competency requirements, and new governance challenges. The implications are therefore transformational rather than additive. Existing research demonstrates the growing importance of both cloud infrastructure and artificial intelligence, but a multidimensional framework is still required to explain the applied transformations that emerge from their convergence and to assess whether such a framework can be empirically supported within capital market companies [4, 10, 14].

Accordingly, understanding AI-driven transformations in cloud accounting requires an exploratory approach capable of identifying emerging dimensions from expert knowledge while also evaluating whether the identified dimensions possess sufficient empirical validity for broader organizational application. Such an approach can contribute to the accounting and management literature by moving beyond technology adoption and examining the reconfiguration of cloud accounting as an integrated professional, structural, security, stakeholder, and ecosystem phenomenon. It can also provide practical insights for managers, accountants, regulators, technology specialists, and capital market participants seeking to prepare accounting infrastructures for the next stage of digital transformation.

The aim of this study is to identify and validate the multidimensional applied transformations of cloud accounting arising from the rapid development of artificial intelligence.

2. Methods and Materials

The methodology of this study can be classified according to three foundations: purpose, outcome, and type of data. In terms of purpose, the study is exploratory because it seeks to uncover aspects of the nature of transformations in cloud accounting based on artificial intelligence that have not previously received adequate attention in prior research. Through interviews, the study seeks to provide meaning to this phenomenon by developing a multidimensional theoretical framework. In terms of outcome, the study should be regarded as developmental because no previous study has specifically focused on the emergence of fourth-generation changes and the transition from the third generation, driven by the rapid development of artificial intelligence, to reconfigure cloud accounting. Therefore, the present study seeks to develop the conceptual dimensions of this variable. Finally, in terms of data collection, this study is mixed-methods because it employs both qualitative and quantitative phases to develop a theoretical framework and to establish the applicability of the core dimensions of

cloud accounting transformations based on emerging aspects of artificial intelligence among capital market companies. Philosophically, the study follows an inductive–deductive approach. This is because, on an inductive basis and through thematic analysis, the emerging aspects of the core phenomenon are initially reconstructed; subsequently, through a deductive philosophy, the identified dimensions are investigated by assessing the goodness-of-fit of the proposed structural model within the study context.

Given the two-phase qualitative and quantitative design of the study, participants in the first phase consisted of experts and scholars in accounting who, based on their established professional records in the field of cloud accounting, were recognized as specialists capable of evaluating the effects arising from the development of artificial intelligence in areas that can be extended to cloud accounting. Accordingly, based on two criteria describing expert adequacy, the following criteria were used to provide a clearer characterization of participants in the qualitative phase:

First, participants in this part of the study were required to be selected from among certified public accountants who, through membership in committees responsible for education and the development of accounting and financial reporting standards, possessed sufficient experience to interpret the questions and assign scores to the developed checklists.

Second, because the two core phenomena of the study are aligned and interconnected, participants in the qualitative phase were required to possess sufficient knowledge and awareness of both technology and financial reporting. This requirement was reflected in educational and research experience related to the variables examined in this study, as documented in the participants' professional résumés.

It should also be noted that the selection of participants in the qualitative phase was based on theoretical sampling and the snowball sampling process. Through access to experts, the selected individuals were expected to demonstrate the highest possible level of participation synergy based on the protocols developed for data collection in this phase of the study. Regarding the implementation of this process, at the beginning of data collection, arrangements were initially made with three participants. Subsequently, other individuals possessing the required level of expertise were introduced, and the necessary arrangements were made with them. Accordingly, the qualitative phase included 14 experts, who were ultimately selected as participants in both analytical components of the qualitative phase based on the point of theoretical saturation achieved in the thematic analysis.

Participants in the quantitative phase of the study consisted of experts with experience serving on the committee responsible for developing the comprehensive governance system, technical experts in the capital market, and members of the boards of directors of companies listed on the Tehran Stock Exchange. Because comprehensive classified information regarding the total target population was unavailable for participant selection, Cochran's sample size formula for an unknown population was used. This approach made it possible to determine an approximate number of distributable checklists and subsequently collect data through simple random sampling. Accordingly, Equation (1) presents Cochran's sample size determination method under the assumption of an unknown target population.

$$n = \frac{Z_{\alpha/2}^2 pq}{d^2}$$

Equation (1)

According to Equation (1), n represents the sample size; $Z_{\alpha/2}$ represents the standard normal value of 1.96; pq represents the proportion of the variable attribute, equal to 0.50; and d^2 represents the probability of

measurement error, equal to 0.05. Accordingly, the sampling calculations yielded a relative sample size of 384. Based on the recommendation to distribute 10% more questionnaires to ensure an adequate number of returned and analyzable checklists (Niles, 2006), 423 checklists were distributed. Through coordination with trusted intermediaries acting as information gatekeepers, 413 checklists were returned. Of these, 23 checklists did not satisfy the criteria for inclusion in the software-based structural equation modeling analysis due to factors such as distorted responses or response deviations. Consequently, 400 checklists were retained as the final sample for this study. The calculated information indicates that 97.63% of the distributed checklists were returned to the researchers. Of these, 96.85% were approved for structural equation modeling analysis to assess the goodness-of-fit of the proposed model. For this purpose, a checklist developed on the basis of the core components and conceptual themes identified in the qualitative phase was distributed among participants in the second phase. Through rotated matrix procedures and exploratory and confirmatory factor analysis coefficients, the extent to which the paradigmatic dimensions could be contextualized was subsequently evaluated.

