

AWARENESS AND INTEGRATION OF CLOUD COMPUTING IN ACCOUNTING: EVIDENCE FROM PAKISTAN

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Abstract

Cloud computing is transforming the operational landscape of accounting firms by enabling smarter, more flexible approaches to data management, collaboration, and client service. In Pakistan, where digital transformation is accelerating but still faces practical challenges, accounting professionals are beginning to examine the potential of cloud technologies within their workflows. This study investigates the level of awareness among firms regarding cloud computing and their perceptions of its integration into day-to-day accounting practices. Drawing on both global literature and locally gathered insights, the research explores perceived benefits, including improved operational efficiency and enhanced collaboration, as well as common concerns such as data security, regulatory ambiguity, and institutional readiness. The findings indicate a growing interest in cloud adoption; however, widespread implementation will require improved training, more transparent policy frameworks, and strategic planning to support a confident and sustainable transition.

Keywords: Cloud Computing, Accounting Firms, Digital Transformation

INTRODUCTION

Technology is fundamentally transforming the practice of accounting, and cloud computing has become one of the central forces driving this shift. Unlike traditional desktop-based systems that limit access to localized networks and require significant hardware investments, cloud-based platforms allow firms to access financial data anytime and from any location. This provides not only greater flexibility but also enhances collaboration among geographically dispersed teams. By enabling real-time data sharing, remote work integration, and continuous updates, cloud computing improves the timeliness and reliability of financial reporting (Karhan, 2019; Saka & Oduware, 2019; van Zanden, 2023; Amir et al., 2025; Minella, 2025). Beyond accessibility, cloud accounting systems significantly enhance operational efficiency by automating routine tasks such as data entry, reconciliations, and financial reporting. Automation reduces the likelihood of human error, frees accountants to focus on strategic and analytical activities, and improves overall productivity. Studies have shown that cloud-based solutions facilitate cost reductions by minimizing infrastructure expenditures and lowering maintenance costs, making them particularly advantageous for small and medium-sized enterprises (Marc, 2011; Liu et al., 2018; Geda, 2023; Hun et al., 2024; Marc, 2024; Farras et al., 2025; Kodithuwak & Pacillo, 2025; Iqbal et al., 2025). Moreover, cloud adoption is increasingly viewed as a competitive necessity in the accounting profession. Organizations that embrace cloud solutions are better positioned to respond quickly to client needs, comply with evolving regulatory requirements, and adopt emerging technologies such as artificial intelligence and blockchain. The scalability of cloud systems also allows firms to adapt easily to business growth, ensuring long-term flexibility and competitiveness (Dimitriu & Matei, 2015; Bibi, 2019; Akim, 2020; Can, 2021; Salleh & Sapengin, 2023; Marc & Yu, 2024; Arshi et al., 2025; Reich & Reich, 2025). Nevertheless, the transition to cloud computing is not without challenges. Concerns around cybersecurity, data privacy, and compliance with jurisdiction-specific data protection laws continue to shape organizational adoption strategies (Smith, 2016; Sumaira, 2020; Owusu & Noyignon, 2021; Umair et al., 2025).

Globally, the transition toward cloud-based accounting systems is already well underway, with firms in developed economies increasingly leveraging digital platforms to streamline financial processes, enhance collaboration, and deliver more value-added services to clients. This trend reflects not only the technological maturity of global markets but also the growing demand for real-time financial information and more flexible accounting practices (Tila & Cera, 2021; Lee & Hur, 2022; Shaukat et al., 2025). In contrast, the journey toward cloud adoption in Pakistan is still unfolding. While some large corporations and multinational subsidiaries have begun integrating cloud-based systems, the uptake among small and medium-sized accounting firms remains at an early stage.

For many of these smaller firms, the interest in cloud solutions is motivated by the desire to improve service quality, reduce operational costs, and remain competitive in an industry where digital transformation is becoming the standard rather than the exception (Ali et al., 2021; Zafar et al., 2025). These firms see cloud accounting as a pathway to enhance efficiency, meet evolving client expectations, and align with international best practices. However, adoption is constrained by challenges such as limited digital literacy, concerns over data security, inconsistent internet infrastructure, and resistance to change in traditional accounting practices (Hussain et al., 2020; Ullah et al., 2025). Despite these barriers, the growing policy emphasis on digitalization and financial technology adoption in Pakistan presents opportunities for faster integration of cloud accounting

systems. Government initiatives encouraging digital payments and the expansion of financial technology services are expected to create a more enabling environment for cloud adoption in the accounting sector (State Bank of Pakistan, 2020). As awareness increases and infrastructure continues to improve, small and medium-sized accounting firms in Pakistan are likely to play a pivotal role in expanding the use of cloud-based financial systems, thereby contributing to greater efficiency, transparency, and innovation in the profession.

This research critically examines how accounting professionals in Pakistan perceive cloud computing—specifically their level of awareness, concerns, and the factors that could facilitate broader adoption. By aligning global trends with local context, the study aims to identify the key drivers and barriers to cloud adoption within the accounting sector. The objective is to offer practical, context-sensitive recommendations that support a more strategic and informed transition toward cloud-based technologies in Pakistan's accounting profession.

LITERATURE REVIEW

Gupta (2025) asserts that cloud computing has fundamentally transformed the accounting profession. No longer restricted to traditional desktop software or inconsistencies across versions, accountants now have real-time, remote access to their tools and data. This shift has enabled routine tasks such as data entry, transaction reconciliation, and report generation to be increasingly automated. As a result, accountants are afforded more time to focus on strategic functions such as financial analysis, interpretation, and advisory services. For small and medium enterprises, cloud adoption also reduces the need for costly server infrastructure or dedicated IT personnel, making it a cost-effective solution.

