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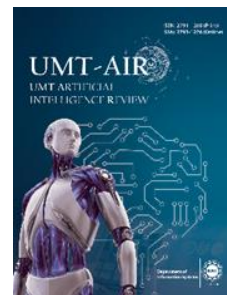
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Title: Mitigating Risks in Cloud Accounting: Strategies and Implications for Financial Institutions

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Mitigating Risks in Cloud Accounting: Strategies and Implications for Financial Institutions

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ABSTRACT This study investigates the impact of cloud accounting technology on businesses in Pakistan with a focus on the banking sector. As technological advancement accelerates, cloud accounting has become essential to maintain competitiveness. The current research aims to explore the adoption, benefits, challenges, and risks associated with cloud-based accounting systems. A deductive methodology was used. Data was collected from 200 experienced bank employees through questionnaire. A cross-sectional analysis was conducted to examine key variables, such as relative advantage, complexity, and compatibility. Quantitative analysis techniques were applied to identify the patterns and relationships. The findings revealed that while cloud accounting offers significant benefits—such as cost efficiency, scalability, and operational flexibility—it also introduces new risks, including data security breaches and compliance concerns. The study proposes effective risk mitigation strategies, including strong encryption protocols, continuous system monitoring, and rigorous vendor vetting. These insights underscore the importance of proactive risk management and collaboration among stakeholders to ensure data integrity and regulatory compliance in cloud environment.

INDEX TERMS cloud accounting, cloud computing implementation, complexity, compatibility, relative advantage

I. INTRODUCTION

Significant changes have occurred in the society by the rapid evolution of information technology. This is characterized by cutting-edge technology, wearable technology, wireless sensor networks, big data, and cloud technology. Corporate sector is currently being shaped by the advancements in the digital age. In addition, the emergence of COVID-19 has also encouraged remote work, thus highlighting the role of IT and networking in our lives [1]. The new age of technology comes with a lot of technological advancements, offering significant advantages and opportunities [2]-[4]. On the other hand, it poses a lot of problems and challenges as well, causing many financial and retail sectors to close their

physical branches and shift online. For instance, financial institutions within European Union closed thousands of physical branches between 2008 and 2016 [5].

In addition, countries like Malaysia anticipate a reduction in the number of bank branches in near future [6]. This shift towards digitalization and remote services impacts the business and society at large. Thus, cloud computing has emerged as a crucial communication technology, offering numerous advantages such as cost-efficiency, collaboration, adaptability, affordability, and reduced environmental impact. However, it also raises concerns related to security, confidentiality, human resource preparedness, and organizational support [7]. While numerous studies have

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explored cloud accounting in various regions, limited research has been conducted in Pakistan, a significant player in Asia and a major hub of internet usage. Given the country's strategic importance and its rapidly growing digital landscape, understanding the implications of cloud accounting in this context is essential for business competitiveness and economic growth [7], [8].

This paper aims to bridge this gap by investigating the impact of cloud accounting and digital transformation on the financial industry in Pakistan, particularly concerning legacy system challenges and opportunities for financial inclusion. It examines how cloud technology can facilitate the modernization of financial institutions, expand accessibility to financial services, and navigate the complexities of legacy systems. Through an in-depth analysis, case studies, and a focus on Pakistan's unique position in the global landscape, this research sheds light on the transformative potential of cloud computing and digital technologies in shaping the future of the financial industry and promoting economic inclusivity.

The following questions are addressed in this study to achieve the above goals.

1. In what way relative advantage affects the implementation of cloud accounting?
2. What are the roles played by complexity in the implementation of cloud accounting?
3. How far compatibility impacts the successful integration of cloud accounting implementation?

A. CONTRIBUTION OF THE STUDY

This study offers several notable

contributions to the existing literature on cloud accounting and digital transformation, particularly within the context of the Pakistani financial sector. It contributes to the growing body of literature on cloud accounting and digital transformation in developing economies by focusing on Pakistan—a country with increased digital adoption but limited scholarly attention in this domain [9]. While prior research has addressed cloud accounting in more developed contexts, the unique economic, technological, and infrastructural dynamics of Pakistan warrant a specific investigation.

Firstly, this research fills a regional gap by empirically examining how key factors—namely relative advantage, complexity, and compatibility—influence the adoption of cloud accounting in the financial sector. These insights are particularly valuable to understand how Pakistani financial institutions assess new technologies and make adoption decisions, offering a localized extension of the established technology adoption frameworks [8], [10].

