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The Role of Cloud Computing Adoption and Firm Performance Using SMEs Technological and Environmental Contexts in Hospitality Industry of Henan, China

Zhang Hui[1] & Alireza Mohammadi[2]

[1,2]Faculty of Business Management, City University Malaysia, Malaysia.

Corresponding Author: Zhang Hui, **Email:** 120757493@qq.com

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ABSTRACT

Purpose: The present study focuses on the role of cloud computing adoption and its impact on firm performance in the hospitality industry of Henan, China, with a focus on Small and Medium-sized Enterprises (SMEs). Moreover, the study analyses this relationship within the technological and environmental contexts of the region, providing empirical evidence of the impact of cloud technology adoption on the performance outcomes of SMEs.

Method: The research employs a quantitative research design, using surveys as the tool for data collection. The population of the study consisted of SME managers in the hospitality sector of Henan. Thus, the quantitative research methodology helped evaluate the relationships between the variables of the present study. The statistical analysis of the data gathered through the survey evaluated the hypothesized relationships.

Findings: The empirical findings of the present study revealed a significant impact of cloud computing adoption on the environmental, financial, and social performance of SMEs in the hospitality sector.

Conclusion: The present study offers data-driven insights into the ways to maximize the benefits of cloud computing in the technological and environmental contexts of SMEs. However, the findings of the study are limited to the context of the hospitality sector of Henan, therefore, its findings do not reflect the other industrial sectors in varying regional contexts.

Keywords: Cloud computing; firm performance; technological and environmental contexts, hospitality industry

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INTRODUCTION

As a result of the rapid growth and progress in the field of technology, cloud computing has become a substantial part of small as well as large enterprises. It helps streamline the delivery of services and resource allocation, which subsequently controls the cost. Cloud computing has taken over all departments of business and technology, including the hospitality industry. It has brought about a huge change in the way businesses operate and deliver services (Nadda et al., 2020). The cloud computing market in China is the fastest-growing market in the world. It is estimated that the global share of the cloud service market in China, which was 6.5 per cent in 2020, will surpass 10.5 per cent by 2024. The Chinese government aims to enhance the digital economy by increasing its share of the GDP to 10 per cent by 2025, as mentioned in its 14th Five-Year Plan (14th FYP). According to this plan, China is planning to promote the digital transformation of its industries (Interesse, 2022). Figure 1 shows the estimated progress in cloud computing infrastructure services in China within the next five years.

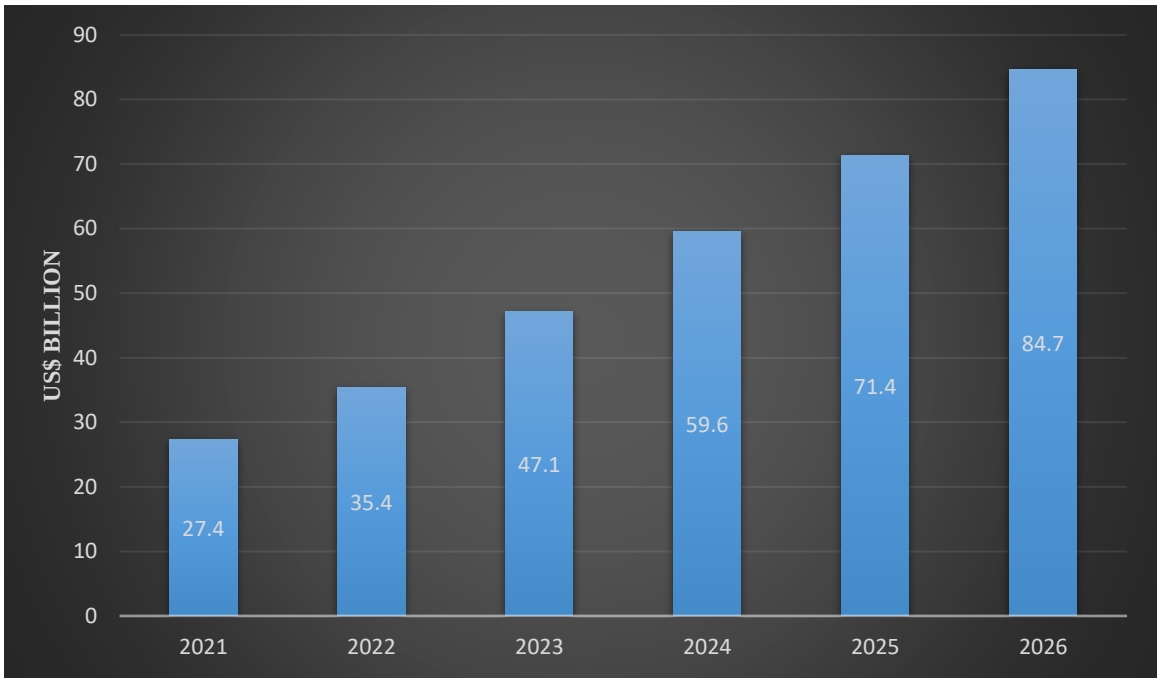

Figure 1: China cloud computing infrastructure services 2021 and five-year forecast
Note: China's cloud computing services grew by 45 per cent in 2021.
Source: (Canalys, 2021)

To date, the cloud computing adoption in China has been mostly observed in consumer-facing companies, which require elastic and on-demand access to unlimited computing prowess to meet the consumer expectations. For instance, China's Singles' Day shopping festivals involve a huge e-commerce traffic and merchandise. However, there are certain barriers, which impede

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the adoption of cloud computing across various industries in China, including security concerns, resource constraints, and regulatory concerns (Shen et al., 2022). The hospitality industry in China is becoming highly digitalized with an increasing adoption of Internet of Things, big data and cloud computing to provide high-quality services to consumers. The use of digital technology ensures adaptive and intelligent decision-making in the hospitality industry (Xinhua & Schaub, 2022). In China, Alibaba Cloud was the leading cloud computing company as it had a lead over Huawei Cloud and Tencent Cloud as shown in Figure 2.