In qualitative research involving interviews, triangulation is regarded as one of the most effective validation methods and was therefore employed in the present study. This validation approach essentially seeks to prevent “inherent bias” during the implementation of the analytical procedures. Accordingly, after completion of the coding process, the opinions of experts were reviewed across four dimensions to establish validity in the qualitative phase.

[Criterion 1] Data Source Triangulation: The objective of this criterion was to determine an appropriate level of correspondence between the identified dimensions and theoretical domains derived from scientific research. Because the interview instrument employed in this study maintained such correspondence, the validity based on data source triangulation can be considered confirmed. Specifically, during the coding stage of the grounded theory method, the identification of the main categories was accompanied by theoretical references to facilitate stronger correspondence between the generated codes and the literature in the field of financial markets.

[Criterion 2] Researcher Triangulation: The objective of this triangulation criterion was to evaluate the generated codes from the perspectives of peer researchers. Following implementation of the analytical procedures in the qualitative phase, the coding stages were re-examined by several researchers with a comparable level of expertise in applying this method to determine whether the coding procedures used to derive the criteria associated with the core phenomenon were consistent with the prescribed analytical guidelines. These individuals were therefore asked to express their interpretations of the analytical process employed in the qualitative phase so that the scientific foundation and the instruments used could be strengthened through convergence among analytical perspectives. The comments obtained under this criterion supported the identified criteria.

[Criterion 3] Implementation-Method Triangulation: The objective of this criterion was to determine how theoretical consensus was achieved in identifying the dimensions of the study’s core phenomenon. Regarding validity in the open-coding process and the determination of saturation, coding was performed after completion of each interview so that categories could emerge through the classification of conceptual themes. Accordingly, the step-by-step procedures undertaken in the qualitative phase provide evidence supporting the validity of the analytical implementation.

[Criterion 4] Theory Triangulation: The objective of this criterion was to integrate the identified criteria associated with the core phenomenon into a theoretical framework so that, through the formation of a shared concept, the identified criteria could serve as a basis for generalization in the form of an evaluable checklist. Accordingly, given the principal dimensions and categories developed within the theoretical framework, the

propositional themes emerging from the interviews can, to some extent, be regarded as representing a distinct understanding of how transformations in artificial intelligence can be extended to cloud accounting functions within the study context.

3. Findings and Results

Given the two-part structure of the study in terms of data collection, the qualitative phase initially sought to identify the emerging aspects of transformations in cloud accounting against the backdrop of the rapid development of artificial intelligence through grounded theory analysis, thereby enabling the development of a theoretical framework. Accordingly, Table 1 introduces these foundations and provides their operational definitions for developing the interview questions, thereby establishing the pathway for transformations arising from the implementation of Extensible Business Reporting Language.

Table 1. Definitions of the Foundations Derived from Theoretical Studies

Identified Basic Themes	Description and Development of Frequently Asked Interview Questions
Operational transformations in cloud accounting	Against the backdrop of the rapid development of artificial intelligence across various domains, cloud accounting, as a technological system originating from the previous generation, requires operational transformations. First, institutional monitoring mechanisms need to be strengthened so that the functional updating of this implementation approach can be further developed. Second, mechanisms for enhancing the professional skills of practitioners should possess greater potential for improving users' cognitive awareness in this area of accounting, thereby preparing them to accommodate the effects of artificial intelligence on cloud computing related to the accounting profession. Based on this basic theme, several frequently raised interview questions were formulated: 1. What manifestations can the operational transformation induced by artificial intelligence in the restructuring of cloud accounting have in the capital market? 2. What skill-related functions can enhance practitioner convergence and thereby improve the efficiency of cloud accounting? 3. What aspects of supervisory approaches arising from rapid changes in artificial intelligence can contribute to the functional reconfiguration of cloud accounting?
Structural transformations in cloud accounting	The second category of cloud accounting transformations following the rapid development of fourth-generation artificial intelligence concerns structural mechanisms that increase system capacities for improving informational data in ways that contribute to greater agility in financial processes for users and financial decision-makers. Moreover, the emergence of artificial intelligence within cloud accounting requires extensive transformations in the security of accounts operating through cloud-based processors so that potential vulnerabilities arising from inadequate infrastructure preparedness in the face of future uncertainties can be prevented. Accordingly, the following frequently asked interview questions were formulated: 4. What manifestations can the structural transformation induced by artificial intelligence in the restructuring of cloud accounting have in the capital market? 5. What capacities within systemic mechanisms, against the backdrop of artificial intelligence development, increase the need to reconfigure cloud accounting functions? 6. What cyber and security mechanisms should be considered in response to the rapid development of artificial intelligence to maintain the effectiveness of cloud accounting in practice?
Competitive transformations in cloud accounting	Competitive transformations, as the final theme concerning the effects of increasing artificial intelligence intensity on cloud accounting, refer to functions through which companies can achieve greater competitive advantages. For example, companies should consider mechanisms that can help protect shareholders' rights and strengthen cloud accounting in response to changes in artificial intelligence associated with the new generation of technological adoption in the accounting profession. Alternatively, such transformations should be regarded as an integrated system within which accounting must move beyond conventional procedures toward robotic or automated approaches capable of satisfying a substantially greater volume of information requirements in the capital market. Accordingly, the following frequently raised interview questions were formulated: 7. What manifestations can the competitive transformation induced by artificial intelligence in the restructuring of cloud accounting have in the capital market? 8. What characteristics should levels of compliance in cloud accounting following the emergence of artificial intelligence possess to generate greater benefits for shareholders? 9. What characteristics should capabilities possess if they are to form an artificial-intelligence-driven cloud accounting ecosystem?