Secondly, the study contributes to the broader discussion on digital transformation by analyzing the role of cloud technology in addressing legacy system challenges, expanding financial accessibility, and supporting the shift toward remote and digitized services [10], [11]. Given that many financial institutions are closing physical branches and moving toward digital channels globally, this research provides contextually relevant findings for institutions navigating similar transitions in Pakistan and comparable economies [12], [13].

Thirdly, the current research advances practical understanding by identifying the risks associated with cloud accounting, including data security, confidentiality,

organizational preparedness, and regulatory compliance [14], [15]. It also proposes evidence-based mitigation strategies, such as implementing robust encryption, ongoing system monitoring, and thorough vendor evaluation—contributing actionable insights for practitioners and policymakers.

To summarize, this study enriches the theoretical landscape of technology adoption, while offering practical guidance to enhance cloud accounting implementation in emerging markets. Hence, it lays a strong foundation for future research and policy development aimed at promoting secure, efficient, and inclusive digital financial ecosystems.

II. LITERATURE REVIEW

Cloud computing has emerged as a transformative force across industries, particularly in the financial sector, where it offers enhanced efficiency, reduced costs, and broader accessibility [15]. As organizations increasingly outsource accounting functions to cloud platforms, theories such as Transaction Cost Economics (TCE) and the Resource-Based View (RBV) help explain the underlying drivers of cloud accounting adoption.

TCE posits that outsourcing decisions are shaped by transaction characteristics including frequency, asset specificity, and uncertainty [16], [17]. High uncertainty and complex transactions can deter outsourcing, while standardized, information-intensive tasks—like accounting—are more suitable for cloud-based solutions, especially when they reduce opportunism and support core business focus [18], [19]. Similarly, RBV suggests that internal resources, such as knowledge, infrastructure, and managerial capability are critical to successful technology adoption [20].

In developing economies like Pakistan, cloud accounting offers a particularly relevant solution due to the technological and financial constraints in traditional systems. The constructs—relative advantage, complexity, and compatibility—are drawn from the Diffusion of Innovation (DOI) theory and technology adoption frameworks to understand cloud accounting implementation in this context.

A. RELATIVE ADVANTAGE AND CLOUD ACCOUNTING IMPLEMENTATION

Relative advantage refers to the perceived benefits of cloud accounting over existing systems. These benefits include cost efficiency, improved coordination, remote access to data, and streamlined processes [21]. In resource-constrained environments such as Pakistan, these advantages can significantly influence adoption by providing better value and functionality than legacy systems.

H1: The relative advantages of cloud accounting technology have a positive effect on cloud accounting implementation.

B. COMPLEXITY AND CLOUD ACCOUNTING IMPLEMENTATION

Complexity captures how difficult a technology is to understand and use. High complexity—driven by integration challenges, security concerns, or lack of employee training—can hinder adoption. In the financial sector of Pakistan, addressing such complexity is essential due to varying levels of digital literacy and regulatory readiness.

H2: The complexity of cloud accounting technology has a negative effect on cloud accounting implementation.

C. COMPATIBILITY AND CLOUD ACCOUNTING IMPLEMENTATION

Compatibility refers to how well cloud accounting aligns with an organization's existing systems, values, and processes. Greater compatibility leads to smoother integration and reduces resistance to change. In dynamic regulatory environments like Pakistan, ensuring that cloud systems align with compliance requirements and existing workflows is crucial.

H3: Cloud accounting technology compatibility has a positive effect on cloud accounting implementation.

This study integrates TCE, RBV, and DOI theories to explain cloud accounting adoption in Pakistan's banking sector. It proposes that organizations are more likely to adopt cloud solutions when they perceive significant relative advantage, experience lower complexity, and find high compatibility with the current practices. These insights are particularly valuable for emerging economies, where digital transformation is both a necessity and a challenge.

III. METHODOLOGY

A. RESEARCH PHILOSOPHY

This study follows a positivist philosophy. So, it focuses on facts that can be observed and measured. The goal is to explore real-world patterns and truths using data, rather than personal opinions or subjective experiences. Hence, this approach supports the use of structured methods to better understand social and business realities.

B. RESEARCH APPROACH

A deductive approach is used in this research, implying that the study begins with existing theories and ideas and then tests them using real data. It's a common

approach in scientific research when the aim is to confirm whether theoretical predictions hold true in practice.

C. RESEARCH STRATEGY

The study uses a quantitative strategy which focuses on collecting numbers and analyzing them to find trends or patterns. This method is helpful when we want to understand how common certain behaviors or attitudes are. Moreover, it allows the findings to be applied to larger groups with more confidence.

D. TIME HORIZON

A cross-sectional design was used, indicating that all data was collected at a single point in time. This approach gives a snapshot of the current situation without the need to track changes over a longer period. It's often used when the goal is to get a quick but reliable understanding of a topic.