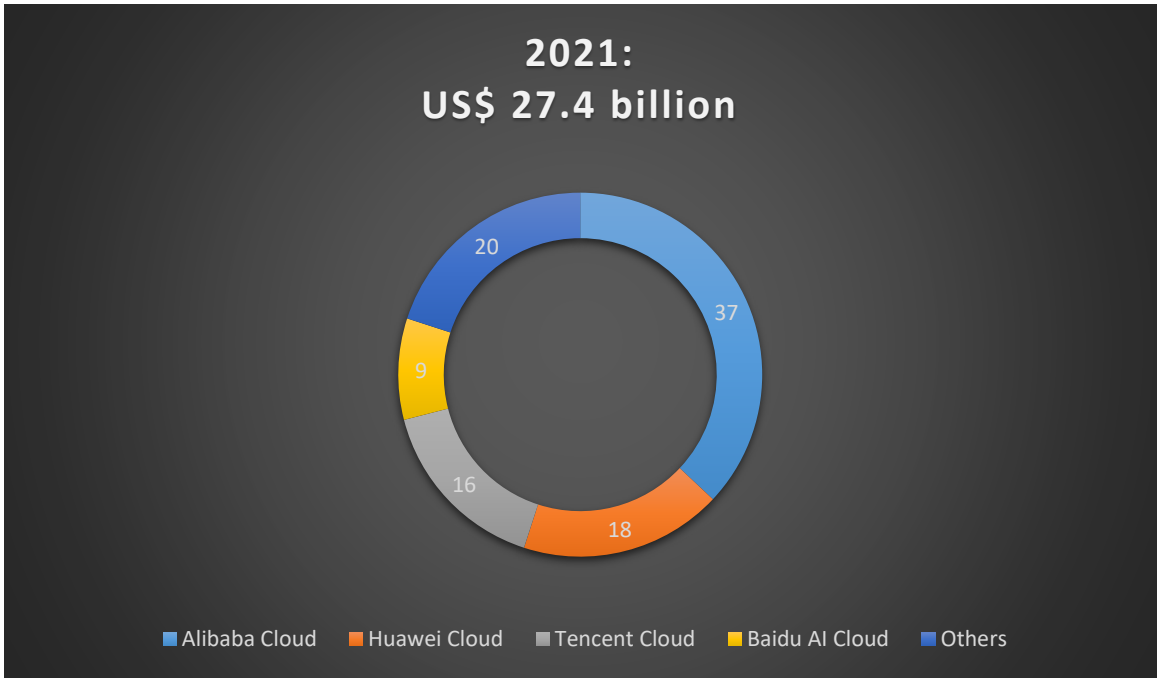

Figure 2: China cloud infrastructure services spend
Note: Alibaba Cloud led the cloud infrastructure services market in 2021.
Source: (Canalys, 2021)

The present study seeks to investigate the impact of cloud computing adoption on the firm performance in China's hospitality industry. The study focuses on the three facets of firm performance, including financial, social and environmental performance of the firm. Moreover, the study analyzes the mediating effect of operational efficiency and the moderating role of technological innovation. Previous studies have mostly focused on the determinants of cloud computing adoption and success (Khayer et al., 2020). Moreover, the existing empirical literature on cloud computing is focused on manufacturing industry (Bashar, 2019; Ooi et al., 2018; Qi & Tao, 2019; Rana & Sharma, 2019; Raut et al., 2019; Siderska & Jadaan, 2018) and healthcare sector (Abdelaziz et al., 2018; Aceto et al., 2020; Ali et al., 2018; Dang et al., 2019; Darwish et al., 2019; Gao et al., 2018; Rajabion et al., 2019). However, there is a significant gap in the empirical literature focused on the hospitality industry, which adds significance to

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the present study for targeting China's hospitality industry. The primary objective of the study is to provide a quantitative evidence of how the cloud computing adoption can impact in firm performance of SMEs in China's hospitality sector. Therefore, the study holds immense significance for its potential to offer valuable recommendations for hospitality sector to adopt cloud computing and provide an enhanced service to its consumers. The study is also significant because of its research framework, which analyzes the role of operational efficiency and technological innovation in driving the impact of cloud computing on the overall firm performance. With the rising concerns regarding the environmental and social impact of hospitality industry, the present study's focus on the holistic view of firm performance makes it even more significant. The study has the potential to offer valuable suggestions to policymakers, which would help them reduce the degenerative impact of the hospitality industry on environment and society through the adoption of cloud computing, leading to enhanced firm performance.

LITERATURE REVIEW

Theoretical background

The resource-based View (RBV) emerged as a well-known concept in management studies and it argues that the resources of a firm play a crucial role in its profit generation and give it a sustainable competitive position in the market. However, these resources should be unique, valuable, and inimitable (Barney, 1996, 2001; Priem & Butler, 2001; Wernerfelt, 1984). RBV is based on two critical assumptions: heterogeneity and immobility of resources (Kraaijenbrink et al., 2010). The first assumption can be used to justify the different capabilities of firms for cloud computing adoption and their subsequent competitive advantages. Mitra et al. (2018) examined the resource-based perspective of cloud computation and argued that the cloud implementation ability of a firm was potentially valuable but not unique and inimitable. The technology industry is prone to rapid transformations, therefore, individuals and firms with sufficient cloud computing skills enjoy a sustainable competitive advantage. Thus, cloud computing adoption emerges as a valuable resource for conferring a competitive advantage for firms in light of RBV. In the context of the present study, RBV provides a theoretical foundation to link cloud computing adoption with firm performance as it provides a firm with a competitive advantage and improves its performance.