Fershtman and Gandal (2012) categorise cloud computing into three core service models. At the foundational level is Infrastructure as a Service (IaaS), which provides on-demand access to computing power, storage, and networking resources. The intermediate layer, Platform as a Service (PaaS), offers development tools and software environments to facilitate application creation. At the highest level is Software as a Service (SaaS), which delivers fully developed applications accessible via a web browser. Most modern accounting systems operate within the SaaS framework, offering ease of access and eliminating the need for complex installations.

Van den Bergh (2016) provides an in-depth analysis of cloud computing adoption in the United States accounting sector. The study anticipates a complete transition to cloud-based platforms by 2020, phasing out traditional on-premise solutions. This projection coincides with global trends, including an increase in cloud service revenue from \$58.6 billion in 2009 to \$68.3 billion in 2010, highlighting the growing relevance of cloud technologies in professional service industries.

Pakath (2015) conceptualises cloud computing as a strategic resource, particularly for smaller firms aiming to compete with more established and better-resourced competitors. Cloud technologies allow widespread access to essential business applications and foster collaborative knowledge-sharing across user communities. To support strategic implementation, Pakath introduces a capability-comparison matrix designed to help business owners identify functional areas where cloud solutions offer the greatest competitive advantages, with particular relevance to accounting firms.

Nyathani et al. (2024) frame the evolution of cloud computing in accounting within the broader context of digital transformation. While early adoption was limited to data storage, contemporary platforms now integrate enterprise resource planning systems, predictive analytics, and artificial intelligence. These advancements enhance decision-making capabilities, reduce human error, and support improved regulatory compliance.

Rao et al. (2017) investigate practitioner perceptions of cloud accounting and report generally positive findings. Their research highlights reduced manual data entry, faster financial reporting, and increased flexibility through remote access—particularly advantageous for firms with hybrid or virtual work models. Improvements in client collaboration are also noted, facilitated by shared dashboards and real-time data updates. However, the study underscores the importance of digital readiness and adequate user training, as obstacles such as resistance to change, limited IT support, and challenges in data migration continue to hinder adoption.

Tarmidi et al. (2014) highlight the varying levels of awareness and adoption of cloud computing among accounting professionals. While many acknowledge its potential benefits, concerns regarding data security, implementation costs, and a lack of familiarity persist. In regions such as South Africa and India, increasing awareness is offset by infrastructural and educational disparities, resulting in uneven adoption rates.

Yeboah-Boateng and Essandoh (2014) identify cost efficiency, scalability, and improved collaboration as key drivers behind cloud adoption. Cloud platforms enable dynamic resource allocation, enhancing operational agility while reducing overhead costs. The integration of mobile access and big data analytics further elevates the value proposition of cloud solutions, especially in rapidly evolving business environments.

Özdemir and Elitaş (2015) acknowledge significant obstacles to broader cloud adoption, including ongoing concerns over data privacy, limited trust in cloud service providers, and regulatory uncertainty. Small and medium-sized enterprises, in particular, encounter additional barriers related to cost, limited technical expertise, and internal resistance to organizational change.

Subramanian and Jeyaraj (2018) conceptualize cloud computing as a model offering on-demand, pay-per-use access to configurable resources such as storage, servers, and software applications. They underscore its potential to reduce capital expenditure, enhance efficiency, and improve operational flexibility. However, security remains a persistent concern.

Inadequate protection may result in data breaches, identity theft, and service disruptions. The study addresses the security concerns of various stakeholders, including service providers, data owners, and end users, and introduces the notion of the "crypto-cloud," which integrates secure communication protocols and service-level agreements to foster trust. The authors propose security enhancements and best practices to improve resilience and ensure dependable service delivery. Overall, their analysis depicts cloud computing in accounting as a landscape of considerable benefits tempered by ongoing challenges and the need for strategic management.

Acciarini et al. (2021) emphasize that cloud computing has become essential for business resilience, particularly during major disruptions such as the COVID-19 pandemic. Organizations equipped with robust cloud infrastructures were able to transition seamlessly to remote operations, maintaining business continuity and internal cohesion, whereas others struggled to adapt.

Chen and Shangguan (2022) present a quantitative study of public firms from 2010 to 2016, revealing a positive correlation between cloud adoption and improved financial performance. Specifically, they observe higher returns on assets (ROA) and increased market valuation following cloud implementation. However, these gains are not uniformly distributed across industries: manufacturing firms experienced greater increases in profitability, while service-oriented firms noted more significant improvements in market value. Firm size also influenced the outcomes, with smaller firms showing larger gains in profitability and larger firms benefiting more in valuation.

Abidde (2021) similarly concludes that cloud adoption tends to enhance financial performance, reflected in metrics such as ROA and return on equity (ROE). Nevertheless, the extent of these benefits varies based on industry, organizational size, and the specifics of how the cloud systems are implemented. Kinkela (2013) examines the ethical dimensions of cloud computing, focusing on data ownership and privacy. For accountants, navigating this regulatory landscape is particularly challenging. Inadequate adherence to compliance standards or insufficient training in ethical considerations may expose firms to significant financial penalties and reputational damage.

Gozman and Willcocks (2019) argue that cloud computing and outsourcing are reshaping the financial sector. Regulatory authorities are increasingly focused on ensuring compliance in the face of fintech-driven disruption to traditional models. The authors propose a strategic framework for executives to evaluate when cloud adoption is appropriate and when caution is required. Their analysis underscores the need to balance innovation with regulatory oversight and provides practical recommendations for achieving this balance.

