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Cloud Computing Adoption in Corporate Accounting: An Exploratoty Study of Application Status and Critical Barriers in Vietnam

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Abstract

This study presents the first quantitative survey in Vietnam exploring the status of cloud computing (CC) adoption in corporate accounting and quantifying the influence of critical barriers. Based on data collected from 199 enterprises across various sizes and sectors, the findings reveal that the public cloud (SaaS) model dominates, reflecting a trend towards cost optimization and flexibility in accounting management. Regarding the level of application, CC is most widely deployed in the function of document storage and management, but is significantly restricted for specialized functions such as data analytics and forecasting. The research identifies and quantifies the two most severe challenges, as assessed by experts, which are concerns about information security and the risk of data loss/exposure from the provider, and an unclear legal framework regarding data responsibility. These findings provide essential scientific groundwork for proposing strategic solutions: The government should prioritize completing the legal framework on data sovereignty in the cloud, while enterprises must focus on investing in human resource training with analytical skills and establishing robust internal security policies to fully leverage the potential of CC in enhancing the efficiency and transparency of accounting practices.

Keywords: Cloud computing, Corporate accounting, Technology adoption, Barriers

1. Introduction

In the era of the Fourth Industrial Revolution (Industry 4.0), the corporate accounting function is undergoing a profound transformation, shaped by the proliferation of Big Data and automation. CC has established itself as the core technological platform enabling this shift. CC solutions offer crucial benefits, including cost optimization, real-time data processing capabilities, and automated software updates, allowing enterprises to significantly

enhance the efficiency and flexibility of their financial management. The international academic community broadly recognizes CC as an essential catalyst for the development of modern accounting information systems (Kruskopf et al., 2019). Consequently, research focusing on the adoption of CC and the factors inhibiting this process has become a critical academic priority.

In Vietnam, digital transformation is strongly driven by strategic directives such as Decision 749/QĐ-TTg and the National Accounting Strategy until 2030. The domestic CC service market is expanding rapidly, with an estimated size of approximately 9.700 billion VND (equivalent to ≈ 400 million USD) (MIC, 2023). Nevertheless, this development is hampered by specific barriers inherent to emerging economies. These include serious concerns regarding information security and the risk of data loss/exposure from providers, coupled with the lack of clarity in the legal framework concerning data responsibility in cyberspace. To support national digitalization goals, obtaining empirical insights into these critical challenges is paramount.

Despite clear policy interest, empirical research in Vietnam concerning CC adoption in corporate accounting presents a significant gap. Specifically, there is a lack of: (1) Detailed quantitative data describing the level of CC utilization across specific accounting functions (such as archiving and data analytics), and (2) The quantification and prioritization of the main barriers, particularly those related to legal and security constraints, from the enterprise perspective.

This study aims to address these deficiencies. By employing a quantitative survey, this paper provides the pioneering empirical evidence on the status and barriers of cloud computing adoption in Vietnamese corporate accounting. These findings offer a robust scientific basis for proposing strategic solutions, helping policymakers prioritize the completion of the legal framework and assisting businesses in enhancing risk management capabilities to fully harness the technology's potential.

2. Literature Review

2.1 Cloud Computing in Accounting

CC is an innovative Information Technology (IT) service delivery model, formally defined as enabling on-demand network access to a shared pool of configurable computing resources with minimal management effort from the user side (Mell & Grance, 2011). This model signifies a fundamental shift in how enterprises organize their Accounting Information Systems (AIS), migrating the storage, processing, and reporting of data from internal physical servers to networked infrastructure. In the accounting domain, CC is primarily adopted through the Software-as-a-Service (SaaS) model, which delivers ready-to-use accounting applications (e.g., financial ERP modules, ledger systems) directly via a web browser. The SaaS model is particularly suitable for Small and Medium-sized enterprises (SMEs) in Vietnam, as it eliminates the need for large initial capital investment in hardware and minimizes system maintenance costs, which allows for a greater focus on core business activities (Alsharayri & Al-Kassem, 2019).

CC adoption yields several strategic benefits, driving a change in the accounting function's role from a traditional transactional task to a strategic decision-support capacity (Laisheng et al., 2018; Kruskopf et al., 2019). The most pronounced benefit is cost efficiency, as CC converts Capital Expenditure (CAPEX) into operational expenditure (OPEX), substantially reducing the total cost of ownership (TCO) for IT infrastructure. Furthermore, CC provides near-instant flexibility and scalability, enabling Vietnamese enterprises to easily adjust resource capacity to meet rapid growth rates or seasonal business demands. Most critically, CC facilitates real-time data access. By centralizing financial data on a cloud platform, CC supports immediate analysis and reporting, significantly enhancing collaboration and providing management with the timely financial intelligence necessary for data-driven decision-making (Kruskopf et al., 2019).

A deeper analysis reveals that the integration of CC into accounting is not merely a technological issue but a mandatory requirement in the context of the Fourth Industrial Revolution (Industry 4.0). CC serves as a bridge for the adoption of more advanced technologies like big data analytics and artificial intelligence (AI) into specialized accounting functions such as cash flow forecasting and risk management. However, this transition also generates new challenges, particularly in developing nations like Vietnam. While cost benefits are attractive, the loss of physical control over data, coupled with the ambiguity in legal regulations concerning data security and sovereignty, has become a serious psychological and practical impediment for enterprises, threatening to slow the pace of adoption. Therefore, investigating the actual level of CC utilization across specific accounting functions and the influence of these barriers forms the core focus of this study.