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Cloud computing adoption and firm performance

Cloud computation is regarded as an evolution in information technology and a widely used IT resource for business organizations. It gives individuals and organizations on-demand access to a large network where they can utilize a large pool of organized and scalable IT resources, including servers, storage, and various other cloud applications (Sunyaev & Sunyaev, 2020). Several researchers have paid immense attention towards examining the impact of cloud computing adoption on firm performance. The present study investigates the impact of cloud computing on firm performance in terms of the financial, environmental, and social performance of firms in light of RBV theory.

Cloud computing adoption and financial performance

Chen et al. (2022) reported that cloud computing had a significant and positive impact on the profitability and market value of listed firms, however, the degree of this impact varied in both short and long periods. Moreover, the impact on the firm performance also varied according to the firm size and the type of industry. The study focused on the worldwide listed firms and did not focus on a particular type of industry. Regardless, the study made a significant contribution towards the empirical literature concerning the significance of IT investments for economic outcomes. The most significant advantage of cloud computing is in enhancing the productivity of firms and their international economy. The study of Ionescu and Andronie (2021) affirmed the role of cloud computing adoption not only as a technological trend but also as a robust instrument to improve the financial performance of firms. This makes cloud computing the most promising technology as its financial implications include adaptability, cost reductions, and competitiveness. Similarly, Ionescu and Andronie (2021) also reported a significant impact of cloud computing on cost reduction and enhanced quality of products, and the adoption of cloud computing also enhanced the marketing of new products and services, leading to desirable financial outcomes. The study highlighted the increased data availability and flexibility through the adoption of cloud computing. Mansour et al. (2020) focused on the adoption of cloud computing in the Malaysian hospitality sector and highlighted various opportunities for increasing financial outcomes. The study suggested that cloud computing adoption had the potential to enhance the economic outcomes of the hospitality sector and subsequently improve the country's economy. The empirical findings of Chulkov et al. (2021) also reported that firms that had adopted cloud computing, showed higher financial performance. Despite focusing on the early adopters of cloud computing, the study provided

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valuable groundwork for future studies on the financial outcomes of cloud computing adoption. Thus, based on the findings of these studies, and the theoretical foundations of RBV theory, the following hypothesis can be formulated:

H1: *Cloud computing adoption has a significant impact on the financial performance of firms.*

Cloud computing adoption and environmental performance

Lopes de Sousa Jabbour et al. (2018) linked Industry 4.0 with the circular economy and emphasized the potential of the technologies of Industry 4.0 to integrate the principles of circular economy into business operations. The study implied that smart technologies had the potential to enhance the environmental performance of firms. The growing environmental concerns motivate firms to adopt such resources that can help advance their environmental performance. Moreover, green resources not only enhance the environmental performance of firms but also avoid the loss of information, leading to the maximization of resources as evident in the study of Gupta et al. (2020) who reported a significant impact of cloud technology on the environmental performance of firms. In addition, by improving the financial sustainability of SMEs, cloud computing services can help firms reduce costs associated with infrastructure maintenance. This would empower firms to invest in other fields, which can enhance the overall sustainable and environmental performance of firms, including employees' sustainability training, corporate social responsibility initiatives, and sustainable supply chain management (Al-Sharafi et al., 2023). Ben Youssef and Zeqiri (2022) delineated how the implementation of Industry 4.0 could help the hospitality sector combat climate change. The study reported that the implementation of Industry 4.0 enhanced energy efficiency and reduced greenhouse gas emissions. Moreover, it reduced the consumption of water and food wastage in the hospitality sector. It also reduced transport and travel, leading to the enhanced environmental performance of the hospitality sector. The study suggested that the implementation of Industry 4.0 had the potential to establish Circular Hospitality 4.0. Nadkarni et al. (2023) also investigated the impact of Industry 4.0 technologies such as the Internet of things and cloud computing on sustainable performance in the hospitality industry. The study reaffirmed the significant impact of cloud computing and other such technologies of Industry 4.0 on the environmental performance of the hospitality industry. Thus, the following hypothesis can be formulated based on the findings of these empirical studies:

H2: *Cloud computing adoption has a significant impact on the environmental performance of firms.*

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Cloud computing adoption and social performance

Al-Sharafi et al. (2023) reported a significant influence of cloud computing on the social performance of SMEs. The study implied that cloud computing could enhance the social performance of SMEs by improving employee and customer satisfaction and reducing environmental impacts and risks to the firm. By adopting cloud computing, SMEs get an opportunity to deliver enhanced and faster services to consumers, which subsequently enhances consumers' satisfaction levels. In addition, cloud computing can enhance the satisfaction level of employees by supporting their individual needs assisting them in fulfilling their family responsibilities and enhancing the professional experience. Modern-day firms strive to exhibit high social performance and, therefore, focus on the integration of ethical practices, open communications and abiding by social obligations. Though social performance cannot have a direct impact on the organization, it has the potential to act as the backbone of the firm in times of crisis (Gupta et al., 2020). Bibby and Dehe (2018) highlighted the significance of the people factor for a successful implementation of Industry 4.0. These empirical studies suggest a significant impact of cloud computing on social performance. However, there is a significant research gap concerning the impact of cloud computing adoption on the social performance in the hospitality sector, Keeping the research gap in consideration, the present study hypothesizes the following correlation between cloud computing adoption and the social performance of the hospitality sector:

H3: *Cloud computing adoption has a significant impact on the social performance of firms.*

Mediating effect of operational efficiency

Operational efficiency is associated with the improvement of consumer experience and is defined in terms of flexibility, consistency, productivity and cycle time or operations (Kim et al., 2002). The rapid implementation of cloud computing has brought about a revolution in the way business organizations employ and manage their resources. As a result, the optimal performance of cloud computing has become crucial to increase consumer satisfaction and operational efficiency of organizations (Kunduru, 2023). Kayanda (2019) revealed that the adoption of cloud computing models reduced operational costs and enhanced the quality of the product. Moreover, it also offered flexible IT solutions and reduced IT costs as organizations did not need to spend resources on IT expenditures. The study of Nadkarni et al. (2023) affirmed that the implementation of Industry 4.0 in the hospitality sector can enhance the financial performance of firms by increasing their operational efficiency and revenue