E. TARGET POPULATION

The study focuses on people who are currently working in the banking sector or those with relevant past experience in this sector. These individuals were chosen likely because they possess firsthand knowledge of the systems, challenges, and technologies being studied—especially cloud accounting.

F. SAMPLE SIZE AND SAMPLING TECHNIQUE

A total of 200 participants were selected using simple random sampling. This method gives every eligible person an equal chance of being chosen, which helps ensure that the sample is fair and unbiased. It also improves the reliability of the results.

G. DATA COLLECTION PROCEDURE

Data was collected through a survey questionnaire. The questionnaire included two sections: one capturing basic

demographic information and another designed to measure the key study variables. The questions were kept clear and focused to make it easy for the participants to respond accurately and honestly.

TABLE I
RELIABILITY

Variable	Cronbach's Alpha
Complexity	0.72
Relative Advantage	0.80
Compatibility	0.75
Cloud Accounting	0.78
Overall	0.753

Cronbach's alpha is a measure of the internal consistency or reliability of a set of items or questions used to assess a particular construct or variable. In this case,

the Cronbach's alpha value of 0.753 suggests that the four items within the "Overall" variable have a moderately high level of internal consistency. This indicates that the items are relatively consistent in measuring the same underlying construct and they tend to be correlated with each other. However, it's important to note that the interpretation of the Cronbach's alpha value may vary depending on the context and specific research objectives. Generally, a higher value (closer to 1.0) indicates greater internal consistency among the items. In this case, a value of 0.753 suggests reasonably good reliability for research purposes. Researchers often aim for a Cronbach's alpha value of 0.7 or higher to consider a measure reliable, but the acceptable threshold can vary based on the field and research goals.

TABLE II
DESCRIPTIVE STATISTICS SUMMARY

Variable	Minimum	Maximum	Mean	Standard Deviation
Complexity	3.40	6.40	5.0150	0.73913
Relative Advantage	2.43	6.43	4.8593	0.92665
Compatibility	3.75	6.25	5.1088	0.62485
Cloud Accounting	2.00	6.33	4.9742	0.75671

TABLE III
DEMOGRAPHIC PROFILE OF RESPONDENTS (N = 200)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	139	69.5%
	Female	61	30.5%
Age Group	18–30	150	75.0%
	31–40	50	25.0%
Marital Status	Single	108	54.0%
	Married	62	31.0%
	Separated	30	15.0%
Industry	Service	109	54.5%
	Manufacturing	91	45.5%
Working Hours	Part-Time	105	52.5%
	Full-Time	95	47.5%
Total Experience	Less than 1 year	95	47.5%
	1–3 years	33	16.5%

Variable	Category	Frequency (n)	Percentage (%)
	3–5 years	32	16.0%
	5–10 years	40	20.0%

Table 2 provides descriptive statistics for four different variables: relative advantage, complexity, compatibility, and cloud accounting. The table includes the descriptive statistics for each variable

Table 3 presents the distribution of the respondents by gender and also provides information about their frequency and percentage in each category. This table is commonly used to understand the gender composition of a sample or population. The table indicates that there are 139 male respondents in the sample, which makes up approximately 69.5% of the total respondents. Furthermore, there are 61 female respondents in the sample, constituting around 30.5% of the total. Table 3 also displays the distribution of respondents by their marital status, presenting both the frequency and percentage of individuals in each category. This table allows us to understand the marital composition of the surveyed population.

Table 3 presents the distribution of respondents by their industry, providing both the frequency and percentage of individuals in each category. This table offers insights into the composition of the surveyed population across different

industries.

The table indicates that 109 respondents in the sample belong to the service industry, constituting approximately 54.5% of the total respondents. It also provides information about the distribution of respondents based on their working hours, including both the frequency and percentage of individuals falling into different working hour categories. The table indicates that 105 respondents in the sample work part-time, constituting approximately 52.5% of the total sample. There are 95 respondents classified as full-time workers in the sample, making up approximately 47.5% of the total respondents. These respondents have more than one year of experience in their current or related field. There are 33 respondents with 1-3 years of experience, constituting around 16.5% of the total sample. Then, there are 40 respondents with 5-10 years of experience, representing around 20.0% of the total respondents.

TABLE IV
CORRELATION

	1	2	3	4
Relative Advantage	1			
Complexity	0.554**	1		
Compatibility	-0.450	0.130	1	
Cloud Accounting	0.841**	0.400**	-0.194**	1

Note. **Correlation is significant at 0.01 level (2-tailed).