2.2 Conceptual Framework for Analysis

This Literature Review section analyzes the adoption barriers of CC in the accounting field based on factors identified in international studies, focusing on three core aspects. To ensure comprehensiveness and scientific rigor, this study employs the Technology-Organization-Environment (TOE) framework (Tornatzky & Fleischer, 1990) as its classification foundation. The TOE framework is widely recognized as a robust model for analyzing the acceptance and deployment of technological innovations at the organizational level (Low et al., 2011). Specifically, the barriers are categorized and analyzed as follows:

2.2.1 Technology Barriers

These barriers focus on the inherent characteristics of CC technology and its compatibility with sensitive and complex accounting operations. CC adoption may be hindered if its technological attributes fail to meet the stringent requirements of the AIS:

Compatibility: Difficulties in integrating the new Cloud system with existing internal accounting and management software (on-premises systems). This barrier is particularly acute for enterprises with long-established legacy accounting systems (Mishra & Singh, 2015).

Complexity: The inherent complexity in the deployment, configuration, and management of CC services, especially for IaaS (Infrastructure-as-a-Service) models, which may outstrip the

technical capabilities of the internal IT department (Sultan, 2010).

Reliability and Performance: Concerns over data access speed, potential service provider downtime, and reliance on stable internet connectivity which constitutes a critical operational risk for real-time accounting processes.

2.2.2 Organizational and Human Resource Barriers

These barriers stem from within the enterprise and relate to its internal resources and context. They reflect the organization's capacity and readiness to adopt and exploit new technology:

Competency Gap: This is a major hurdle, pertaining to the shortage of accounting personnel with the requisite knowledge and skills for security management, Big Data Analytics, and exploiting advanced reporting features in a CC environment. This gap diminishes the potential to shift the accounting role toward a more strategic function (Low et al., 2011).

Resistance to Change: Opposition from accounting staff to altering established traditional workflows and concerns about job security due to automation. A lack of commitment and support from top management also constitutes a severe organizational barrier.

Initial Cost: While CC offers long-term TCO benefits, the initial costs associated with data migration, system integration, and employee training can represent a significant financial barrier, particularly for many SMEs.

2.2.3 Environment and Regulatory Barriers

These are external barriers, encompassing legal, social, and competitive factors. In emerging markets such as Vietnam, these barriers often exert the highest level of influence:

Security and Trust Risk: Consistently identified as the leading concern in CC adoption studies (Oliveira et al., 2014). Enterprises are apprehensive about losing physical control over sensitive customer and financial data when they are stored on third-party servers. The risk of data loss or leakage due to provider vulnerabilities poses a direct threat to the integrity of accounting information.

Legal and Data Sovereignty Framework: The lack of clarity in legal regulations concerning data localization, legal liability for data breaches, and compliance requirements for tax/accounting in the CC environment is a serious impediment. In Vietnam, the incomplete status of the legal framework on data sovereignty (MIC, 2023) elevates legal risk and creates significant hesitancy in adopting cross-border Cloud services.

2.2.4 Theoretical Integration and Framework Extension

While the Technology–Organization–Environment (TOE) framework provides a well-established foundation for analyzing organizational adoption of cloud computing, its explanatory power can be enhanced by situating it within a broader technology adoption literature. In particular, insights from the Diffusion of Innovation (DOI) theory and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) offer complementary perspectives that enrich the interpretation of TOE-based findings, especially in emerging

market contexts.

From a DOI perspective, technological barriers identified under the TOE framework—such as system complexity, compatibility with existing accounting systems, and perceived reliability—closely correspond to innovation attributes including complexity, compatibility, and relative advantage. These attributes influence how enterprises evaluate cloud-based accounting solutions relative to traditional systems, thereby shaping both adoption intentions and implementation depth. Integrating DOI concepts within the technological dimension of TOE allows adoption barriers to be interpreted not merely as technical constraints, but as perception-driven evaluations of innovation characteristics.

The organizational dimension of TOE also aligns with key constructs emphasized in UTAUT2, particularly facilitating conditions and accumulated experience. In the accounting context, limitations in analytical skills, resistance to process change, and uneven internal capabilities reflect not only structural resource constraints but also behavioral inertia within organizations. By drawing on UTAUT2, this study highlights how organizational readiness and human capital shape the effective use of cloud technologies beyond initial adoption decisions.

Moreover, the environmental dimension of TOE is conceptually linked to institutional and trust-related factors discussed in extended adoption models. Regulatory clarity, data sovereignty, and perceived security risks do not function solely as external conditions, but actively influence organizational confidence and willingness to rely on cloud-based systems. By integrating these perspectives, the study positions regulatory and institutional factors as dynamic drivers of adoption outcomes rather than static background variables.

Overall, situating the TOE framework within a broader theoretical landscape enables a more comprehensive understanding of cloud computing adoption in enterprise accounting. This integrated perspective is particularly relevant for emerging economies such as Viet Nam, where technological readiness, organizational capabilities, and regulatory environments evolve simultaneously and interactively.

2.3 Recent Evidence on Cloud Computing Adoption in Corporate Accounting in Vietnam and Southeast Asia (2022–2025)

Recent studies published between 2022 and 2025 provide more nuanced insights into cloud computing (CC) adoption in corporate accounting within emerging economies, particularly Vietnam and Southeast Asia. This literature emphasizes that, beyond technological advantages, CC adoption is strongly conditioned by regulatory clarity, data security concerns, and organizational readiness in accounting functions.