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generation. The study implied that an optimized use of Industry 4.0 resources such as cloud computing could help hospitality firms enhance their operational efficiency and attain sustainable performance. In addition, Abd-Elmageed and Abdel Megeid (2020) reported that the operational efficiency of firms had a significant impact on their financial performance in terms of the profitability of firms. Lee et al. (2023) found that firms with higher operational efficiency were more likely to adopt environmental management practices than those with lower operational efficiency, suggesting a significant link between operational efficiency and the sustainable performance of firms. Thus, based on the empirical findings of the aforementioned studies, the following mediating relations of operational efficiency for the three constructs of firm performance can be hypothesized:

H4: *Operational efficiency significantly mediates the correlation between cloud computing adoption and the financial performance of firms.*

H5: *Operational efficiency significantly mediates the correlation between cloud computing adoption and the environmental performance of firms.*

H6: *Operational efficiency significantly mediates the correlation between cloud computing adoption and the social performance of firms.*

Moderating role of technological innovation

Technological innovation is defined as the economic function, which entails the introduction of new technological alternatives into the production and consumption processes (Scherer, 2011). Chege et al. (2020) reported that technological innovation had a significant and positive impact on the firm performance. The study regarded technological innovation as crucial for firms to gain a competitive advantage in a highly competitive market. Similarly, Yadegaridehkordi et al. (2020) reported that technology was the most influential factor in enhancing the firm performance of SME hotels in Malaysia. Lin et al. (2020) also reported a significant impact of technological innovation on firm performance. In light of the RBV theory, technological innovation can, thus, be regarded as a valuable resource for firms to enhance their financial, social, and environmental performance. Based on the aforementioned studies, the present study hypothesizes the significant moderating role of technological innovation on the correlations between cloud computing adoption and the three constructs of firm performance through the following hypotheses:

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H7: *Technological innovation significantly mediates the correlation between cloud computing adoption and the financial performance of firms.*

H8: *Technological innovation significantly mediates the correlation between cloud computing adoption and the environmental performance of firms.*

H9: *Technological innovation significantly mediates the correlation between cloud computing adoption and the social performance of firms.*

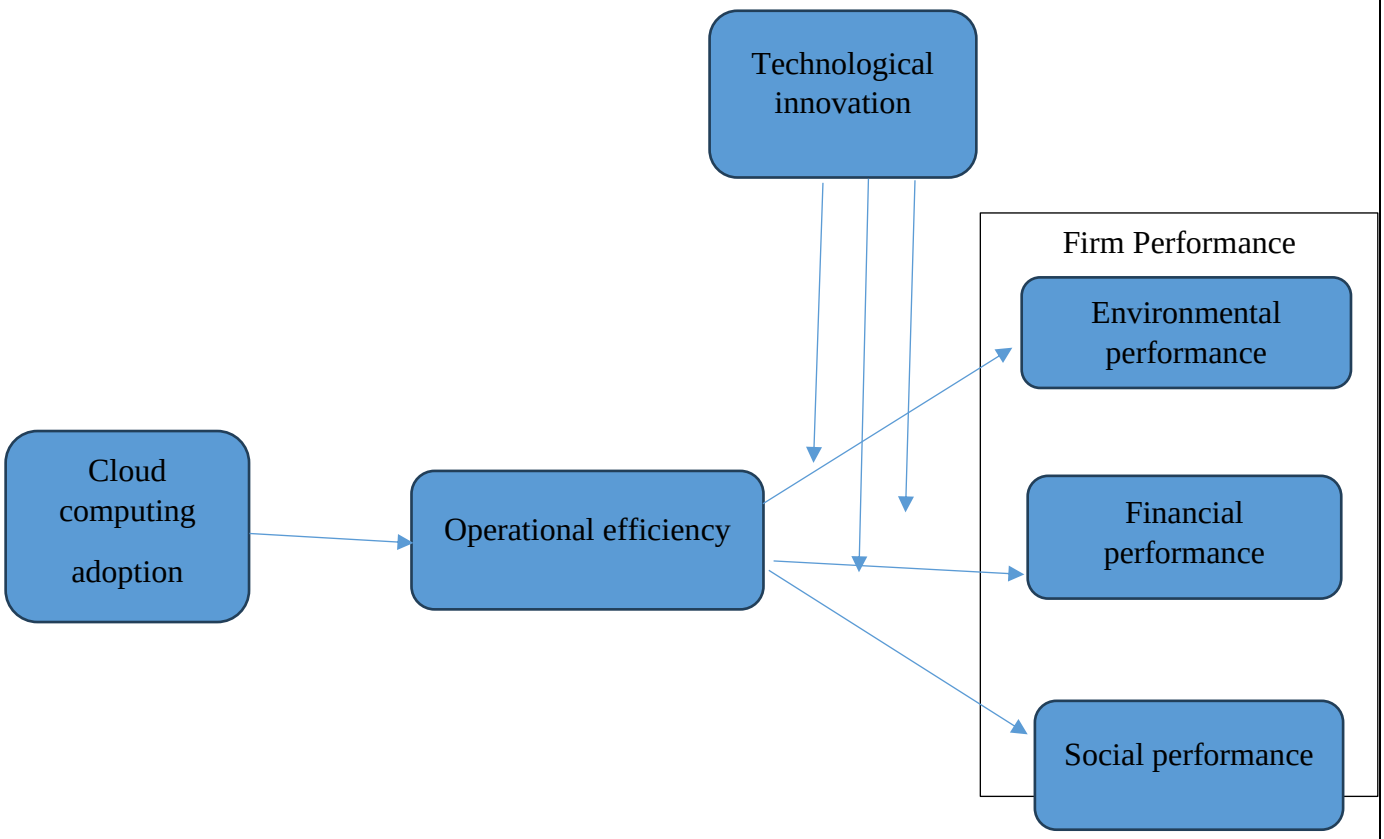

Figure 3: Research Model

METHODOLOGY

Research Context

This study was conducted within the context of China in a particular region Henan. The study has concentrated its evaluation on the cloud computing and technological adoption of SMEs; therefore, a quantitative research methodology has facilitated the study to constructively evaluate the targeted concepts. As it was evident, that the SMEs sector was targeted, using a

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generalized approach with a large sample size was preferred to provide more robust findings for the cloud computing and technology innovation.