Following this stage, initial coding was performed for each interview to identify conceptually equivalent themes within the process of basic theme identification. The 14 interviews conducted with experts resulted in the

identification of 287 open codes. To derive the basic themes, redundancies had to be eliminated and semantically equivalent themes standardized to facilitate the transition from basic theme identification to organizing theme identification. Accordingly, the initial 287 open codes were reduced to 29 basic themes. An important consideration during the initial coding stage was establishing a relative balance among the identified basic themes so that the phenomenon could be meaningfully represented in terms of the number of potentially emerging dimensions. The study subsequently proceeded to the organizing-theme stage so that, as explained above, a set of semantically related basic themes could be assigned to a single organizing theme. Organizing themes can therefore be defined as themes formed through the integration and summarization of basic themes that contribute to a clearer understanding of the phenomenon under investigation. Accordingly, through reviewing similar concepts among the generated initial codes and basic themes, semantically similar and shared concepts were grouped into categories referred to as organizing themes. Thus, in moving from organizing themes to global themes, the findings showed that the 29 basic themes were classified into six organizing themes. Finally, at the last stage of thematic development, the analysis proceeded to the global-theme level. Semantically equivalent organizing themes were grouped into specific categories while preserving their conceptual and functional nature, thereby providing the dimensions of the study's core phenomenon with a new and evaluable identity. In the third stage of coding, all organizing themes were therefore classified into larger units represented by global themes. Their labels were selected on the basis of theoretical dimensions or standards associated with the phenomenon under investigation. Coding at this stage involved moving from basic themes to concepts with increasingly explicit meanings, first through organizing themes and subsequently through global themes. Accordingly, based on the 14 interviews conducted in the present study, the initial 287 open codes distinguished the three thematic dimensions of the core phenomenon, as presented in Table 2.

Table 2. Results of the Grounded Theory Analysis Process

	Global Themes						Total
	Operational Transformations in Cloud Accounting		Structural Transformations in Cloud Accounting		Competitive Transformations in Cloud Accounting		
Core Components	Professional Skills	Institutional Monitoring	Systemic Mechanisms	Security Mechanisms	Protection of Shareholders' Interests	Ecosystem Capabilities	
Open Codes	49	47	54	44	46	47	287
Organizing Themes	5	4	5	5	5	5	29
Percentage of Basic-Theme Emergence	17.07%	16.37%	18.81%	15.33%	16.02%	16.37%	100%
Percentage of Organizing-Theme Coding	17.24%	13.80%	17.24%	17.24%	17.24%	17.24%	100%

As shown in Table 2, based on the 287 open codes derived from the interviews, 29 basic themes were identified, indicating that 10.10% of the generated open codes were converted into conceptual themes. Furthermore, based on the identification of six organizing themes from the 29 conceptual themes, it can be inferred that, on average, 20.68% of the basic themes contributed to the formation of an organizing theme, and two organizing themes were reconfigured for each global theme, resulting in three global themes. These details concerning the coding process, together with an examination of the thematic coding percentages, can justify the process of reaching theoretical

saturation. To determine the point at which interviews could be terminated, coding had to be conducted after each interview, the number of open codes had to be determined, and the relative balance in assigning open codes first to basic themes and subsequently to organizing themes had to be considered. Maintaining such a balance allowed sufficient validity-related integration to be established across the identified dimensions of the core phenomenon. Accordingly, based on these explanations, the thematic dimensions of the core phenomenon can be presented within the framework shown in Table 3.