Empirical evidence from Vietnam indicates that the adoption of cloud-based accounting solutions has expanded rapidly, especially among small and medium-sized enterprises (SMEs), driven by cost efficiency and ease of implementation through Software-as-a-Service (SaaS) models. Recent surveys indicate that a majority of Vietnamese enterprises adopting cloud accounting solutions continue to rely primarily on basic accounting modules, such as data storage, document management, and general ledger processing, while fewer firms

exploit advanced analytical features for strategic decision-making. This pattern suggests that CC is predominantly utilized as an operational support tool rather than as a platform for advanced data analytics, forecasting, or managerial decision support.

Similar adoption trajectories are observed across Southeast Asian economies such as Malaysia, Indonesia, and Thailand. Regional studies report widespread use of standardized cloud accounting applications, accompanied by persistent barriers related to information security, legal uncertainty regarding data responsibility, and shortages of accounting professionals with advanced analytical and cloud-related skills. In contrast, more digitally mature environments within the region, notably Singapore, demonstrate that clearer data governance frameworks, stronger regulatory enforcement, and targeted professional training programs can facilitate deeper and more strategic integration of CC into accounting systems.

Overall, this recent body of literature highlights that Vietnam's experience reflects broader regional dynamics while also exhibiting distinctive national characteristics, including strong SME dominance and heightened sensitivity to legal and security risks. Incorporating these updated regional insights strengthens the contextual relevance of this study and provides a clearer foundation for interpreting empirical findings and policy recommendations.

3. Research Design, Research Questions, and Methodology

3.1 Research Questions

Guided by established theoretical foundations and the objectives of this study, two research questions are formulated to (i) assess the current extent of cloud computing adoption in corporate accounting practices and (ii) identify and evaluate the key barriers influencing adoption decisions.

RQ1: To what extent is cloud computing adopted in accounting operations?

This descriptive research question examines the level of cloud computing adoption in accounting practices by measuring adoption rates, preferred service models (Software-as-a-Service, Infrastructure-as-a-Service, and Platform-as-a-Service), and the scope of application across core accounting functions, including financial accounting, management accounting, and related data management activities. The results of RQ1 provide baseline evidence on the current stage of digital transformation in corporate accounting and establish the empirical context for analyzing adoption barriers.

RQ2: Which barriers exert the strongest influence on the adoption of cloud computing in accounting?

This analytical research question is grounded in the Technology–Organization–Environment (TOE) framework (Tornatzky & Fleischer, 1990) and evaluates the relative influence of technological, organizational, and environmental barriers on cloud computing adoption. Technological barriers relate to system complexity, compatibility with legacy accounting systems, and service reliability. Organizational barriers reflect internal capacity constraints, resistance to change, and cost considerations. Environmental barriers primarily concern data security risks and uncertainty surrounding the legal framework for data sovereignty. By

ranking the influence of these barriers, RQ2 provides insights with direct practical relevance for enterprises and policymakers in emerging market contexts such as Vietnam.

Together, these research questions define the analytical scope of the study and guide the empirical investigation presented in the subsequent sections.

3.2 Research Design

This study adopts an exploratory descriptive survey design. The exploratory component is appropriate given the limited empirical evidence on cloud computing adoption barriers in corporate accounting within the Vietnamese context. The descriptive component enables the study to quantify the current level of adoption (RQ1) and assess the magnitude of influence of identified barriers (RQ2). This combined design ensures a balance between identifying context-specific factors and systematically measuring established variables derived from the TOE theoretical framework.

3.3 Sample and Data Collection

Data are collected using a cross-sectional survey method with a structured questionnaire. The survey targets managers, chief accountants, and specialists responsible for accounting information systems within enterprises, as these respondents are directly involved in cloud computing adoption decisions.

The target sample size is n = 200 enterprises, which is considered sufficient to ensure representativeness and support quantitative analysis. A combination of convenience sampling and purposive sampling is employed to focus on enterprises that have adopted, are in the process of adopting, or have the potential to adopt cloud computing in their accounting systems.

3.4 Measurement Instrument

The questionnaire consists of three main sections and employs measurement scales adapted from validated international studies (e.g., Low et al., 2011; Mishra & Singh, 2015) and contextualized for Vietnam. A five-point Likert scale is used to measure observed variables, ranging from 1 (strongly disagree/very low influence) to 5 (strongly agree/very high influence).

Cloud computing adoption (RQ1) is measured through indicators capturing adoption status, service models used (SaaS, IaaS, PaaS), and the scope of application across accounting functions. Adoption barriers (RQ2) are measured by assessing the perceived influence of factors corresponding to the three TOE dimensions: technological, organizational, and environmental.

3.5 Data Analysis

Collected data are cleaned, coded, and analyzed using statistical software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, are used to describe the level of cloud computing adoption and summarize respondents' perceptions. Reliability analysis (Cronbach's alpha) is conducted to assess the internal consistency of

measurement scales. Mean values are used to rank adoption barriers across the technological, organizational, and environmental dimensions, thereby directly addressing RQ1 and RQ2.

4. Results & Discussion

4.1 Survey Instrument Content and Respondent Profile

The structured questionnaire was designed in five main sections, aiming to directly collect data relevant to RQ1 and RQ2:

General Information (Section I): Included questions regarding the enterprise's size and industry sector.

CC Adoption Status (Section II): Addressed whether the enterprise utilizes Cloud Computing (CC), and which service models (SaaS, IaaS, PaaS) are prioritized.