Participants and Sample

The participants of the study were the employees of the SMEs within the Henan region of China. The participants of the study were selected to give the study a viewpoint on the status of the targeted variables within the SME sector. The number of employees in all the SMEs of Henan was not possible to calculate and the population size was unknown, therefore as a consequence of the unknown sample size, the non-probability purposive sampling technique was practiced and the employees currently working in the SMEs were accessed to get their responses.

Procedure

The survey tool i.e., the questionnaire was designed and used as a source of data collection. The data collection was practiced with the help of the online medium of Google Doc link and the link was distributed to the SMEs of Henan and voluntary participation was asked from the SMEs employees. The link to the questionnaire was also attached with the requirements of the respondents and the characteristics of the target population. The addressed SMEs were also motivated and reminded again after some time to encourage their employees to fill out the response form in their free time. Once, the desired and sufficient level of respondents were gathered, the online response sheet was transferred to Microsoft Excel which was later entered into the software SPSS.

Data Collection Instrument

The research instrument was divided into different sections including the demographical questions and the statements of the items adopted from the literature studies. The researcher has adopted 4 items for measuring the independent variable cloud computing. The moderator of technological innovation was measured with 4 items. The dependent variables were the three dimensions of performance including social, environmental and financial performance which were measured with 4, 6, and 4 items respectively. The last variable of operational efficacy i.e., the mediator of this study was measured with 7 items. The following table has been designed to present the details related to the adopted items and their sources.

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Table 1: *The adopted items' background.*

Variable	Financial performance	Environment performance	Operational efficacy	Cloud computing adoption	Technological innovation	Social performance
Source	(Algarni et al., 2022)	(Chavez et al., 2022)	(Kareem et al., 2019)	(Mohammed et al., 2016)	(Donbesuur et al., 2020)	(Chavez et al., 2022)
Items used	4	6	7	4	4	4

Data Analysis

The collected data after entering into the software SPSS was passed through the initial tests of missing values, outliers and descriptives. Next, after ensuring the quality of the data, the next advanced calculation of reliability through CR and validity through AVE were applied and they were evaluated against threshold ranges of value above 0.7 and 0.5 respectively. The discriminant validity was also verified. The model fitness was computed to confirm the effectiveness of the designed model and its inner factors. The test of structural equational modeling was applied at the end and the significance of the designed relationships was evaluated with the help of a p-value.

RESULTS AND INTERPRETATIONS

Descriptive Analysis

After being initially checked for outliers and missing values, the collected data was ready for analysis. First, the normality of the gathered data was assessed using the descriptive statistics test. The computer values were compared against the threshold range of values between -1 and +1 in order to analyse the normality using the skewness value. The output of the analysis revealed an even distribution of the data that was gathered. The mean score of the variables was calculated in addition to the normalcy to determine the respondent's preference for the concepts that were addressed. The respondents' positive as well as favourable perceptions of the concepts asked about in the questionnaire are indicated by a mean value close to or above 3. The study's mean values are either close to 3 or surpass 3 for every variable, signifying the respondents' support.

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Table 2: *The Descriptive Analysis*

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
CCA	290	1.00	5.00	3.0448	1.20361	.060	.143
TI	290	1.00	5.00	2.7405	1.36143	.396	.143
SP	290	1.00	5.00	3.5517	1.08262	-.427	.143
EP	290	1.00	5.00	3.8609	1.08961	-.704	.143
FP	290	1.00	5.00	2.8776	1.24961	.305	.143
OE	290	1.00	5.00	3.3414	1.32669	-.184	.143
Valid N (listwise)	290						

The Sample Adequacy Test

Following the confirmation of the data's normalcy, the KMO and Bartlett's test were utilized to assess the suitability of the quantity of responses gathered. The calculated result value exceeded the 0.6 threshold, indicating that the sample size was sufficient to represent the variables and the associations. The obtained data also passed the Bartlett's test of redundancy, yielding a significance value of 0.00.

Table 3: *The Sample Adequacy Test*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.898
Bartlett's Test of Sphericity	Approx. Chi-Square	8136.074
	df	276
	Sig.	.000

Factor Analysis

The rotated component analysis was performed, and the exploratory factor analysis was carried out to assess the quality of the gathered data in relation to their parent variable. The values were compared to a benchmark value of 0.7, and any problems related to cross-loading were looked into. Furthermore, every value was higher than 0.7, indicating that the items had good factor loadings.

Table 4: *The Factor Loadings of the Items*

	1	2	3	4	5	6
OE1	.904					
OE2	.877					
OE3	.854					

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OE4	.874					
OE5	.883					
OE6	.805					
OE7	.801					
FP1						.786
FP2						.797
FP3						.793
FP4						.796
CCA1				.877		
CCA2				.859		
CCA3				.875		
CCA4				.885		
TI1			.951			
TI2			.950			
TI3			.956			
TI4			.947			
EP1		.895				
EWP2		.870				
EP3		.892				
EP4		.914				
EP5		.869				
EP6		.800				
SP1					.731	
SP2					.734	
SP3					.861	
SP4					.841	

Reliability and Validity

To guarantee the robustness of the data for testing hypotheses, the validity and reliability of the variables must be assessed. As a result, the study calculated reliability as well as discriminant and convergent validity. The convergent validity was calculated using AVE and a benchmark value of 0.5, and the reliability was calculated using the composite reliability indicator, which has a threshold range of 0.7. Values exceeding 0.7 were used to assess the discriminant validity along with their significance level. The following outcome was produced, and it showed that the data had good validity and reliability.