Table 3. Thematic Dimensions of Extensible Business Reporting Language Transformations

Global Themes	Organizing Themes	Basic Themes
Operational transformations in cloud accounting	Enhancement of practitioners' professional skills	Strengthening the professional skills of operational practitioners for working with artificial intelligence tools
		Strengthening the professional skills of operational practitioners for working with cloud services
		Strengthening the professional skills of operational practitioners for working with virtual servers
		Strengthening the professional skills of operational practitioners for working through defined cloud modules
	Enhancement of institutional monitoring	Strengthening the professional skills of operational practitioners to become familiar with future avatars in accounting
		Increasing requirements associated with artificial intelligence development in cloud accounting implementation
		Increasing the applied capacities of the Internet of Things in cloud accounting implementation
		Increasing mechanisms for using GPT-based chat systems in cloud-based assessments
Structural transformations in cloud accounting	Improvement of systemic mechanisms	Increasing digital asset computations in cloud-based assessments
		Capacity building for cloud accounting information systems within an artificial intelligence environment
		Capacity building for AI-based scientific and software computing as a substitute for traditional computations
		Capacity building for cloud accounting operational transaction-processing systems through artificial intelligence
		Capacity building for decision support within artificial intelligence information systems in cloud accounting
	Effectiveness of security mechanisms	Capacity building for radio-frequency identification (RFID) technology to transmit electronic signals from databases within cloud computing
		Using system-based identity credentials for users in the development of AI-based cloud accounting
		Using system-based user authentication in the development of AI-based cloud accounting
		Using users' electronic signatures in the development of AI-based cloud accounting
		Changing traditional user registration procedures in cloud accounting implementation
Social transformations in cloud accounting	Principles of protecting shareholders' interests	Using AI-based hardware security modules in cloud accounting implementation
		Compliance with Know Your Customer/Anti-Money Laundering (KYC/AML) implementation guidelines to identify money-laundering channels in cloud accounting
		Commitment to personalization of shareholder information in cloud accounting implementation
		Commitment to using unique proxies when defining shareholders as cloud accounting users

	Commitment to Mazdax transactions for protecting the security of cloud accounts
	Commitment to updating information required by shareholders within the cloud accounting environment
Ecosystem capabilities	Focusing on the automation of cloud accounting based on the effects of artificial intelligence
	Focusing on the robotization of cloud accounting based on the effects of artificial intelligence
	Focusing on the scalability of cloud accounting based on the effects of artificial intelligence
	Focusing on strengthening machine learning in cloud accounting computations based on the effects of artificial intelligence
	Focusing on the intelligent integration of multiple applications in cloud accounting based on the effects of artificial intelligence

To provide a clearer understanding of the dimensions presented above, the theoretical framework of the phenomenon under investigation is presented in Figure 1.

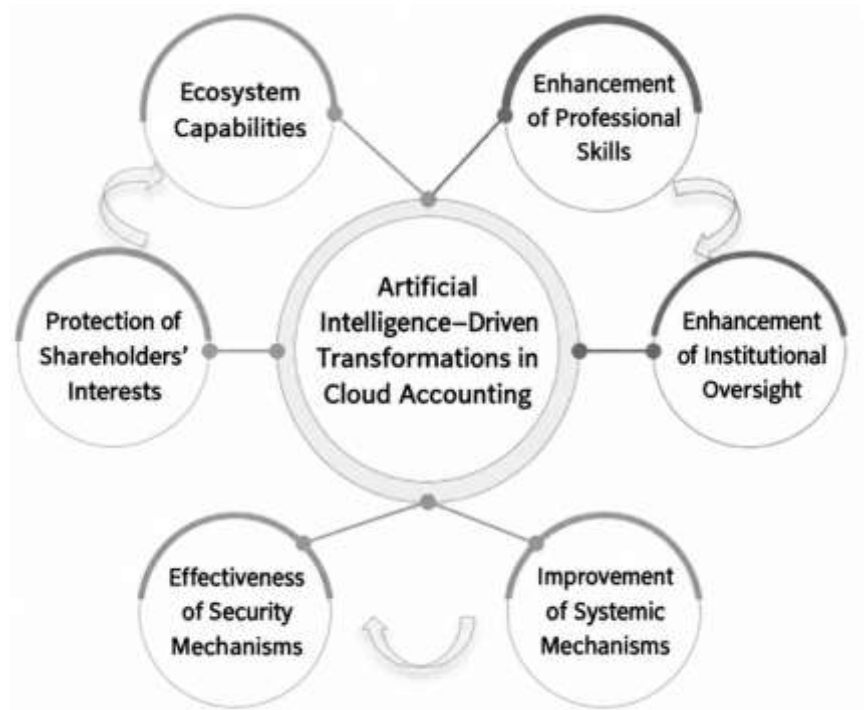


Figure 1. Theoretical Framework of the Identified Themes of Cloud Accounting Transformations Against the Backdrop of the Rapid Evolution of Artificial Intelligence

Following the determination of these criteria, exploratory factor analysis (EFA) was employed in the quantitative phase. To assess generalizability with a higher level of confidence, the criteria of the paradigmatic framework, based on the opinions of participants in the qualitative phase and according to the developed and distributed checklist, demonstrated alignment between the themes and the identified components and categories. This checklist, developed using a five-point Likert scale, can provide an appropriate basis for evaluating factor-loading analyses to assess the generalizability of the identified criteria to companies operating in the capital market. Accordingly, 400 checklists, corresponding to the number of approved returned checklists, were examined to assess factorial validity.