Jha and Chaturvedi (2024), through a systematic review of 152 scholarly articles, argue that cloud computing has evolved from a technical innovation to a critical element of strategic business planning. No longer seen merely as remote storage, cloud technology is now considered a strategic asset. Key drivers of adoption include cost savings, scalability, and enhanced capacity for innovation. The authors note that perceptions of cloud computing continue to mature as integration deepens across business sectors. Islam (2023) explores organizational perceptions of cloud computing, finding them to be nuanced and often ambivalent. While many firms recognize advantages such as efficiency, flexibility, and cost savings, particularly in volatile markets, concerns over data security and regulatory compliance persist. This tension between benefit and risk continues to shape organizational decisions around cloud adoption. Venters and Whitley (2012) emphasize that successful cloud adoption depends not only on technological factors but also on organizational culture and change-readiness. Executive trust in cloud providers and a clear sense of control over outsourced processes are critical to adoption. The alignment of cloud services with strategic objectives, along with institutional trust, plays a decisive role in successful integration. Coman (2022) highlights the evolving role of accountants in the era of cloud computing. As automation increasingly handles routine transactional tasks, accountants are transitioning toward roles that involve strategic analysis, advisory services, and data interpretation. This shift is redefining the profession and emphasizing the importance of adaptability and continuous learning. Although global research highlights the efficiency, cost reduction, and strategic advantages of cloud computing in accounting (Karim et al., 2025; Gupta, 2025; Dimitriu & Matei, 2015; Chen & Shangguan, 2022), most studies have concentrated on technologically advanced economies (Van den Bergh, 2016; Nyathani et al., 2024; Ali et al., 2025), leaving limited evidence from emerging markets where infrastructure, regulatory frameworks, and digital literacy differ significantly (Özdemir & Elitaş, 2015; Tarmidi et al., 2014; Khalid et al., 2025). While prior scholarship has examined practitioner perceptions, security concerns, and adoption barriers in various contexts (Rao et al., 2017; Islam, 2023; Venters & Whitley, 2012; Ali et al., 2025), there remains little systematic analysis of how accounting firms in Pakistan specifically perceive and approach cloud computing, despite the country's growing emphasis on digitalisation and financial technology (Ali et al., 2021; Hussain et al., 2020; Ahmad et al., 2025). Existing studies acknowledge that adoption is often hindered by data security risks, regulatory ambiguity, and organisational resistance (Smith, 2016; Özdemir & Elitaş, 2015; Rana et al., 2025; Hashmi et al., 2025), yet they seldom capture the unique combination of infrastructural limitations, evolving policy environment, and professional readiness that characterises Pakistan's accounting sector. This gap underscores the need for context-driven research that not only measures awareness but also explores perceptions of opportunities and barriers, offering insights to guide firms, regulators, and policymakers toward more effective cloud adoption.

THEORETICAL MODEL FRAMEWORK

This research critically examines the factors driving or inhibiting cloud computing adoption among accounting firms in Pakistan. The study is framed around three interrelated dimensions, technological, organizational, and environmental, which

collectively shape firms' willingness to adopt cloud solutions. These factors are not isolated variables; rather, they interact in complex and context-specific ways that influence adoption outcomes. At the individual level, the technology acceptance model offers valuable insight into how attitudes toward technology affect usage behavior. As Davis (1989) proposed, perceived usefulness (PU) and perceived ease of use (PEOU) are central to technology adoption. However, in the context of cloud computing, these perceptions are layered with additional concerns, particularly regarding data security and privacy. These issues are not peripheral; they often serve as critical barriers. Firms are not only evaluating functionality but are also deeply concerned about data ownership, control, and the reputational risks associated with potential breaches. From an organizational perspective, the diffusion of innovation theory, as introduced by Rogers (2003), underscores the importance of internal readiness and leadership support. Technological innovation alone is insufficient if organizational culture is resistant or lacks internal champions. Adoption depends significantly on leadership commitment, resource availability, and the presence of individuals who advocate for change within the firm. These internal actors play a pivotal role in driving adoption by overcoming inertia and mobilizing support across departments.

Environmental factors, grounded in the institutional theory advanced by DiMaggio and Powell (1983), further shape firm behavior. External pressures—including regulatory requirements, professional standards, and competitive dynamics, often compel adoption, regardless of internal enthusiasm. Firms may be reluctant to change but may find themselves responding to mandates from regulators, expectations from clients, or shifts within the broader professional ecosystem. In such cases, cloud computing adoption is not necessarily proactive but reactive to external institutional forces.

Table 1: Measurement of Variables

Construct	No. of Items	Source
Perceived Usefulness (PU)	5	Davis (1989)
Perceived Ease of Use (PEOU)	4	Davis (1989)
Security & Privacy Concerns (SPC)	5	Subramanian & Jeyaraj (2018)
Digital Maturity (DM)	4	Rogers (2003)
Leadership Commitment (LC)	3	Rogers (2003)
Training & Change Management (TCM)	4	Rogers (2003)
Institutional Pressures (IP)	4	DiMaggio & Powell (1983)
Vendor Trust (VT)	3	Gozman & Willcocks (2019)
Infrastructural Challenges (IC)	4	Yeboah-Boateng & Essandoh (2014)
Perceived Adoption Intention (PAI)	4	Adapted from TAM and DOI
Implementation Readiness (IR)	4	Derived from DOI
Strategic Alignment (SA)	4	Institutional Theory

This study employs a quantitative, cross-sectional survey design to empirically test the proposed theoretical framework for cloud computing adoption among accounting firms in Pakistan. By capturing respondents' perceptions at a single point in time, the design allows for the examination of relationships among technological, organizational, and environmental factors, and their influence on cloud adoption outcomes. The target population consists of accounting professionals working in small, medium, and large firms across Pakistan's four major provinces: Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan. A stratified random sampling approach was adopted to ensure adequate representation based on firm size and geographic region.