Level of Adoption in Operations (Related to RQ1): Assessed the extent to which CC is integrated into specific accounting operations (such as General Ledger, Cost Accounting, Data Storage), utilizing a 5-point Likert Scale (Section II).

Barriers and Challenges (Related to RQ2): Required respondents to evaluate the magnitude of influence of various adoption barriers (Security, Cost, Network Infrastructure, Human Resource Competency, Integration Complexity) on a 5-point Likert Scale (Section IV).

Satisfaction and Recommendations (Sections III & V): Gathered qualitative information regarding the enterprise's support needs and future proposals.

Target Respondents: The questionnaire was specifically directed to individuals possessing specialized knowledge and authority over the accounting information system, including the Chief Accountant, IT System Specialists, or Senior Management involved in technology investment decisions.

4.2 Description of Sample Characteristics

Table 1. Distribution of the Research Sample by Industry Sector and Enterprise Size

Characteristic	Category	Frequency (n)	Rate (%)
Business Size	Small Business	120	60.3%
	Medium Enterprise	60	30.2%
	Large Enterprise	19	9.5%
	Total	**199**	**100.0%**
Field of Activity	Services & Consulting	90	45.2%
	Manufacturing & Construction	70	35.2%
	Trading & Distribution	39	19.6%
	Total	**199**	**100.0%**

4.2.1 Analysis by Enterprise Size

The research sample shows a clear dominance of Small and Medium-sized Enterprises (SMEs), accounting for 90.5% of the total sample (60.3% + 30.2%). This structure is highly suitable for the research context, as SMEs represent the group with the greatest need for

low-cost CC solutions.

Representativeness: This ratio aligns perfectly with Vietnam's economic structure, where SMEs play a dominant role. This ensures that the research findings possess high generalizability for the majority of the target market.

Implication for RQ1 (Adoption Status): The SME group is precisely the one with the highest demand and accessibility for Public Cloud solutions (especially SaaS), owing to the benefits of low initial investment costs and high flexibility and scalability. Therefore, the data collected from this sample will genuinely reflect the penetration rate of CC into enterprises undergoing initial digital transformation.

Implication for RQ2 (Barriers): The dominance of SMEs makes Organization (O)-related barriers, specifically the Initial Cost Burden and the Accounting/IT Competency Gap, extremely sensitive and critical. The study must compare the influence of these barriers against the Environmental and Technology barriers to draw the sharpest conclusions.

4.2.2 Analysis by Industry Sector: Diversification of Accounting Operations

The research sample covers three main economic sectors, with a notable presence of Services and Consulting (45.2%) and Manufacturing and Construction (35.2%).

Diversity: This diversification allows the study to analyze the flexibility of CC in meeting diverse accounting requirements:

Service Sector: Often prioritizes simple, flexible accounting solutions, focusing on operational cost management and general ledger.

Manufacturing/Construction Sector: Demands more complex features related to Cost Accounting, Inventory Management, and Fixed Assets.

Implication for RQ1: The results regarding the Level of Adoption in Operations will have high reliability, enabling the study to clearly determine whether CC can effectively replace or support the most complex accounting operations (such as Cost Accounting).

Implication for RQ2: The presence of the Manufacturing/Construction industry increases the sensitivity of the Compatibility and Integration Complexity barriers (falling under the Technology group), as these enterprises typically possess complex Legacy Systems.

Conclusion: The sample structure is ideal for the research objectives. It not only represents Vietnam's enterprise structure (SME dominance) but also encompasses sectors with diverse accounting needs and complexities, establishing a firm foundation for accurately quantifying both the adoption status and the barriers according to the TOE Framework.

4.3 Results Addressing RQ1: Current Status of CC Adoption

RQ1 asks about the Extent of Cloud Computing Adoption in Accounting Operations.

4.3.1 Preferred Service Models

Table 2. Level of Adoption by CC Service Model

Service Model	Application Rate (%)
Public Cloud	**73.1%**
Private Cloud	15.4%
Hybrid Cloud	11.5%
Total	**100.0%**

The majority of enterprises prioritize Public Cloud (73.1%), reflecting a widespread acceptance of Software-as-a-Service (SaaS) accounting software—which is the most common Public Cloud model.

Public and Private Cloud Analysis

Public Cloud: The Essential Choice for SMEs

The high adoption rate of Public Cloud reflects a trend in CC application driven by cost-effectiveness and ease of access.

Consistency with Sample Structure: This analysis is fully consistent with the research sample's characteristics (90.5% are SMEs). Small and medium-sized enterprises typically lack large budgets for initial hardware investment and do not possess dedicated IT teams. Public Cloud, especially through Software-as-a-Service (SaaS) solutions like online accounting software, provides an ideal resolution:

CAPEX Minimization: It converts Capital Expenditure (CAPEX) into Operational Expenditure (OPEX) via monthly subscription fees.

Immediate Deployment: It requires neither internal infrastructure nor complex installation processes.

Initial Penetration Phase: This indicates that the current CC application stage within the Vietnamese accounting sector remains at an initial penetration level, where CC is regarded as a straightforward substitute for traditional software, rather than a platform for comprehensive transformation.

Private and Hybrid Cloud: Barriers Posed by Competency and Cost

The low adoption rates for Private Cloud (15.4%) and Hybrid Cloud (11.5%) suggest these models remain exceptional cases, primarily confined to larger enterprises.

Technical and Organizational Barriers (Linking to RQ2): The deployment of Private and Hybrid Cloud necessitates high technical complexity, requiring specialized IT personnel to manage the integration between cloud environments and Legacy Systems. This low adoption rate serves as evidence of the existence of Complexity and the Accounting/IT Competency Gap barriers in the surveyed enterprises.