In this analysis, sample adequacy was evaluated using the Kaiser–Meyer–Olkin (KMO) coefficient, while the significance of Bartlett’s test of sphericity was also assessed. Conducting these two tests prior to exploratory factor analysis is necessary to determine whether the research data are suitable for factor analysis in terms of sample adequacy and the existence of statistically significant correlations among variables. Accordingly, based on significance levels of 0.05 and 0.01, these tests demonstrated the necessary adequacy for the objectives of exploratory factor analysis. The findings presented in Table 4 indicate confirmation of the statistical significance of the dimensions examined within the selected sample.

Table 4. KMO and Bartlett’s Test in Exploratory Factor Analysis Estimation

Test Type and Coefficient	Estimated Coefficient
Sample adequacy coefficient (KMO)	0.541
Approximate chi-square coefficient	133,726.037
Degrees of freedom	521
Significance level	0.000

Given that the sample adequacy coefficient was greater than 0.50 and the significance level was below 0.01, it can be concluded that the exploratory factor analysis of the evaluated criteria provides sufficient confidence for their contextualization among capital market companies. Subsequently, for the 29 conceptual themes identified, a composite scale combining matrix-based and Likert scoring, as presented in Table 8, was used to determine the number of potentially emerging components based on the corresponding conceptual themes and their assigned scores.

Table 5. Composite Scoring Scale

Matrix Scale	[1]	[3]	[8; 6; 4; 2]	[5]	[7]	[9]
Combination of Matrix and Likert Scales	$i = j \cong 1$	$i > j \cong 2$	$i \approx j \cong 3$	$i \gg j \cong 4$	$i \ggg j \cong 5$	—
Interpretation of the Matrix–Likert Combination	i and j are equally important	i is somewhat more important than j	i and j are neutral/equivalent	i is more important than j	i is substantially more important than j	—

These scales were used to evaluate the checklist distributed among participants in the quantitative phase. Following confirmation of the significance of the criteria derived from the qualitative phase through exploratory factor analysis, the procedure was intended to determine, from a validity perspective, the number of core components that could emerge from the identified propositional themes. Accordingly, based on the number of propositional themes, the developed checklist was structured as a correspondence matrix. After data collection, it was evaluated through the integration of the matrix and Likert scales. Thus, instances of absolute preference in the corresponding matrices were assigned a Likert score of 5; highly preferred instances were assigned a score of 4; intermediate preference was assigned a score of 3; somewhat preferred instances were assigned a score of 2; and equal preference was assigned a score of 1. This procedure enabled assessment of the rotated matrix for determining the number of principal components on the basis of the propositional themes. To distinguish individual themes, the abbreviation “L” was used in constructing the checklist. By pairwise correspondence of the themes using the matrix scales, the most frequently occurring importance coefficients reflecting alignment among several themes were used to determine the number of similar core components.

Table 6. Thematic Checklist for Performing the Rotated Matrix Analysis

j/i	1	2	3	4	5	6	7	8	9	i/j
[L ₂₉]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₁]
[L ₂₈]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₂]
[L ₂₇]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₃]
[L ₂₆]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₄]
[L ₂₅]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₅]
[L ₂₄]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₆]
[L ₂₃]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₇]
[L ₂₂]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₈]
[L ₂₁]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₉]
[L ₂₀]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₁₀]
[L ₁₉]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₁₁]
[L ₁₈]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₁₂]
[L ₁₇]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₁₃]
[L ₁₆]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₁₄]
[L ₁₅]	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	[L ₁₅]

Based on the overall correspondence analysis of the assigned scores using the defined scales, the findings of the orthogonal matrix were obtained. Components with eigenvalues greater than 1.00 were considered reliable components of the paradigmatic model.

Table 7. Total Variance of the Identified Dimensions and Themes

Dimensions	Extraction Sums of Squared Loadings			Final Rotated Sums of Squared Loadings		
	Eigenvalue	Variance (%)	Cumulative Variance (%)	Eigenvalue	Variance (%)	Cumulative Variance (%)
One confirmed component	6.351	6.602	79.720	6.820	6.701	80.949
Two confirmed components	5.103	5.304	85.024	5.438	5.485	86.434
Three confirmed components	4.320	4.725	89.749	4.689	5.001	91.435
Four confirmed components	3.017	3.200	92.949	3.112	3.402	94.837
Five confirmed components	2.121	2.409	95.358	2.206	2.626	97.463
Six confirmed components	1.528	1.989	97.256	2.081	2.537	100.00
Seven confirmed components	0.835	1.176	98.432	—	—	—
Eight confirmed components	0.484	1.000	99.432	—	—	—
Nine confirmed components	0.218	0.568	100.00	—	—	—

The findings derived from the total calculated variance of the themes indicate the emergence of six reliable components. This result corresponds with the components identified through grounded theory analysis. Specifically, the eigenvalues of Components 1 through 6 were greater than 1.000, while their cumulative explained variance reached 97.256%. Accordingly, the validity resulting from the correspondence between the themes and the components identified in the qualitative phase was confirmed. There was a possibility that the 29 emerging propositional themes could form as many as 16 core components; however, at the acceptable eigenvalue threshold

of greater than 1.000, only six core components were confirmed on the basis of the identified propositional themes. Following this stage of quantitative analysis, all core components were required to be examined in terms of the diagonal squared rotated factor loadings using the Varimax method. Their validity adequacy was subsequently assessed, with coefficients greater than 0.50 considered supportive of the identified categories. Accordingly, the notation $|H_n|$ was assigned to each category and $\langle E_n \rangle$ to each component. The rotated factor loading analysis using the Varimax method demonstrated the statistical adequacy of the emerging core components in relation to the structural categories.