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Table 5: *The Reliability and Validity*

	CR	AVE	MSV	MaxR(H)	OPE	ENP	TLI	CCAD	SPR	FNP
OPE	0.957	0.761	0.261	0.961	**0.873**					
ENP	0.956	0.784	0.215	0.964	0.387***	**0.885**				
TLI	0.993	0.971	0.312	0.993	0.057	-0.051	**0.985**			
CCAD	0.923	0.749	0.212	0.923	0.147*	0.153*	0.230***	**0.866**		
SPR	0.899	0.699	0.261	0.987	0.511***	0.463***	0.047	0.068	**0.836**	
FNP	0.890	0.669	0.312	0.897	-0.151*	0.004	0.559***	0.460***	-0.211**	**0.818**

The Model Fit Measures

Several model fit indicators were calculated, and the CFA test was done to calculate the designed model's model fitness. The model was rated as having excellent status by all model fit indicators, and the results are attached in the table below. Furthermore, Figure 4 presents the graphical output of the CFA.

Table 6: *The Modell Fit Measures*

Measure	Estimate	Threshold	Interpretation
CMIN	791.706	--	--
DF	362.000	--	--
CMIN/DF	2.187	Between 1 and 3	Excellent
CFI	0.957	>0.95	Excellent
SRMR	0.043	<0.08	Excellent
RMSEA	0.064	<0.06	Acceptable
PClose	0.000	>0.05	Not Estimated

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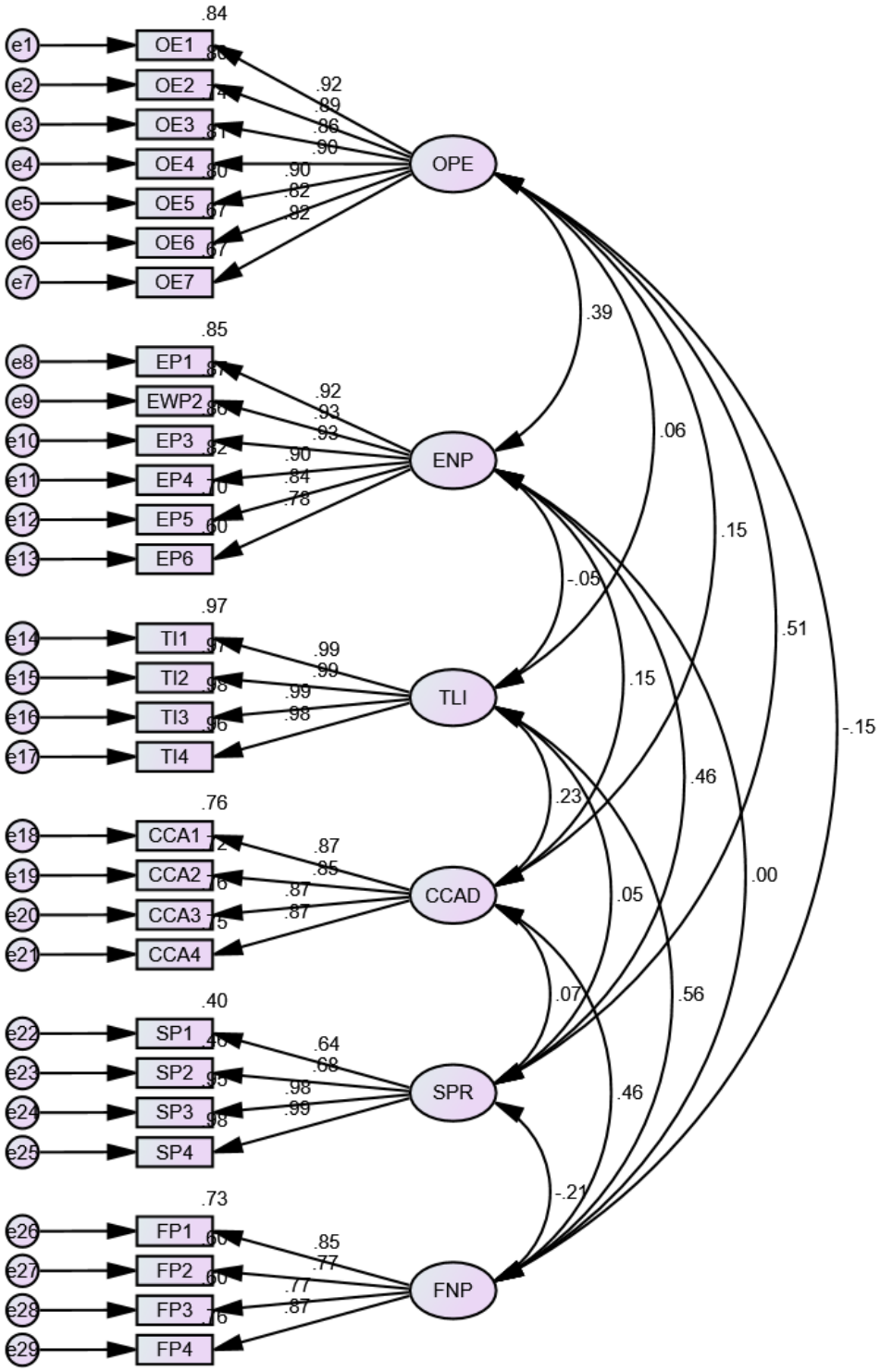

Figure 4: The CFA Output

The Hypotheses Testing

Lastly, the testing of the hypotheses was done in the final stage of analysis. The results of the Structural Equational Modelling (SEM) were compiled. The adoption of cloud computing was