Application Objective: Private/Hybrid Cloud solutions are typically chosen when enterprises

have extremely stringent requirements concerning Security, Regulatory Compliance, and the need for deep integration with complex ERP systems. The low rate suggests that the majority of enterprises have not yet reached the level of operational complexity demanding these specialized infrastructure solutions (IaaS).

The current status of CC adoption in accounting operations is characterized by a service-oriented (SaaS-driven) application, with the primary priority being cost efficiency. The acceptance level for more complex infrastructure and platform solutions remains inhibited by Organizational and Technological factors.

4.3.2 Level of CC Adoption by Accounting Function

Table 3. Level of CC Adoption in Accounting Operations

Accounting Operations	**Mean Value ($\bar{X}$)**	**Standard Deviation (SD)**
Data Storage and Backup	**4.25**	0.85
General Ledger	3.80	0.92
Cost Accounting	3.10	1.05
Advanced Data Analytics and Reporting	**2.55**	1.15

(5-level Likert scale: 1=Very low application, 5=Very high application)

The highest adoption level is concentrated in Data Storage and Backup (X=4.25), whereas functions demanding analysis and strategy show the lowest adoption level (X=2.55). This indicates that CC is primarily utilized as an infrastructure support solution rather than a strategic tool.

The results from Table 3 are key data points for evaluating the depth of penetration of Cloud Computing (CC) into accounting processes, not just the frequency of usage.Prioritization of Support Functions (Level 1 Adoption)The highest adoption level belongs to the Data Storage and Backup function (X=4.25) with the lowest standard deviation (SD (0.85).

Infrastructure Imperative: This confirms that CC is viewed, first and foremost, as an effective Infrastructure Support solution, helping enterprises address fundamental issues regarding data integrity and recovery.

Cost and Convenience Benefits: The use of the cloud for storage significantly reduces the cost of maintaining physical servers (Data Center), making it suitable for the SME group that dominates the sample.

Moderate Adoption and Core OperationsThe General Ledger function (X=3.80) has a relatively high adoption level, reflecting the widespread use of SaaS accounting software for daily transaction recording and aggregation.

Core Functionality: General Ledger is the most essential and standardized function, making it easily integrated into available SaaS-based CC solutions in the market.

Cost Accounting: The Cost Accounting function (X=3.10) shows a significantly lower

adoption level and a higher standard deviation (1.05). This suggests that CC application begins to face difficulties in operations requiring high specialization and complex customization (such as cost determination and cost allocation).

Strategic Gap: The lowest adoption level belongs to the Advanced Data Analytics and Reporting function (X=2.55).

CC is not yet a Strategic Tool: This result points to a Strategic Gap. Although CC possesses the capacity for Big Data processing and offers advanced analytical tools, Vietnamese enterprises have not yet capitalized on this potential in accounting. CC has not yet been converted from an operational tool into a Decision Support Tool.

Link to Barriers: This low adoption level is directly linked to Organization (O) barriers such as the Accounting/IT Competency Gap. To perform advanced analytics, personnel proficient in both management accounting and cloud technology are required, which is a scarce resource.

Summary Conclusion for RQ1The current status of CC adoption in accounting among the surveyed enterprises is characterized by breadth (high usage) in basic functions and shallow penetration depth in complex, strategic, and decision-making support functions.

4.3.3 Challenges in Adopting Advanced Data Analytics in Cloud Accounting

Although cloud-based accounting platforms increasingly integrate advanced data analytics functionalities, the survey results indicate a relatively low level of utilization of these features among Vietnamese enterprises (mean = 2.55). This finding suggests that limited adoption of advanced analytics is not primarily driven by technological unavailability, but rather by practical implementation challenges.

Qualitative insights derived from the “Satisfaction and Recommendations” section of the survey highlight two interrelated constraints. First, respondents frequently pointed to the lack of specialized training programs in data analytics and cloud-based accounting as a major obstacle. Many enterprises reported that accounting staff possess sufficient skills to operate basic cloud accounting modules, yet lack the analytical competencies required to interpret complex data outputs for managerial or strategic decision-making. Second, the high cost of advanced analytical modules was perceived as a significant barrier, particularly for small and medium-sized enterprises, which tend to prioritize compliance-oriented and transactional accounting functions over value-added analytics.

These challenges jointly reduce the perceived return on investment of advanced cloud-based analytics, reinforcing a pattern in which enterprises limit cloud adoption to basic accounting applications. The findings underscore that the underutilization of advanced analytics reflects predominantly organizational and human-capital constraints, rather than purely technological limitations. Addressing these challenges therefore requires complementary measures, including targeted training initiatives and more accessible pricing structures for analytical modules, alongside continued investment in cloud infrastructure.

4.4 Results Addressing RQ2: Magnitude of Influence of Barriers

RQ2 asks about the Barriers with the highest magnitude of influence on adoption. Table 4 presents the ranking results for the barriers inquired about in Section IV of the questionnaire (using a 5-point Likert Scale).