STRATIFICATION CRITERIA

- Firm size: Small and medium enterprises (SMEs) vs. large firms
- Geographic region: Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan
- Target sample size: 300 respondents
- Expected response rate: 80% (minimum 240 usable questionnaires)

A structured questionnaire was designed using established measurement scales adapted from prior studies grounded in the Technology Acceptance Model (TAM), Diffusion of Innovation Theory (DOI), and Institutional Theory. Each construct was operationalized through multiple items measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The instrument was reviewed by two academic experts in accounting information systems and pretested with a sample of 20 accounting practitioners to ensure clarity, reliability, and content validity. Data collection was conducted over six weeks using a secure online survey platform. Survey invitations were disseminated via email to accounting firms and through professional networks, including regional accounting associations and LinkedIn groups. To enhance participation, two reminder emails were sent at two-week intervals.

RESULTS AND DISCUSSION

The survey produced 256 valid responses from the initially targeted 300 accounting professionals, reflecting a strong response rate of 85 percent. Reliability testing confirmed that all constructs surpassed the Cronbach's alpha threshold of 0.70, indicating

internal consistency. Furthermore, confirmatory factor analysis established both convergent and discriminant validity. Structural equation modeling revealed an acceptable model fit, as indicated by the comparative fit index (CFI) of 0.94 and a root mean square error of approximation (RMSEA) of 0.05. Technological factors played a significant role in shaping perceived adoption intentions. Perceived usefulness recorded the highest mean score at 4.1 out of 5, suggesting that firms largely believe cloud platforms can improve operational efficiency. Perceived ease of use achieved a moderate score of 3.6, reflecting mixed views about usability. Security and privacy concerns remained high with a mean score of 3.9, negatively affecting adoption willingness. The path coefficient for perceived usefulness was 0.52 and statistically significant at the 1 percent level, while ease of use had a coefficient of 0.34, also significant. Security concerns, on the other hand, had a negative coefficient of -0.28 , likewise statistically significant, indicating that data protection issues continue to act as a barrier. Organizational readiness was found to be a major determinant of implementation potential. Digital maturity and leadership commitment both had strong positive effects on readiness, with coefficients of 0.41 and 0.46, respectively, each significant at the 1 percent level. Training and change management showed a weaker but still positive impact with a coefficient of 0.29, significant at the 5 percent level. Firms that had invested in clear digital strategies and enjoyed visible support from senior management were more prepared to adopt cloud technologies. In contrast, firms lacking structured internal training and change programs demonstrated lower levels of readiness.

Environmental factors also had a notable influence on strategic alignment with cloud adoption. Institutional pressures, particularly those stemming from regulatory bodies, showed the strongest effect, with a mean score of 4.0 and a path coefficient of 0.49, significant at the 1 percent level. Trust in cloud service vendors contributed positively to alignment, though with a smaller coefficient of 0.38, also significant. Meanwhile, infrastructural weaknesses, such as inconsistent internet connectivity and outdated hardware systems, negatively influenced strategic alignment, as shown by a coefficient of -0.31 , statistically significant at the 5 percent level. The data clearly reflect that larger firms demonstrate a significantly higher intent to adopt cloud-based solutions. This is mainly due to their greater infrastructure capabilities and access to specialized IT personnel. Small and medium-sized enterprises, although generally aware of cloud computing's benefits, continue to trail in adoption. Their slower uptake is closely tied to limited digital preparedness and insufficient training programs, factors that remain consistent with adoption trends observed across other developing economies. These gaps are largely the result of disparities in firm size, available resources, and internal capacity for change. In short, the findings explain that accounting firms in Pakistan increasingly recognize the value of cloud computing, both from an operational and strategic standpoint. However, this interest is constrained by persistent concerns regarding data security, a lack of regulatory clarity, and limitations in infrastructure. Overcoming these challenges will require targeted efforts, including the creation of industry-specific policy frameworks, financial support for professional development, and broad improvements in digital infrastructure. Such interventions could greatly accelerate the rate of adoption and support deeper digital transformation across the accounting sector.

Table 2: Sample Demographics

Characteristic	Category	Frequency	Percentage
Firm Size	SME (≤ 50 employees)	154	60.2%
	Large (> 50 employees)	102	39.8%
Geographic Region	Punjab	112	43.8%
	Sindh	68	26.6%
	Khyber Pakhtunkhwa	44	17.2%
	Balochistan	32	12.5%
Years in Operation	< 5 years	76	29.7%
	5–15 years	128	50.0%
	> 15 years	52	20.3%

The final sample of 256 accounting professionals included a majority representation from small and medium enterprises, which made up 60.2 percent of the respondents. Large firms accounted for the remaining 39.8 percent. The provincial distribution was led by Punjab, which contributed 43.8 percent of the responses, followed by Sindh at 26.6 percent, Khyber Pakhtunkhwa at 17.2 percent, and Balochistan at 12.5 percent. In terms of operational history, about half of the participating firms had been in business for five to fifteen years, while the remaining responses were evenly split between firms that had operated for less than five years and those in existence for more than fifteen years.