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the only independent variable in the model, and firm performance (that is, financial, social, and environmental performance) was the dependent variable. Technological innovation served as a moderator between operational efficiency and firm performance, while operational efficiency acted as a mediator between the adoption of cloud computing and firm performance. The output of the results is displayed in the following tables:

Table 7: *The Direct Effects*

Parameter			Estimate	Lower	Upper	P
OE	<---	CCA	.140	.040	.245	.027
EP	<---	CCA	.093	.014	.179	.051
SP	<---	CCA	-.009	-.086	.074	.905
FP	<---	CCA	.445	.349	.533	.001
EP	<---	OE	.368	.273	.459	.001
SP	<---	OE	.534	.457	.609	.001
FP	<---	OE	-.196	-.290	-.104	.001

Table 8: *Mediation Results*

Indirect Path	Unstandardized Estimate	Lower	Upper	P-Value	Standardized Estimate
CCA --> OE --> EP	0.047	0.015	0.087	0.020	0.052*
CCA --> OE --> SP	0.067	0.019	0.119	0.026	0.075*
CCA --> OE --> FP	-0.028	-0.058	-0.008	0.019	-0.027*

Table 9: *Moderation Results*

Parameter			Estimate	Lower	Upper	P
ZEP	<---	MOD_INT	.181	.089	.271	.015
ZFP	<---	MOD_INT	.257	.174	.341	.007
ZSP	<---	MOD_INT	.283	.195	.349	.023

The results show that cloud computing adoption has a significant impact on the financial performance of firms, whereas it does not have a significant impact on the social performance of firms. The results depict that cloud computing adoption also has a significant impact on the

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environmental performance of firms. Moreover, it is evident from the results that operational efficiency mediates the correlation between cloud computing adoption and firm performance. Furthermore, the proposed hypotheses related to moderation were also accepted which means that technological innovation significantly moderate the correlation between cloud computing adoption and the firm performance. Figure 5 illustrates the SEM output:

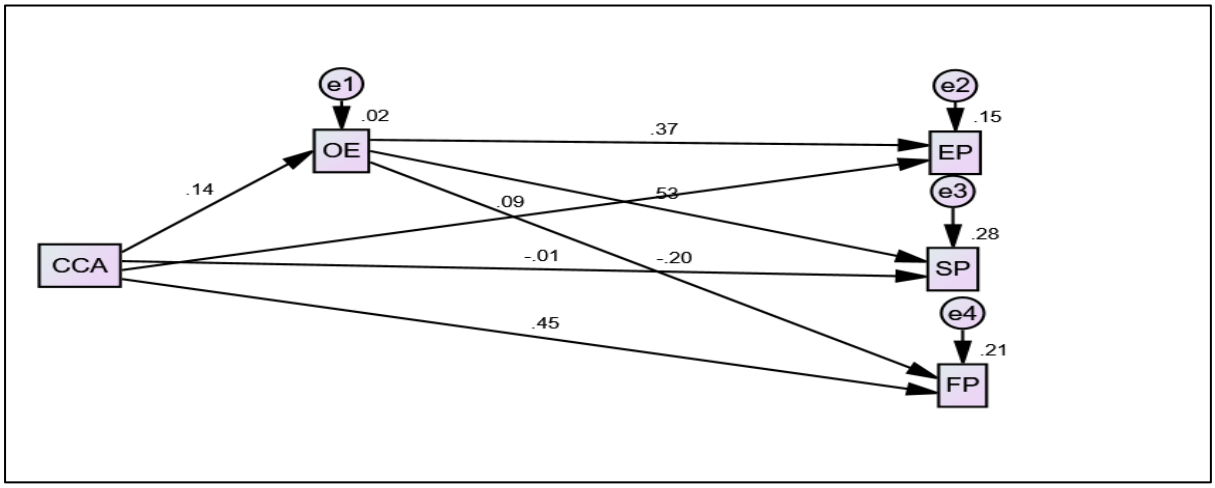

Figure 5: The SEM Output

DISCUSSION AND FINDINGS

The study's results provide insight into the complex relationship that exists between the adoption of cloud computing and firm efficiency in the backdrop of Henan, China's hospitality sector, with a particular emphasis on SMEs. The acknowledged hypotheses, which take into account both technological as well as environmental contexts, offer insightful information about the complex effects of online computing implementation on various aspects of company performance. The investigation backs up H1, which states that the monetary performance of Henan-based hospitality companies is greatly impacted by their adoption of cloud computing. This result is consistent with the general perception that online computing can enhance a company's operational effectiveness, lower expenses, and produce better financial results overall. The findings highlight how crucial it is to adopt cloud technologies strategically if one wants to succeed financially and sustainably in the highly competitive hospitality market. Likewise, H2 is endorsed, confirming that the use of cloud computing has a significant effect on companies' environmental performance. The positive relationship found among cloud adoption as well as environmental performance implies that cloud computing-related technological innovations, like energy efficiency along with virtualization, help hotels lessen

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their environmental impact. This research emphasizes how cloud computing can support environmentally friendly business practices.

The relationships among the adoption of cloud computing and financial along with environmental performance are introduced by H4 as well as H5, respectively, and the intermediary function of operational effectiveness is discussed. Both of the study's hypotheses are supported, showing that operational effectiveness plays a major mediating role in how cloud adoption affects financial as well as environmental results. This suggests that enhancements to operational effectiveness act as a mediating factor for the beneficial impacts of cloud computing on financial along with environmental performance. Regarding H6, the research indicates that operational effectiveness also plays a significant role in mediating the relationship between the adoption of cloud computing and social achievement. This demonstrates how adopting cloud computing can have wider societal effects, implying that better operational efficiency can also benefit Henan's hospitality industry. Moreover, the moderating effect of technological advancement in the association between the adoption of cloud computing and monetary, environmental, along with social performance is introduced in H7, H8, as well as H9, respectively. The results show that the effect of cloud implementation on social, financial, as well as environmental performance is significantly moderated by technological innovation. Rejection of H3 implies that the adoption of cloud computing has no discernible and direct influence on social efficacy of Henan-based hospitality enterprises. This finding motivates more research into the precise dynamics and environmental elements that might affect how cloud adoption as well as social performance are related.