Table 8. Diagonal Squared Values of the Rotated Factor Matrix Using the Varimax Method

Core Components ↓	Enhancement of Practitioners' Professional Skills	Enhancement of Institutional Monitoring	Improvement of Systemic Mechanisms	Effectiveness of Security Mechanisms	Principles of Protecting Shareholders' Interests	Ecosystem Capabilities
Abbreviation	$[B_1]$	$[B_2]$	$(\backslash \text{left}$	$B_3 \backslash \text{right}$	$)$	$(\backslash \text{left}$
$[B_1]$	0.732	—	—	—	—	—
$[B_2]$	—	0.812	—	—	—	—
$[B_3]$	—	—	0.516	—	—	—
$[B_4]$	—	—	—	0.630	—	—
$[B_5]$	—	—	—	—	0.589	—
$[B_6]$	—	—	—	—	—	0.659

By determining the intersections of each component with the identified categories, the squared rotated factor loadings, all of which were above 0.50, confirmed the level of content correspondence between the components and the identified categories. In other words, the dimensions identified in relation to the theoretical framework possess sufficient factorial validity to explain the phenomenon within the context of the present study.

4. Discussion and Conclusion

The present study sought to identify and validate the multidimensional transformations of cloud accounting arising from the rapid development of artificial intelligence. The qualitative findings derived from 14 expert interviews yielded 287 open codes, which were subsequently reduced to 29 basic themes, six organizing themes, and three overarching dimensions. The six core components identified were enhancement of professional skills, enhancement of institutional oversight, improvement of systemic mechanisms, effectiveness of security mechanisms, protection of shareholders' interests, and ecosystem capabilities. The quantitative phase provided further support for this structure. Exploratory factor analysis confirmed the adequacy of the data for extracting the underlying dimensions, and six components with eigenvalues greater than 1.00 were retained. These six components jointly explained a substantial proportion of the cumulative variance, and the rotated factor loadings for all six components exceeded the minimum acceptable threshold of 0.50. Taken together, these findings indicate that the transformation of cloud accounting under the influence of artificial intelligence is not confined to the automation of accounting procedures, but represents a broader reconfiguration involving human competencies, governance arrangements, technological infrastructure, cybersecurity, stakeholder-oriented mechanisms, and digital ecosystem integration.

The first major finding concerns the enhancement of professional skills among accounting practitioners. The qualitative findings showed that the rapid expansion of artificial intelligence requires accountants and other users of cloud-based systems to develop stronger competencies in working with AI-enabled tools, cloud services, virtual

servers, cloud modules, and emerging intelligent interfaces. This result suggests that technological transformation in accounting cannot be sustained solely through software acquisition; instead, it depends on the ability of professionals to interpret, manage, supervise, and effectively apply intelligent systems. This finding is consistent with the growing literature on AI-driven accounting automation. Bakhshizadeh Baghestani et al. emphasized that artificial intelligence is increasingly automating routine accounting procedures and changing the nature of professional accounting work, thereby requiring accountants to acquire analytical and technological capabilities rather than relying exclusively on traditional technical skills [10]. Similarly, Vărzaru showed that acceptance of artificial intelligence in managerial accounting is strongly linked to users' perceptions of usefulness, ease of use, and their ability to interact with AI-based systems [13]. The current findings extend these arguments by showing that professional skill development is one of the structural requirements of AI-driven cloud accounting rather than a peripheral implementation issue.

This finding is also aligned with the broader transformation documented in recent accounting and finance research. The rapid growth of artificial intelligence, machine learning, advanced analytics, and other digital technologies has altered the competency profile required of accounting professionals, particularly where accounting systems are increasingly integrated with data-intensive technologies [2]. The emergence of machine-learning-based accounting classification systems further illustrates this shift. Koç and Koç demonstrated that machine learning and deep learning techniques can perform accounting code classification and contribute to more efficient accounting processes [11]. Such developments imply that accountants are likely to move from direct execution of routine tasks toward supervision, interpretation, exception management, and validation of intelligent outputs. Accordingly, the present study's identification of professional skills as a central component of cloud accounting transformation is theoretically and practically consistent with the broader evolution of digital accounting.

The second major finding concerns the enhancement of institutional oversight. The qualitative analysis showed that the development of AI-based cloud accounting requires greater attention to institutional requirements, the Internet of Things, AI-based conversational technologies, and digital asset calculations within cloud environments. This result indicates that the transformation of cloud accounting is occurring within a regulatory and institutional context that must adapt alongside technological change. Existing studies on cloud accounting adoption have repeatedly shown that environmental and institutional factors influence the acceptance and implementation of cloud-based accounting systems. Barzegar Khandouzi et al. identified environmental and human factors as important determinants of cloud accounting adoption, demonstrating that technological implementation is closely connected with organizational and external institutional conditions [5]. Tawfik et al. similarly reported that implementation of cloud accounting among small and medium-sized enterprises is influenced by technological, organizational, and environmental conditions [6]. The current study develops this line of reasoning further by showing that institutional oversight must evolve not merely to support cloud adoption, but to regulate increasingly intelligent and interconnected cloud accounting systems.