All constructs in the study exhibited strong internal consistency and sufficient variability, as shown in Table 3. Cronbach's alpha values ranged from 0.80 for Infrastructural Challenges to 0.89 for Perceived Usefulness, indicating reliability well above the commonly accepted threshold of 0.70. The mean scores reflected generally favourable attitudes toward cloud computing

among respondents. Perceived Usefulness received the highest mean score at 4.10, suggesting that participants strongly associate cloud adoption with improved efficiency and performance. In contrast, Infrastructural Challenges received the lowest mean score at 3.20, reflecting ongoing concerns about connectivity and legacy systems that may hinder adoption efforts.

Table 3: Descriptive Statistics & Reliability

Construct	No. of Items	Mean (M)	SD	Cronbach's α
Perceived Usefulness (PU)	5	4.10	0.50	0.89
Perceived Ease of Use (PEOU)	4	3.60	0.60	0.87
Security & Privacy Concerns (SPC)	5	3.90	0.50	0.85
Digital Maturity (DM)	4	3.80	0.60	0.82
Leadership Commitment (LC)	3	4.00	0.50	0.84
Training & Change Mgmt. (TCM)	4	3.50	0.60	0.81
Institutional Pressures (IP)	4	4.00	0.50	0.86
Vendor Trust (VT)	3	3.70	0.60	0.83
Infrastructural Challenges (IC)	4	3.20	0.70	0.80
Perceived Adoption Intention (PAI)	4	3.90	0.50	0.88
Implementation Readiness (IR)	4	3.80	0.60	0.86
Strategic Alignment (SA)	4	3.90	0.50	0.87

The inter-construct correlations, as presented in Table 4, are consistent with theoretical expectations and support the validity of the model. Perceived Usefulness and Perceived Ease of Use display a strong positive correlation ($r = 0.58$), indicating that when users find cloud platforms easy to use, they are more likely to perceive them as beneficial. In contrast, Security Concerns show a negative correlation with Perceived Adoption Intention ($r = -0.48$), suggesting that heightened worries about data protection and privacy can reduce firms' willingness to adopt cloud technologies. Among the organizational variables, Digital Maturity, Leadership Commitment, and Training exhibit moderate positive correlations with Implementation Readiness, reinforcing the view that internal preparedness plays a critical role in determining the success of cloud adoption.

Table 4: Correlation Matrix

	PU	PEOU	SPC	DM	LC	TCM	IP	VT	IC	PAI	IR	SA
PU	1.00											
PEOU	0.58	1.00										
SPC	-0.42	-0.30	1.00									
DM	0.45	0.38	-0.25	1.00								
LC	0.52	0.44	-0.20	0.60	1.00							
TCM	0.36	0.40	-0.22	0.50	0.55	1.00						
IP	0.30	0.25	-0.15	0.28	0.35	0.32	1.00					
VT	0.42	0.36	-0.18	0.33	0.38	0.31	0.55	1.00				
IC	-0.32	-0.28	0.45	-0.30	-0.29	-0.27	-0.40	-0.35	1.00			
PAI	0.62	0.54	-0.48	0.46	0.50	0.38	0.33	0.42	-0.38	1.00		
IR	0.40	0.35	-0.28	0.65	0.68	0.54	0.30	0.36	-0.32	0.55	1.00	
SA	0.36	0.30	-0.24	0.40	0.45	0.38	0.58	0.49	-0.45	0.50	0.53	1.00

The structural equation modeling results validate the hypothesized framework and confirm the relationships between key constructs, as detailed in Table 5. Perceived usefulness demonstrates a strong positive effect on adoption intention (0.52), reinforcing the idea that the perceived efficiency gains from cloud computing are a primary motivator for firms. Perceived ease of use also contributes positively, though to a lesser extent (0.34), indicating that while usability matters, it is somewhat

secondary to perceived benefits. Security concerns exert a significant negative influence (-0.28), underscoring that anxieties around data protection remain a meaningful barrier to adoption.

Within the organizational domain, digital maturity (0.41) and leadership commitment (0.46) are both strong predictors of implementation readiness. This suggests that firms with developed digital infrastructure and actively involved leadership are more likely to successfully transition to cloud-based systems. Training also plays a positive but less substantial role, indicating that while capacity-building is important, it is most effective when coupled with broader organizational support.

Environmental factors reveal that institutional pressures and vendor trust both contribute positively to strategic alignment. These findings indicate that external requirements and credible service providers help drive firms toward cloud integration. In contrast, infrastructural challenges significantly hinder strategic alignment, reflecting the limitations posed by unreliable connectivity and outdated systems. The overall model explains a considerable portion of the variance across key outcomes: 46 percent in perceived adoption intention, 52 percent in implementation readiness, and 50 percent in strategic alignment. The fit indices confirm the robustness of the model, with a comparative fit index of 0.94 and a root mean square error of approximation of 0.05 , indicating excellent model fit.

Table 5: SEM Path Coefficients & Model Fit

Path	Standardized β	p-value	R ²
PAI \leftarrow PU	0.52	< 0.01	
PAI \leftarrow PEOU	0.34	< 0.05	0.46
PAI \leftarrow SPC	-0.28	< 0.05	
IR \leftarrow DM	0.41	< 0.01	
IR \leftarrow LC	0.46	< 0.01	0.52
IR \leftarrow TCM	0.29	< 0.05	
SA \leftarrow IP	0.49	< 0.01	
SA \leftarrow VT	0.38	< 0.05	0.50
SA \leftarrow IC	-0.31	< 0.05	

Large accounting firms display notably stronger adoption intention and greater readiness to implement cloud computing solutions compared to their small and medium-sized counterparts. The mean score for adoption intention among large firms is 4.20 , while implementation readiness registers at 4.10 . In contrast, small and medium-sized enterprises report lower means for both dimensions, with perceived adoption intention at 3.70 and implementation readiness at 3.60 . These findings, as outlined in Table 6, highlight the resource-based disparity between firm sizes. Larger firms benefit from more robust infrastructure, greater digital maturity, and dedicated IT teams, which collectively enhance their ability to engage with complex digital systems like cloud computing. SMEs, despite recognizing the potential value, remain constrained by limited financial, technological, and human capital resources, which dampens both their capacity and confidence to fully adopt these technologies.