The variable “relative advantage” has a highly significant relationship with cloud

accounting implementation as the values are $r=.841^{**}$, $p<0.01$. Afterwards,

complexity with financial performance is 0.400** and compatibility with financial performance is $r = -0.194$, which is negative and shows a non-significant relationship. The correlation between relative advantage and complexity is positive (0.554**). This suggests that as the perceived relative advantage of using cloud accounting technology increases, so does the complexity associated with it. This positive relationship indicates that respondents may perceive cloud accounting as more advantageous but also more complex. The correlation between relative advantage and compatibility is negative (-0.450). This implies that as the perceived relative advantage of cloud accounting increases, the compatibility with the existing systems tends to decrease. This suggests a trade-off between perceived advantage and compatibility. The correlation between complexity and compatibility is positive (0.130), but it's not marked as statistically significant. This indicates a weak positive relationship between complexity and compatibility, suggesting that as complexity increases (though not significantly), compatibility also tends to increase slightly. The correlation between relative advantage and cloud accounting is strongly positive (0.841**), indicating a significant and strong positive relationship. This suggests that as the perceived relative advantage of cloud accounting increases, the likelihood of implementing cloud accounting also increases. The correlation between complexity and cloud accounting is positive (0.400**), indicating that as

complexity increases, the use or implementation of cloud accounting technology is more likely. This positive relationship suggests that organizations may adopt cloud accounting despite its complexity. The correlation between compatibility and cloud accounting is negative (-0.194**), signifying that as compatibility decreases, the likelihood of implementing cloud accounting increases. This suggests that organizations may be more willing to adopt cloud accounting even if it's not highly compatible with their existing systems.

TABLE V
MODEL SUMMARY

<i>R</i>	<i>R</i> ²	Adjusted <i>R</i> ²	SE
0.857 ^a	0.743	0.730	0.39343

Note. Predictors: (Constant) Compatibility, relative advantage, complexity

The results in Table 5 suggest that the combination of compatibility, relative advantage, and complexity (the predictors) has a strong positive linear relationship with the dependent variable. Additionally, the model explains a substantial portion (74.3%) of the variance in the dependent variable and maintains its explanatory power even after adjusting for model complexity (Adjusted R Square of 0.730). The standard error of the estimate is relatively low (0.39343), indicating that the model's predictions are relatively accurate. This suggests that the predictors in the model are effective in explaining and predicting the dependent variable.

TABLE VI
COEFFICIENTS

Model	<i>B</i>	<i>SE</i>	β	<i>t</i>	Sig.
(Constant)	2.752	0.292		9.438	0.000
Relative Advantage	0.709	0.037	0.869	19.416	0.000
Complexity	-0.064	0.046	-0.062	-1.383	0.168
Compatibility	-0.177	0.045	-0.146	-3.893	0.000

Table 12, presents the results of a multiple regression analysis, which aims to understand how the predictors (relative advantage, complexity, and compatibility) influence the dependent variable, namely cloud accounting. Relative advantage and compatibility significantly predicted the outcome.

IV. DISCUSSION

This study sought to examine the key determinants influencing the adoption of cloud accounting technology within the Pakistani banking sector, focusing specifically on perceived relative advantage, complexity, and compatibility—variables grounded in the Diffusion of Innovation (DOI) theory and supported by perspectives from the Resource-Based View (RBV) and Transaction Cost Economics (TCE). The empirical findings contribute both theoretically and practically to the understanding of technology adoption in a developing economy context, particularly within a highly regulated and legacy-driven industry.

The analysis confirms that relative advantage exerts the strongest and most statistically significant influence on cloud accounting adoption ($\beta = 0.869, p < 0.001$). This finding is consistent with prior literature (e.g., Chen et al., 2013; Gangwar et al., 2015), affirming that when cloud accounting is perceived to offer superior benefits—such as cost savings, real-time data access, improved collaboration, and enhanced scalability—it becomes a compelling choice for financial institutions undergoing digital transformation. The high correlation between relative advantage and cloud accounting adoption ($r = 0.841^{**}$) reinforces the theoretical assertion that innovations offering clear and quantifiable improvements over incumbent

systems are more likely to be adopted (Rogers, 2003). In the context of Pakistan's banking sector, which has historically relied on rigid, on-premise legacy systems, cloud solutions represent a strategic shift toward operational agility and responsiveness to market changes. These findings suggest that demonstrating tangible value—particularly in terms of operational efficiency and cost reduction—is critical for successful technology diffusion in emerging markets.