The need for stronger institutional monitoring becomes even more important as accounting systems integrate with advanced digital infrastructures. Alshenaifi and El Sayad showed that the adoption of cloud-based accounting solutions in micro, small, and medium-sized enterprises is influenced by organizational preparedness and external conditions, reinforcing the significance of managerial and institutional support structures [7]. In the present study, institutional oversight was not limited to conventional compliance monitoring, but also included the need to address technologies such as AI-based chat systems, digital assets, and interconnected data environments. This

suggests that the regulatory domain of accounting may gradually expand from conventional financial reporting supervision toward governance of algorithmic accounting processes, data infrastructure, and intelligent decision-support mechanisms.

The third core component identified in this study was the improvement of systemic mechanisms. The findings showed that AI-driven transformation of cloud accounting requires stronger accounting information systems, AI-based computational capabilities, intelligent transaction-processing systems, decision-support architectures, and technologies such as RFID for data transmission in cloud computing environments. This finding reflects the structural nature of AI-driven change. Artificial intelligence requires data-rich, integrated, and scalable infrastructures, while cloud computing provides the architecture necessary to support such infrastructures. Nguyen Phu et al. showed that cloud computing technology can have a significant influence on cloud accounting adoption and financial management by improving technological capabilities and data accessibility [4]. Akpan likewise emphasized that cloud computing is transforming accounting by enabling more flexible, accessible, and scalable accounting processes in the digital environment [1]. The present findings support these arguments while showing that the introduction of artificial intelligence adds a further requirement: cloud accounting systems must be redesigned so that they can support intelligent processing, automated decision support, and advanced data integration.

The importance of systemic reconfiguration is also supported by research on the broader integration of artificial intelligence and cloud computing. Wang et al. demonstrated that AI and cloud computing increasingly operate as mutually reinforcing technologies, with cloud infrastructure providing computational capacity and AI providing enhanced automation and analytical intelligence [14]. Although their study was conducted in another sector, the technological logic is applicable to accounting. Cloud accounting systems must increasingly accommodate machine learning models, automated analytics, real-time data processing, and intelligent monitoring. The significance of such systems is further reinforced by research showing that cloud-based accounting information systems can improve organizational performance by strengthening the availability, quality, and usefulness of accounting information [8]. Therefore, the current study's identification of systemic mechanisms as a central component suggests that the future development of cloud accounting depends on the integration of accounting information systems with intelligent and scalable digital infrastructures.

The fourth and particularly important finding concerns the effectiveness of security mechanisms. The study identified system-based identity credentials, user authentication, electronic signatures, revised registration methods, and AI-enabled hardware security modules as important requirements for the transformation of cloud accounting. This finding is especially significant because cloud accounting involves the remote storage, transmission, and processing of highly sensitive financial information. Security has long been regarded as one of the most critical barriers to cloud accounting implementation. Tawfik et al. identified security-related concerns among the factors affecting cloud accounting implementation [6], while Alshenaifi and El Sayad also emphasized that confidence in technological systems and organizational preparedness influence the adoption of cloud-based accounting solutions [7]. The present findings suggest that the integration of artificial intelligence intensifies rather than reduces the importance of cybersecurity because intelligent cloud accounting creates more complex digital interactions, more automated access points, and potentially wider exposure to cyber risks.

This result should also be interpreted in relation to the fundamental architecture of cloud computing. The cloud model is based on network-based access, shared resources, scalability, and remote service provisioning [3]. These characteristics generate substantial operational advantages but simultaneously create the need for strong access

control, identity management, monitoring, and data protection mechanisms. The present findings indicate that AI may become both a source of cybersecurity challenges and a mechanism for addressing them. AI-enabled security may help identify anomalous behavior, detect suspicious transactions, strengthen identity verification, and support continuous monitoring. Therefore, security appears to be a central enabling condition for the successful expansion of intelligent cloud accounting.

The fifth component concerns the protection of shareholders' interests. The findings indicated that cloud accounting transformation should include attention to KYC/AML requirements, personalization of shareholder information, unique digital proxies, secure digital exchanges, and continuous updating of stakeholder information. This result shows that the transformation of cloud accounting has consequences not only for internal accounting operations but also for corporate governance and external users of accounting information. Cloud-based accounting information systems can enhance transparency, accessibility, and organizational performance by improving the flow of financial information [8]. Jaradat et al. also showed that cloud computing-based accounting information systems can contribute to broader economic and organizational development by improving efficiency and information infrastructure [9]. The present findings complement these studies by suggesting that such benefits depend on the extent to which intelligent cloud accounting systems are designed to preserve stakeholder rights, ensure secure access, and provide relevant and timely information.