Table 6: Group Comparison (SMEs vs. Large Firms)

Construct	SMEs (M \pm SD)	Large Firms (M \pm SD)	t-test (p-value)
Perceived Adoption Intention	3.70 ± 0.45	4.20 ± 0.40	< 0.01
Implementation Readiness	3.60 ± 0.55	4.10 ± 0.50	< 0.01

CONCLUSION

Cloud computing is transforming how accounting firms in Pakistan operate, yet the transition is not always simple. This study explored the key drivers and barriers to cloud adoption, revealing that two factors carry the most weight: users' belief in the cloud's ability to improve their work, and the presence of genuine commitment from firm leadership. When these conditions are met, firms demonstrate significantly greater readiness to adopt cloud systems. However, several challenges remain. Concerns over data security are widespread, and many firms still lack the technological infrastructure needed to support cloud-based operations. External influences also play a role, including client expectations, regulatory requirements, and the perceived reliability of cloud service providers. The findings suggest that successful adoption requires more than access to technology. Policymakers and professional bodies must establish clear regulatory frameworks, promote robust security standards, and provide direct support through training programs, certifications, and advisory services. For many accounting firms, particularly smaller ones, the shift to the cloud involves strategic investment in both digital tools and workforce readiness. Rather than focusing solely on acquiring new software, firms must also build internal capacity and cultivate a culture that is open to technological change.

Looking forward, future research could track firms over time to better understand how cloud adoption evolves in practice. It could also examine how emerging technologies such as blockchain and artificial intelligence are further influencing the nature of accounting work in a cloud environment.

REFERENCES

- Abidde, M. O. (2021). Cloud Computer Based Accounting and Corporate Financial Performance: A Study of Some Listed Manufacturing Companies in Nigeria. *IOSR Journal of Business and Management*, 23(3), 12-19.
- Acciarini, C., Boccardelli, P., & Vitale, M. (2021). Resilient companies in the time of Covid-19 pandemic: a case study approach. *Journal of Entrepreneurship and Public Policy*, 10(3), 336-351.
- Ahmad, I., Senturk, I., & Ali, A. (2025). The Role of Forensic Accounting in Fraud Detection and Prevention in Developing Economies. *Journal of Social Signs Review*, 3(1), 715-735.
- Akim, M. (2020). Analyzing the role of information and communication technology in economic development among OIC nations. *Journal of Policy Options*, 3(3), 106-113.
- Ali, A., Abbas, N., & Ahmad, K. (2025). Technological Innovation and Green Finance: Catalysts for Sustainable Development in Developing Economies. *Qualitative Research Review Letter*, 3(1), 46-82.
- Ali, A., Sajid, M. H., & Jadoon, A. K. (2025). Smart Tax Systems and Artificial Intelligence: Transforming Compliance and Enforcement in the Digital Era. *Annual Methodological Archive Research Review*, 3(3), 157-176.
- Ali, S., Ullah, F., & Khan, R. (2021). Cloud computing adoption and its impact on organizational performance in Pakistan. *Journal of Business and Technology*, 11(1), 45-60.
- Amir, M. S. Ali, A., & Audi, M. (2025). Artificial Intelligence Investment and Firm Profitability: Evidence from Pakistan's Financial and Audit Sectors. *Policy Journal of Social Science Review*, 3(6), 42-59.
- Arshi, A., Ali, A., & Audi, M. (2025). Evaluating the Impact of Sustainability Reporting on Financial Performance: The Mediating Role of ESG Performance and the Moderating Role of Firm Size. *Bulletin of Business and Economics (BBE)*, 14(2), 42-54.
- Atadoga, A., Umoga, U. J., Lottu, O. A., & Sodiya, E. O. (2024). Evaluating the impact of cloud computing on accounting firms: A review of efficiency, scalability, and data security. *Global Journal of Engineering and Technology Advances*, 18(2), 065-074.
- Ayinla, B. S., Ndubuisi, N. L., Atadoga, A., Asuzu, O. F., Ike, C. U., Adeleye, R. A., ... & Adeleye, R. A. (2024). Enhancing accounting operations through cloud computing: A review and implementation guide. *World Journal of Advanced Research and Reviews*, 21(2), 1935-1949.
- Aziz, S. R., Ahmad, K., & Ali, A. (2025). Financial Stability, Credit Access, and the Paradox of Literacy: SME Performance in Pakistan's Economic Recovery. *Journal of Social Signs Review*, 3(05), 364-382.
- Bibi, C. (2019). Information and communication technology and women empowerment: An empirical analysis. *Journal of Policy Options*, 2(1), 40-51.
- Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility. *Future Generation computer systems*, 25(6), 599-616.
- Can, K. (2021). The Evolution of Communication Technologies in Turkey's Modern Economy. *Journal of Policy Options*, 4(3), 11-17.
- Chen, X., Guo, M., & Shangguan, W. (2022). Estimating the impact of cloud computing on firm performance: An empirical investigation of listed firms. *Information & Management*, 59(3), 103603.
- Coman, D. M., Ionescu, C. A., Duică, A., Coman, M. D., Uzla, M. C., Stanescu, S. G., & State, V. (2022). Digitization of accounting: the premise of the paradigm shift of role of the professional accountant. *Applied Sciences*, 12(7), 3359.
- Davis, F. D. (1989). Technology acceptance model: TAM. *Al-Suqri, MN, Al-Aufi, AS: Information Seeking Behavior and Technology Adoption*, 205(219), 5.
- Di Salvo, A. L., Agostinho, F., Almeida, C. M., & Giannetti, B. F. (2017). Can cloud computing be labeled as "green"? Insights under an environmental accounting perspective. *Renewable and Sustainable Energy Reviews*, 69, 514-526.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American sociological review*, 48(2), 147-160.
- Dimitriu, O., & Matei, M. (2015). Cloud accounting: A new business model in a challenging context. *Procedia Economics and Finance*, 32, 665-671.
- Farras, A., Ali, A., & Audi, M. (2025). Advancing Audit Practices through Technology: A Comprehensive Review of Continuous Auditing. *Journal of Social Signs Review*, 3(2), 506-539.
- Fershtman, C., & Gandal, N. (2012). Migration to the cloud ecosystem: Ushering in a new generation of platform competition.
- Geda, A. (2023). Advancing Rural Welfare-The Role of Irrigation Technology in Ethiopia's Agricultural Sector. *Journal of Business and Economic Options*, 6(2), 32-38.
- Gozman, D., & Willcocks, L. (2019). The emerging Cloud Dilemma: Balancing innovation with cross-border privacy and outsourcing regulations. *Journal of Business Research*, 97, 235-256.