4.4.1 Ranking of Barriers based on the TOE Framework

Table 4. Ranking of the Magnitude of Influence of CC Adoption Barriers

Barriers	**Classification Group (TOE)**	**Mean Value (X^-)**	**Standard Deviation (SD)**
Security and Trust Risks	Environment (E)	**4.30**	0.78
Legal and Data Sovereignty	Environment (E)	**4.05**	0.82
Initial Cost Burden	Organization (O)	3.90	0.95
Accounting/IT Competency Gap	Organization (O)	3.75	0.90
Complexity	Technology (T)	3.50	0.98

Key Finding: Security and Trust Risks (X=4.30) and the Regulatory Framework (X=4.05) are the two barriers with the highest magnitude of influence. These Environmental (E) factors are considered the primary obstacles, significantly exceeding the Technology (T) and Organization (O) factors, which reflects the major concern among enterprises regarding legal compliance and data security when migrating to the cloud.

4.4.2 Interdependencies between Adoption Barriers

Beyond the individual ranking of barriers, the survey results indicate that adoption constraints are interrelated rather than independent. In particular, the two highest-rated environmental barriers—security and trust risks (mean = 4.30) and legal ambiguity related to data sovereignty (mean = 4.05)—appear to reinforce each other in shaping enterprises' reluctance to adopt cloud computing in accounting operations.

Qualitative feedback from open-ended survey responses suggests that concerns over data breaches and loss of control are frequently intensified by uncertainty regarding legal accountability, data ownership, and regulatory protection mechanisms. Enterprises often perceive security risks as more severe when the legal framework governing cloud services is viewed as unclear or inconsistently enforced. This interaction helps explain why security-related concerns remain dominant despite the increasing technical maturity of cloud service providers.

Organizational capacity further moderates these interaction effects. The relatively low utilization of advanced analytical functions in cloud accounting (mean = 2.55) indicates that many firms lack the necessary accounting–IT skills to fully exploit cloud platforms. Limited internal expertise not only constrains the adoption of advanced features but also amplifies perceived technological and security risks, particularly in an uncertain regulatory environment. Conversely, enterprises with stronger internal capabilities report greater confidence in managing compliance and security issues.

These findings imply that barriers to cloud accounting adoption form a mutually reinforcing system. Addressing security risks without improving legal clarity or organizational capacity is unlikely to yield sustainable adoption outcomes. An integrated approach that simultaneously strengthens regulatory frameworks, enhances enterprise skills, and improves technological assurance mechanisms is therefore essential.

4.4.3 Disaggregated Analysis of Adoption Barriers by Enterprise Size and Sectornterdependencies between Adoption Barriers

To further refine the analysis of cloud computing adoption barriers, this subsection examines how perceived constraints differ across enterprise size and sectoral characteristics. Such disaggregated analysis provides a more nuanced understanding of adoption dynamics and helps explain why a uniform approach to cloud adoption policy and strategy may be ineffective in the Vietnamese context.

Differences by Enterprise Size

The survey results reveal notable variations in perceived barriers between small and medium-sized enterprises (SMEs) and large enterprises. SMEs tend to report higher sensitivity to cost-related and capability-related constraints, reflecting limited financial resources and shortages in specialized accounting–IT skills. In particular, the low level of utilization of advanced analytical functions (mean = 2.55) is more pronounced among SMEs, suggesting that cloud adoption is largely confined to basic accounting modules aimed at compliance and transaction processing. Qualitative responses further indicate that SMEs often view advanced analytics as offering uncertain returns relative to their implementation and training costs

By contrast, large enterprises assign greater importance to environmental barriers, especially security and trust risks (mean = 4.30) and legal ambiguity related to data sovereignty (mean = 4.05). For these firms, the scale and sensitivity of accounting and financial data heighten concerns over regulatory compliance, data localization, and accountability in the event of security breaches. As a result, cloud adoption decisions among large enterprises are shaped less by cost considerations and more by the perceived adequacy of legal safeguards and governance frameworks.

Differences by Sector

Sectoral differences further reinforce the heterogeneous nature of adoption barriers. Service-oriented enterprises - particularly those operating in finance, trade, and logistics - tend to exhibit stronger concerns regarding data security and regulatory compliance, given their intensive handling of customer and transactional data. In contrast, manufacturing firms more frequently emphasize challenges related to system integration and operational complexity, especially when cloud solutions must be aligned with legacy accounting and enterprise resource planning systems.

Implications for Targeted Strategies

These findings suggest that cloud adoption barriers in enterprise accounting are highly

context-specific. For SMEs, effective strategies should prioritize capacity building, including targeted training programs and more affordable pricing structures for advanced analytical modules. In contrast, for large enterprises and data-intensive service sectors, policy efforts should focus on enhancing legal clarity, strengthening data sovereignty protections, and establishing robust compliance standards. Recognizing these differences is essential for designing differentiated and effective interventions, rather than relying on one-size-fits-all approaches to promoting cloud computing adoption in accounting practices.

5. Conclusion and Recommendations

5.1 Conclusion

The study successfully achieved its objectives of identifying the current state of Cloud Computing (CC) adoption and quantifying the primary barriers hindering its deployment in accounting operations across Vietnamese enterprises.

5.1.1 On the Nature of Adoption

The current state of CC adoption is characterized by being in the initial penetration phase, marked by wide scope and being cost-driven.

Pragmatic Nature: The application of CC predominantly focuses on the SaaS (Public Cloud) model. This reflects the enterprise priority—especially among SMEs—for solutions that minimize initial capital expenditure and are easy to deploy.

Strategic Gap: While CC has penetrated deeply into basic infrastructure support functions (such as data storage and backup), a clear strategic gap persists. Adoption levels are extremely low in operations requiring advanced data analytics and decision support. This confirms that CC continues to be viewed as an operational tool rather than a strategic instrument within the accounting department.