The sixth component identified in the study was ecosystem capability. The findings highlighted automation, robotic accounting, scalability, machine learning, and intelligent integration of multiple applications as essential elements of the future cloud accounting ecosystem. This result indicates that cloud accounting is moving away from being a stand-alone accounting application toward becoming part of a broader digital ecosystem in which multiple intelligent systems interact continuously. Recent reviews of accounting and finance technologies confirm that artificial intelligence is increasingly being integrated with other advanced technologies, producing more interconnected and data-driven financial environments [2]. Moreover, Kureljusic and Karger showed that artificial intelligence has substantial potential in financial accounting forecasting, particularly because it can process complex datasets and generate predictive insights that exceed conventional analytical capabilities [12]. These capacities become even more significant when deployed through cloud infrastructures that provide scalable processing and integrated access to financial data.

The ecosystem perspective identified in this study also helps explain the broader strategic significance of AI-driven cloud accounting. As accounting systems become interconnected with financial technologies, enterprise systems, digital identities, automated reporting tools, and analytical platforms, the boundaries between accounting, information technology, and financial management become increasingly blurred. Nguyen Phu et al. demonstrated that cloud computing adoption can directly influence business financial management [4], while Akpan emphasized the transformative effect of cloud computing on accounting practice in the digital age [1]. The current findings suggest that artificial intelligence amplifies this transformation by allowing accounting ecosystems to become more autonomous, scalable, predictive, and responsive. Thus, ecosystem capabilities can be regarded as the dimension through which professional, structural, and technological transformations converge.

Overall, the findings provide evidence that AI-driven transformation in cloud accounting is multidimensional and systemic. The confirmed six-component structure shows that technological change cannot be adequately explained only through automation or software adoption. Instead, the transformation simultaneously affects professional competencies, institutional governance, system architecture, cybersecurity, stakeholder protection, and ecosystem integration. The quantitative confirmation of these dimensions reinforces the validity of the

qualitative framework and suggests that the identified components possess sufficient coherence to represent the broader structure of transformation in the study context. This integrated interpretation is consistent with the literature showing that both cloud computing and artificial intelligence are increasingly central to accounting and financial management, while their successful implementation depends on an interaction among technological, organizational, human, and institutional factors [2, 5, 13].

The present study is subject to several limitations. First, the qualitative phase was based on 14 experts, and although theoretical saturation was achieved, the views obtained may reflect the professional and institutional experiences of a relatively specialized group. Second, the quantitative phase was conducted among participants associated with the capital market and related professional structures; therefore, caution should be exercised when generalizing the findings to small enterprises, public-sector organizations, nonprofit institutions, or firms operating in different regulatory environments. Third, the study relied primarily on perceptual and judgment-based data obtained through interviews and structured checklists, and therefore did not incorporate objective longitudinal measures of cloud accounting performance, cybersecurity incidents, system efficiency, or financial reporting quality. Fourth, because artificial intelligence technologies are evolving rapidly, some of the technological mechanisms identified in this study may change as new applications, regulatory requirements, and security risks emerge. Finally, the cross-sectional design limits the ability to determine how the identified dimensions evolve over time as organizations progress through different stages of AI and cloud accounting maturity.

Future studies can extend the present framework in several directions. Longitudinal research is recommended to investigate how the six identified dimensions evolve as organizations move from early adoption toward mature AI-enabled cloud accounting environments. Comparative studies could examine whether the relative importance of professional skills, institutional oversight, systemic mechanisms, security, shareholder protection, and ecosystem capabilities differs across industries, organizational sizes, or national regulatory systems. Researchers may also develop standardized measurement scales for each dimension and test the framework through confirmatory factor analysis and structural equation modeling in independent samples. Future work could investigate causal relationships between the identified dimensions and outcomes such as financial reporting quality, decision-making effectiveness, audit quality, cybersecurity resilience, organizational agility, and firm performance. Experimental and case-study research may further clarify how specific AI technologies, including generative AI, machine learning, intelligent agents, robotic process automation, and predictive analytics, influence individual cloud accounting processes. Additional research should also investigate ethical issues, algorithmic transparency, accountability, data ownership, and the potential displacement or redesign of professional accounting roles.

Organizations seeking to implement AI-driven cloud accounting should adopt an integrated transformation strategy rather than treating artificial intelligence as an isolated software investment. Professional development programs should be established to strengthen accountants' competencies in cloud technologies, AI-assisted analytics, cybersecurity, and intelligent decision-support systems. Firms should also update governance and oversight mechanisms so that responsibilities for algorithmic decisions, data integrity, access control, and system monitoring are clearly defined. Cloud accounting infrastructures should be redesigned to support scalable processing, integrated applications, automated transaction management, and real-time analytical capabilities. Particular attention should be given to cybersecurity through multi-factor authentication, digital identity controls, electronic signatures, hardware security mechanisms, continuous monitoring, and clearly defined incident-response procedures. Organizations should further ensure that shareholder information is protected and updated through secure digital channels and that relevant KYC and AML procedures are incorporated into cloud-based

accounting processes. Finally, managers should view cloud accounting as part of a broader intelligent financial ecosystem and prioritize interoperability between accounting platforms, enterprise systems, analytical tools, digital payment mechanisms, and emerging AI applications.

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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