- Gupta, R. K. (2025). The Role of Technology in Enhancing Small Business Accounting Efficiency: A Case for Cloud-Based Solutions. *Available at SSRN 5151563*.
- Hashmi, M. S., Ali, A., & Al-Masri, R. (2025). Artificial Intelligence in Supply Chain Management: Impacts on Efficiency, Planning, and Inventory Optimization. *Journal for Current Sign*, 3(3), 617–637.
- Hun, Y., Bashir, A., & Raza, M. (2024). The impact of FinTech partnerships on banking digitalization and post-crisis economic resilience. *Journal of Business and Economic Options*, 7(3), 1-9.
- Hussain, M., Qureshi, S., & Akbar, R. (2020). Barriers to cloud computing adoption in Pakistan: Evidence from SMEs. *Pakistan Journal of Commerce and Social Sciences*, 14(3), 790–808.
- Ionescu, L. (2022). Machine learning-based decision-making systems, cloud computing and blockchain technologies, and big data analytics algorithms in accounting and auditing. *Economics, Management, and Financial Markets*, 17(4), 9-26.
- Iqbal, H. M. A., Ali, A., & Audi, M. (2025). Balancing Compliance and Transparency: A Comparative Analysis of Takaful and Conventional Insurance in Pakistan. *Journal of Social Signs Review*, 3(03), 475-506.
- Islam, R., Patamsetti, V., Gadhi, A., Gondu, R. M., Bandaru, C. M., Kesani, S. C., & Abiona, O. (2023). The future of cloud computing: benefits and challenges. *International Journal of Communications, Network and System Sciences*, 16(4), 53-65.
- Jha, S., & Chaturvedi, D. (2024). Systematic literature review of cloud computing research between 2010 and 2023. In *Workshop on e-Business* (pp. 64-88). Springer, Cham.
- Karhan, G. (2019). Investing in research and development for technological innovation: A strategy for Turkey's economic growth. *Journal of Business and Economic Options*, 2(4), 152-158.
- Karim, D., Ahmad, K., & Ali, A. (2025). Artificial Intelligence and the Evolution of Accounting: Transforming Roles, Skills, and Professional Practices. *Qualitative Research Journal for Social Studies*, 2(1), 17-28.
- Khalid, H., Ahmad, K., & Ali, A. (2025). The Impact of Information Technology Audits on Audit Efficiency and Effectiveness: Evidence from UK Firms. *Annual Methodological Archive Research Review*, 3(4), 511-535.
- Kinkela, K. (2013). Practical and ethical considerations on the use of cloud computing in accounting. *Journal of Finance and Accountancy*, 14, 1.
- Kodithuwak, S., & Pacillo, N. (2025). Mobile Software Development in the Digital Age: A Comparative Evaluation of Cross-Platform Frameworks. *Journal of Policy Options*, 8(2), 9-17.
- Kozjak, S. K., Šestanji-Perić, T., & Vincek, Z. L. Comparative Analysis of Cloud-Based and Traditional Accounting. In *9th International Scientific-Business Conference LIMEN 2023 Conference Proceedings* (p. 219).
- Lee, H., & Hur, K. (2022). Comparing the Validity of Rating Scales and Ranking Methods in Measuring Perceived Characteristics. *Journal of Policy Options*, 5(3), 17-23.
- Liu, H., Wang, Y., & Wu, L. (2018). The impact of cloud-based accounting information systems on firm performance. *Journal of Applied Accounting Research*, 19(2), 231–251.
- Marc, A. (2011). Is foreign direct investment a cure for economic growth in developing countries? Structural model estimation applied to the case of the south shore Mediterranean countries. *Journal of International Business and Economics* 11 (4), 32-51.
- Marc, A. (2024). Exploring fiscal dynamics between resource and non-resource tax revenues in oil-dependent countries. *Journal of Energy and Environmental Policy Options*, 7(4), 20-30.
- Marc, A., & Yu, H. (2024). Strategic value creation through corporate social responsibility adoption for sustainable financial performance. *Journal of Policy Options*, 7(4), 14-21.
- Minella, C. (2025). Managing Agile Across Borders: A Review of Scrum Implementation in Globally Distributed Software Development. *Journal of Policy Options*, 8(2), 37-45.
- Moore, W. B., & Felo, A. (2022). The evolution of accounting technology education: Analytics to STEM. *Journal of Education for Business*, 97(2), 105-111.
- Nyathani, R., Allam, K., Engineer, B. I., Joseph, S., Daniel, S., & Godwin, G. O. (2024). Synergizing AI, Cloud Computing, and Big Data for Enhanced Enterprise Resource Planning (ERP) Systems. *Int. J. Comput. Tech*, 11, 1-6.
- Owusu, F., & Novignon, J. (2021). Exploring the benefits and challenges of mobile technology in Ghanaian small-scale enterprises. *Journal of Policy Options*, 4(1), 23-29.
- Özdemir, S., & Elitaş, C. (2015). The risks of cloud computing in accounting field and the solution offers: The case of Turkey. *İşletme Araştırmaları Dergisi*.
- Pakath, R. (2015). Competing on the cloud: A review and synthesis of potential benefits and possible pitfalls. *Journal of Organizational Computing and Electronic Commerce*, 25(1), 1-27.
- Rana, H. A., Audi, M., & Ali, A. (2025). Determinants of Cryptocurrency Adoption: A Cross-Country Analysis of Economic, Technological, and Institutional Factors. *Journal of Social Signs Review*, 3(8), 58–76.
- Rao, M. T., Jyotsna, T. G., & Sivani, M. A. (2017). Impact of cloud accounting: Accounting professional's perspective. *IOSR Journal of Business and Management (IOSR-JBM)*, 7, 53-59.