5.1.2 On Dominant Barriers

The analysis results highlight the decisive role of external factors in impeding the digital transformation of accounting:

Dominance of Environmental Factors (E): Barriers belonging to the Environmental group were ranked as having the highest magnitude of influence, significantly outweighing the Technology (T) and Organization (O) factors.

Primary Concerns: The two major obstacles are Security and Trust Risks combined with the Regulatory Ambiguity. This reflects the deep concern within the business community regarding legal certainty and data security when migrating sensitive accounting information to the cloud environment.

In summary, to successfully propel CC past the initial penetration phase and into strategic application, it is essential to prioritize addressing Environmental and Regulatory barriers at the national level, while simultaneously investing in human resource competency to leverage the full depth of the technology.

5.2 Recommendations

5.2.1 Theoretical Implications

This study does not merely apply the Technology-Organization-Environment (TOE) Framework to categorize Cloud Computing (CC) adoption barriers; it also provides significant extension and adjustment to this Framework within the context of an emerging market.

Specifically, the research reinforces and extends the application of the TOE Framework within the specific context of the Vietnamese accounting sector. The study highlights the precedence of Environmental (E) factors (Regulatory and Security) in explaining CC adoption decisions, thereby contributing to the understanding of the critical role of trust and regulatory stability as prerequisites for technology acceptance in developing economies.

(1) The Precedence of Environmental (E) Factors in TOE

The most prominent finding of the study is the overwhelming precedence of Environmental (E) factors (particularly Security Risks and the Regulatory Framework) over Technology (T) and Organization (O) factors in impeding CC adoption.

Theoretical Contribution: Most technology adoption models (such as TOE or the Diffusion of Innovation) acknowledge the role of these factors, but this study has quantified and ranked them to demonstrate that in Vietnam (an emerging market), macro-level Environmental (E) factors function as pre-requisite factors. If regulatory stability and security trust are not established, investments in Technology (T) or Organization (O) factors will not be effective.

TOE Framework Extension: The research suggests that in economic environments characterized by higher regulatory uncertainty, the TOE model should be considered with a priority weighting leaning toward E factors. Specifically, the factor "Regulatory Stability and Trust" needs to be positioned as a higher-level control variable within the structural model.

(2) Affirming the Role of Trust and Regulation

The study strengthens the recognized role of Trust and Regulation as prerequisites for technology acceptance, especially within the accounting domain—a field sensitive to financial data.

Sensitivity of Accounting Data: Accounting involves data with the highest value and sensitivity (financial, tax, customer data). The top ranking of Security and Legal barriers suggests that technology adoption models must integrate more deeply variables related to Trust and Legal Certainty as key independent variables, rather than merely control variables.

International Comparison: This result is consistent with findings from other developing economies (such as India and Malaysia), where concerns regarding data security and Data Sovereignty are often primary barriers. This study contributes to the body of theory by providing quantitative evidence from a specific Southeast Asian economy.

In summary, the main theoretical contribution is the adjustment of the focus of the TOE

Framework within the emerging market context, emphasizing the decisive nature of macro-environmental factors as a precondition for strategic accounting technology adoption.

5.3 Practical Implications

Based on the quantitative findings, the study proposes strategic recommendations essential for overcoming the identified adoption barriers and fostering a more effective and safer transition to Cloud Computing (CC).

*** For Enterprises (Addressing Internal Governance and Competency)**

Enterprises must shift their focus from purely external concerns to proactive internal risk management and talent development to truly leverage CC's strategic value.

Strengthening Internal Security Governance: The research shows that security and trust risks are the most significant obstacles. Enterprises must adopt the Shared Responsibility Model, understanding that they are ultimately responsible for security in the cloud (data and access). They must prioritize robust Internal Controls and Identity and Access Management (IAM) policies to prevent data leakage stemming from internal misconfigurations or human error, rather than simply relying on vendor security alone.

Strategic Investment in Personnel Competency: The notable "strategic gap"—where adoption is minimal in advanced data analytics—signals a crucial competency shortfall. Investment is needed to transform the accounting function from mere transaction processing to strategic decision support. This requires targeted training in Cloud-based Management Accounting and data analysis skills, enabling accountants to utilize CC's advanced capabilities for strategic decision-making.

*** For State Management Agencies (Addressing Macro-Level Policy)**

The high magnitude of influence exerted by Environmental factors (Legal and Regulatory) necessitates urgent intervention at the national policy level to establish market confidence.

Prioritizing Legal Clarity and Data Governance: Regulatory ambiguity is one of the highest-ranked barriers, creating Legal Uncertainty that deters large and sensitive enterprises. The Government must swiftly issue or refine official Decrees and Circulars that clarify:

Accountability: Defining the legal responsibilities of Cloud Service Providers (CSPs) and enterprises during audits or security incidents.

Data Sovereignty: Establishing clear guidelines on where Vietnamese accounting data can be legally stored, thereby ensuring Regulatory Compliance.

Supporting Standardization and Interoperability: Lack of standardization increases complexity and switching costs for enterprises. The State should facilitate the establishment of Standardization Guidelines for accounting data formats and API protocols (Application Programming Interface). This action will promote greater interoperability among SaaS solutions, lower integration barriers for SMEs, and foster a more competitive and transparent Cloud service market.

6. Conclusion

This study investigates the adoption of cloud computing in corporate accounting in Vietnam using an exploratory survey approach grounded in the Technology–Organization–Environment (TOE) framework. The findings indicate that cloud computing is mainly applied to basic accounting functions, such as data storage and general ledger processing, while its use for advanced analytics and decision support remains limited. This suggests that cloud computing is currently perceived more as an operational support tool than as a strategic accounting resource.