The findings of this investigation are consistent with those of several earlier studies. Asiaei and Ab. Rahim (2019) examined how cloud computing affects SMEs in service industry, highlighting the benefits for overall performance as well as operational efficiency. Similarly, Ayoobkhan and Kaldeen (2020) carried out study focusing on the hospitality industry in Sri Lanka, emphasizing how cloud computing is revolutionizing business operations and competitiveness. Moreover, AL-Shboul (2019) examined the environmental as well as technological facets of cloud computing in the developing countries, emphasizing the importance of this strategy for getting a competitive advantage.

CONCLUSION

In a nutshell, this study focused on the technological as well as environmental contexts for SMEs and explored the complex association between the adoption of cloud computing and

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company efficiency in the hotel sector of Henan, China. The approved hypotheses clarified a number of important facets of this association. The study verified that the adoption of cloud computing has a major impact on financial as well as environmental performance. These results highlighted how crucial it is for the Henan hotel industry to adopt cloud technologies in order to improve economic outcomes as well as deal with environmental concerns. Furthermore, the research findings indicated that operational effectiveness was a critical mediating factor in the relationship between the adoption of cloud computing and economic, environmental, as well as social performance. This implied that enhancements to operational efficiency were the main mechanism through which the adoption of cloud computing benefits company's performance. The study also examined the moderating effect of technological advancement, highlighting its importance in affecting the relationship between the adoption of cloud computing and social, financial, as well as environmental performance. This highlighted the necessity of innovative technological approaches to optimize the advantages of cloud computing in the hotel sector. On the other hand, the hypothesis that claimed that the adoption of cloud computing had a major effect on social success was not accepted. This suggested that the adoption of cloud computing did not result in appreciable gains in social efficiency within the investigated SMEs in the hotel sector of Henan.

IMPLICATIONS

The current study has been effective in providing many implications, which contribute to its overall usefulness.

Theoretical Contributions

The study has added a great deal to the body of current knowledge. Through an analysis of online computing adoption within a particular industry as well as regional setting, the study tackles the distinct technological along with environmental obstacles that SMEs in the hotel sector encounter. The study provides insightful information about the technology environment of SMEs in the Henan, China, illuminating the ways in which the adoption of cloud computing affects their overall productivity, cost-effectiveness, as well as operational efficiency. This contextualized method offers a sophisticated insight into the function of cloud computing in an area with unique technological as well as economic features. Moreover, by taking into account the environmental aspects that influence the adoption of cloud computing, the study adds to the body of literature. This comprehensive viewpoint makes it possible to

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analyse in detail how technological developments interact with the distinctive environmental conditions unique to Henan's hospitality sector.

Practical Implications

Practical improvements as well as advancements have been guided by this research study in a significant way. First and foremost, the research study has given insightful information about the unique chances and difficulties Henan's SMEs in the hotel industry have when implementing cloud computing innovations and technologies. It is imperative for companies to comprehend these challenges in order to customize their adoption methods and address any potential roadblocks, ultimately improving the overall effectiveness of the way they operate. Furthermore, the study has provided SMEs of Henan with a standard for evaluating their own advancement and competitiveness by examining the firm productivity in connection to adoption of cloud computing. Businesses can find opportunities for innovation as well as improvement because of this useful benchmarking, which promotes a more flexible and dynamic industry environment. Moreover, the study has aided in the creation of best standards and recommendations for SMEs of Henan to maximize their technology infrastructure in backdrop of regional conditions. Consequently, this enhances the sustainability as well as adaptability of enterprises in the hotel industry, enabling them to more effectively manage changes in technology and ecological obstacles.

LIMITATIONS

Even though this study provided insightful information, there are a few important limitations as well. The study is limited in its applicability to other sectors or regions due to its exclusive emphasis on the hotel sector in Henan, China. Moreover, the study ignored outside variables that might have an impact on the association between adoption of cloud computing and company performance, such as changes in regulations or fluctuations in the economy. Furthermore, the study mostly ignored potential connections with other evolving technologies that might have an effect on results in favour of concentrating on the effect of online computing use on company performance. Besides, the lack of exploration of the various strategies as well as implementation approaches used by various SMEs have resulted in the study's inability to account for variations in results depending on particular organizational contexts. Additionally, the study did not investigate how organizational culture affect online computing adoption and efficacy. Lastly, because technology is always changing, the results of this study might not be

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applicable in the future when new developments in online computing along with related fields appear.

FUTURE RESEARCH DIRECTIONS

Future studies should explore a number of interesting avenues. First off, considering that the H3 was disqualified, it seems worthwhile to investigate the precise mechanisms by which the adoption of cloud computing affects social performance. A thorough examination of the social dimensions, including community involvement, staff well-being, as well as customer satisfaction, will provide insight into the complex nature of online computing in the hotel industry. Furthermore, more investigation is necessary into the function of effectiveness as an intermediary. Subsequent research endeavours should examine the extent and complexity of operational procedures impacted by the adoption of cloud computing, pinpointing particular operational aspects that function as intermediaries in the correlation with monetary, environmental, as well as social outcomes. This would offer a more detailed comprehension of the complex processes by which cloud computing affects the overall efficiency of companies. Besides, investigating the contextual elements of Henan's hotel sector will provide insightful information. Examining regional quirks, legal frameworks, and cultural subtleties would improve the findings' generalizability and offer useful suggestions for companies doing business in this particular area. In addition, more research should be done on the moderating effect of technological advances. Businesses can make strategic decisions regarding technology integration by identifying particular advances or technologies that collaborate with the adoption of cloud computing to either enhance or hinder its effect on firm efficiency.

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