Surprisingly, complexity—traditionally considered a barrier to adoption—did not emerge as a statistically significant predictor in the regression model ($\beta = -0.062, p = 0.168$), despite showing a moderate positive correlation with cloud adoption ($r = 0.400^{**}$). This counterintuitive result may reflect a shift in user perception, possibly driven by increased exposure to digital systems, improved vendor support, and enhanced user-friendliness of modern cloud interfaces. From the TCE perspective, it is also plausible that organizations are willing to accept short-term complexity costs in anticipation of long-term efficiency gains. In contexts where institutional pressures to digitize are strong—such as post-COVID financial environments—complexity may be reframed not as a barrier but as a necessary transitional cost. Furthermore, this finding underscores the evolving nature of technological sophistication among employees in developing countries, indicating a diminishing impact of perceived difficulty in system implementation.

Contrary to expectations and prevailing literature (e.g., Deng & Xu, 2019; Ou & Zhang, 2021), compatibility exhibited a negative and statistically significant relationship with cloud accounting adoption ($\beta = -0.146, p < 0.001$). While

DOI theory posits that higher compatibility should facilitate adoption by reducing disruption to existing workflows and systems, this finding suggests a nuanced dynamic in contexts characterized by outdated or inefficient infrastructure.

In such environments, lower compatibility may signal an opportunity rather than a challenge. Organizations aiming to modernize may purposefully seek out systems that replace rather than integrate with legacy infrastructure. This may be particularly relevant in Pakistan's financial sector, where institutional inertia and technical debt often impede innovation. As a result, institutions may favor cloud solutions that offer a complete overhaul of inefficient processes, even at the cost of incompatibility with the existing technologies. This inverse relationship between compatibility and adoption could also be viewed through the RBV lens. Firms may perceive incompatible cloud systems as pathways to develop new capabilities and resources, enabling them to leapfrog existing limitations and create competitive differentiation.

In sum, this study provides robust evidence that perceived strategic value (relative advantage) is the most influential factor in cloud accounting adoption within Pakistan's banking sector. Contrary to conventional wisdom, complexity does not significantly deter adoption. Whereas, lower compatibility may, paradoxically, act as an enabler, reflecting a willingness among institutions to abandon legacy systems in favor of transformative solutions. These findings underscore the necessity of re-evaluating technology adoption models within emerging market contexts, where technological disruptions may be driven more by the imperative to modernize than by the ease of integration.

A. IMPLICATIONS

Based on the current study's findings, companies have cloud accounting adoption risk intervention strategies, cloud accounting adoption, and cloud accounting intercept less risk mitigation dealing within the clouds. Every company has to step forward into the shielding cloud world. While jumping into the cloud boards, companies have to think carefully regarding the benefits and the cloud accounting adoption value, paying thorough consideration to potential obscured costs and IT outsourcing worth in the present and in the future. Companies should analyze the accounting software. The reason accounting software is professionally tailored differ specific to a company. For regulators and industry associations, the findings point to the need for policies that encourage secure, scalable, and interoperable cloud ecosystems, while reducing institutional barriers to innovation. Moreover, as the study reveals a readiness among younger professionals to engage with cloud technologies, organizations should invest in capacity building at both technical and managerial levels to leverage this emerging digital fluency.

B. LIMITATIONS

The study's limitations emerge from the use of questionnaires which do not guarantee genuine responses and understanding of statement items. The sample size of responses from a few sectors is another limitation which poses a risk to the generalizability of the findings.

Further quantitative work could be performed to confirm and better analyze the risks and mitigation strategies in this study's context. Also, the evaluation of the effect of cloud accounting software on the quality of work in accounting practice and

the comparative study of risk perception between users and non-users of cloud accounting could yield useful information.

To conclude, this study underscores the significance of the technology's ease of use and compatibility regarding the adoption of cloud accounting. Therefore, it has implications for designing software and teaching accounting.

C. CONCLUSION

This research examines the risks concerning cloud-based accounting platforms and services and suggests strategies on how to mitigate such risks. It also provides a 'how to' guide on transitioning to cloud accounting. The study shows that cloud computing in accounting exposes even the most cautious businesses to potential risks, such as data loss and security breaches. While loss mitigation strategies such as competitive bidding and mutual agreements remain vital, internal business processes such as policymaking and capacity building also play a critical role. This research utilizes TCE (Transaction Cost Economics), alongside TOE (technological, organizational, and environmental) frameworks to classify and analyze user perceptions of cloud accounting risks and mitigation techniques. It adds to the scant literature on accounting software platforms by addressing cloud computing in accounting in the context of an industrialized/a newly industrialized nation.

CONFLICT OF INTEREST

The author of the manuscript has no financial or non-financial conflict of interest in the subject matter or materials discussed in this manuscript.

DATA AVAILABILITY STATEMENT

Data will be provided by corresponding

author upon reasonable request.

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