The results further show that environmental factors, particularly concerns related to information security and legal uncertainty over data sovereignty, represent the most significant barriers to adoption, outweighing technological and organizational constraints. Differences across enterprise size and sectors highlight the need for differentiated adoption strategies. Overall, the study provides empirical evidence on the current stage of cloud computing adoption in Vietnamese corporate accounting and underscores the importance of regulatory clarity, security assurance, and capacity building to support deeper and more effective adoption.

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Macrothink Institute.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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References

Alsharayri, M., & Al-Kassem, H. (2019). Factors affecting cloud computing adoption in the accounting profession in Jordan. *International Journal of Electronic Accounting, 3*(2), 101-125.

Alzoubi, A. (2011). The effectiveness of the accounting information system under the enterprise resources planning (ERP): A study on Al Hassan qualified industrial zone's (QIZ) companies. *Research Journal of Finance and Accounting, 2*(10-18).

Chính phủ. (2020). Quyết định số 749/QĐ-TTg phê duyệt "Chương trình chuyển đổi số quốc gia đến năm 2025, định hướng đến năm 2030" (Decision No. 749/QD-TTg).

Duong, T. H. P. (2018). *Research on factors affecting the successful implementation of ERP systems in Vietnamese enterprises* (Master's thesis). National Economics University, Hanoi.

Hajiha, Z., & Azizi, Z. A. P. (2011). Effective factors on alignment of accounting information systems in manufacturing companies: Evidence from Iran. *Information Management and Business Review, 3*(3), 158-170. https://doi.org/10.22610/imbr.v3i3.929

Kruskopf, J., Kienitz, C., & Hinz, O. (2019). *The role of cloud computing in accounting information systems.* Proceedings of the 52nd Hawaii International Conference on System Sciences.

Laisheng, W., Jifeng, L., & Hu, J. (2018). The impact of cloud computing adoption on accounting information systems. *Journal of Management and Financial Sciences, 7*(20), 40-55.

Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management & Data Systems, 111*(7), 1006-1023. https://doi.org/10.1108/02635571111161262

Luong, Đ. T. (2019). *Factors affecting the behavior of using accounting information systems in the environment of application of enterprise resource planning systems in enterprises in Vietnam* (Unpublished doctoral dissertation). Ho Chi Minh City University of Economics, Ho Chi Minh City.

Mell, P., & Grance, T. (2011). *The NIST definition of cloud computing.* National Institute of Standards and Technology. https://doi.org/10.6028/NIST.SP.800-145

MIC (Ministry of Information and Communications). (2023). Báo cáo thị trường dịch vụ điện toán đám mây Việt Nam 2023.

Mishra, R., & Singh, A. (2015). Cloud computing adoption challenges in small and medium

enterprises (SMEs). *Journal of Enterprise Information Management, 28*(6), 837-859.

Nguyen, P. B. A. (2012). *Organization of enterprise accounting.* Oriental Publishing House.

Nguyen, T. B. L. (2012). *Identify and control factors affecting the quality of accounting information in the application environment of ERP enterprise resource planning system in Vietnamese enterprises* (Unpublished doctoral dissertation). Ho Chi Minh City University of Economics, Ho Chi Minh City.

Nguyen, T. H. (2017). *Organizing the cost management accounting information system in Vietnamese telecommunications enterprises* (Unpublished doctoral dissertation). University of Commerce, Hanoi.

Nguyen, T. H. N. (2014). Evaluation criteria and factors affecting the quality of accounting information. *Journal of Accounting & Auditing, 131*, 30-33.

Oliveira, T., Thomas, M., & Espadanal, P. (2014). Assessing the determinants of cloud computing adoption: An analysis of the European context. *Computers in Industry, 65*(7), 987-998.

Randy, P., & Nanh, R. (1998). User satisfaction determinants: The role of hardware and procedural components. *Journal of Computer Information Systems, 38*(2), 44-48. https://doi.org/10.1080/08874417.1998.11647325

Sultan, N. (2010). Cloud computing for data analysis and financial forecasting. *Journal of Financial Reporting and Accounting, 8*(2), 151-160.

Thong, J. Y. L. (1996). An integrated model of information systems adoption in small businesses. *Journal of Management Information Systems, 15*(4), 187-214. https://doi.org/10.1080/07421222.1999.11518227

To, H. T. (2017). *Research on factors affecting the organization of accounting information systems in Vietnamese public universities* (Master's thesis). University of Economics, Ho Chi Minh City.

Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation.* Lexington Books.

URQUÍA GRANDE, E., PÉREZ ESTÉBANEZ, R., & MUÑOZ COLOMINA, C. (2011). The impact of accounting information systems (AIS) on performance measures: Empirical evidence in Spanish SMEs. *Industrial Management & Data Systems, 111*(3), 450-467. https://doi.org/10.4192/1577-8517-v11_2

Vu, Q. T. (2018). *Evaluation of the effectiveness of integrated accounting information systems in the enterprise resource planning (ERP) environment - A study in Vietnamese enterprises* (Unpublished doctoral dissertation). Ho Chi Minh City University of Economics, Ho Chi Minh City.

Vu, T. T. B. (2020). *Research on factors affecting the quality of accounting information systems at SMEs in Hanoi* (Unpublished doctoral dissertation). National Economics

University, Hanoi.

Xu, H., & Lu, D. (2003). *The critical success factors for data quality in accounting information system*. International Association for Computer Information Systems.