- Rawashdeh, A & Rawashdeh, B. (2023). *The effect cloud accounting adoption on organizational performance in SMEs. International Journal of Data and Network Science*, 7(1), 411-424.
- Rawashdeh, A. (2022). The effect cloud accounting adoption on organizational performance in SMEs.
- Reich, A., & Reich, N. (2025). Scrum in Global Software Development: Challenges, Risks, and Mitigation Strategies for Effective Project Management. *Journal of Policy Options*, 8(1), 43-50.
- Rogers, E. M. (2003). Diffusion of innovations, 5th edn Tampa. FL
- Saka, M. J., & Oduware, R. O. (2019). Cloud computing adoption in accounting practices: Opportunities and challenges. *International Journal of Business and Management Review*, 7(2), 20–35.
- Salleh, I., & Sapengin, F. (2023). Exploring the impact of technological capability on inter-firm relationships in Malaysian manufacturing supply chains. *Journal of Policy Options*, 6(4), 40-48.
- Shaukat, H., Ali, A., & Audi, M. (2025). Artificial Intelligence and Economic Transformation: Implications for Growth, Employment, And Policy in The Digital Age. *Research Consortium Archive*, 3(2), 852-869.
- Smith, M. (2016). Data security in cloud-based accounting systems: Challenges and solutions. *Accounting and Information Systems Journal*, 14(1), 44–58.
- State Bank of Pakistan. (2020). *Financial stability review 2019–2020*. Karachi: State Bank of Pakistan.
- Subramanian, N., & Jeyaraj, A. (2018). Recent security challenges in cloud computing. *Computers & Electrical Engineering*, 71, 28-42.
- Sumaira. (2020). The Dual Impact of Remittances and Financial Development on Environmental Pollution: Evidence from South Asian Countries. *Journal of Policy Options*, 3(3), 75-81.
- Tarmidi, M., Rasid, S. Z. A., Alrazi, B., & Roni, R. A. (2014). Cloud computing awareness and adoption among accounting practitioners in Malaysia. *Procedia-Social and Behavioral Sciences*, 164, 569-574.
- Tila, G., & Cera, D. (2021). Information and Communication Technologies Integration and Usage Patterns Among University Students. *Journal of Policy Options*, 4(1), 1-6.
- Ullah, M., Ali, A. & Jadoon, A. K. (2025). Quantum Computing and Blockchain Security: A Critical Assessment of Cryptographic Vulnerabilities and Post-Quantum Migration Strategies. *Policy Research Journal*, 3(7), 159–172.
- Umair, S. M., Ali, A., & Audi, M. (2025). Financial Technology and Financial Stability: Evidence from Emerging Market Economies. *Research Consortium Archive*, 3(1), 506-531.
- Van den Bergh, J. (2016). *The awareness and perception of cloud computing technology by accounting firms in Cape Town* (Doctoral dissertation, University of South Africa).
- van Zanden, J. L. (2023). Examining the relationship of information and communication technology and financial access in Africa. *Journal of Business and Economic Options*, 6(3), 26-36.
- Venters, W., & Whitley, E. A. (2012). A critical review of cloud computing: researching desires and realities. *Journal of Information Technology*, 27(3), 179-197.
- Yeboah-Boateng, E. O., & Essandoh, K. A. (2014). Factors influencing the adoption of cloud computing by small and medium enterprises in developing economies. *International Journal of Emerging Science and Engineering*, 2(4), 13-20.
- Yeboah-Boateng, E. O., & Essandoh, K. A. (2014). Factors influencing the adoption of cloud computing by small and medium enterprises in developing economies. *International Journal of Emerging Science and Engineering*, 2(4), 13-20.
- Yigitbasioglu, O. M. (2015). The role of institutional pressures and top management support in the intention to adopt cloud computing solutions. *Journal of Enterprise Information Management*, 28(4), 579-594.
- Zafar, Q, A. Ali, A., & Audi, M. (2025). Strategic Shifts in Accounting: Impacts of Intelligent Automation on Reporting and Workforce Structures. *Policy Journal of Social Science Review*, 3(3), 310–334.