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Original Article

Evidence on the Impact of Organizational Factors on Cloud Computing Adoption: A Meta-Analysis

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Abstract *- This study examined whether organizational aspects significantly impact the integration of cloud computing in Small and Medium-Sized Enterprises (SMEs). The author examined the literature using the PRISMA protocol. The search and filtering process yielded eight studies on the connection between organizational aspects and SME cloud computing implementation. The first meta-analysis model examined the pooled effect of various chosen organizational aspects on cloud computing adoption. Significant heterogeneity due to the diverse range of organizational factors was obtained. As such, the random-effects model was favored over the fixed-effects model. The overall mean difference (SMD = 1.21) was also not statistically significant ($p > 0.05$). The second meta-model sought to understand what individual aspects of the organization directly influence, namely management support, organizational readiness, facilitating conditions, resources, and the experience and knowledge of the personnel concerning cloud computing. None of the factors was significantly correlated with cloud computing adoption. However, since none of the organizational factors is statistically significant, the findings provided that there could be more to cloud computing usage. The findings pointed out that there is a need for more elaborate future studies to understand other organizational aspects that impact cloud computing integration in SMEs, such as issues related to resource management, organizational preparedness, and the level of expertise of the employees in the organizations.*

Keywords *- Cloud computing, Organizational factors, SMEs, Technology adoption, TOE framework.*

1. Introduction

Organizations are discovering, implementing, and applying various technologies to improve their work and efficiency. Businesses have implemented different technologies to enhance their production, communication, and engagement with their existing and prospective clients (Ammar et al., 2021; Mohsen, 2023). Organizations use technology to streamline production processes, improve communication, and interact with existing and potential customers (Ammar et al., 2021; Mohsen, 2023). According to Ng et al. (2021), the automation of general tasks helped free up time for other higher-level work.

Adopting technology enhances organizational agility with remote working, better data handling, and collaboration (Ng et al., 2022). Despite the financial and compatibility challenges that influenced the adoption and use of technology in organizations, there was instead a general agreement that various types of technology advanced, such as cloud solutions, IoT, and artificial intelligence, have enhanced organizations' proficiency and productivity (Belgaum et al., 2021).

While numerous published articles examine the effect of IT adoption on organizations in general, there is still minimal research on the moderating effect of organizational factors on cloud computing implementation, particularly in SMEs. Specifically, no meta-analysis of the current literature addressed aspects such as management support, organizational preparedness, and knowledge about cloud computing influencing SME adoption decisions. According to the available peer-reviewed academic literature, this study sought to evaluate the organizational aspects impacting the integration of cloud computing technology in SMEs.

2. 2. Related Literature

2.1. Overview of Cloud Computing and Its Importance

Cloud computing refers to the utility computing model that uses the internet to obtain servers, databases, networking applications, intelligence, and storage, which earlier required tangible facilities and platforms (Islam et al., 2023). Sandhu, 2021). This technology impacts businesses and individuals by providing flexible resources and achieving economies of scale and speed to market to foster innovation. In their study, Vinoth et al. (2022) opined

that through cloud computing, one can save on cost and time while at the same time being able to get access to many options in IT. Cloud computing is a model whereby organizations can get computing and analytical services without owning computing infrastructure (Golightly et al.,.2022). These facilitate realizing higher speed, flexibility, cost savings, and strategic impact of businesses for digital transformation (Islam et al., 2023).

2.2. Cloud Computing Adoption in SMEs

However, SMEs encounter challenges in embracing cloud computing, as detailed below (Hojnik & Hudek, 2023; Zamani, 2022). SMEs also face problems regarding funding, skills, and the general infrastructure necessary to integrate cloud computing smoothly. Although a lot of work has been published on the case of cloud computing implementation, limited information is available regarding SMEs and, more precisely, the organizational aspects that might affect their decision to implement cloud computing (Zamani, 2022). Therefore, it is essential to determine the applicability of the existing theories of cloud technology in the SMEs and further focus on the organizational factors involving management support, organizational preparedness, and expertise of the employees of the SMEs.

2.3. Technology-Organization-Environment (TOE) Framework

The TOE framework by Tornatzky and Fleischer (1990) helps easily categorize them. The theoretical framework categorizes these factors into technological, organizational, and environmental environments. The technological context defines all technologies needed in an organization's current or advanced production line (Baker, 2011). The framework cuts across aspects such as size, structure, culture, and management support, whereby size is an institution's ability to adopt new technologies. The environmental milieu embraces external factors like the rules and regulations and the level of competition, which also affect the adoption decisions.

2.4. Organizational Factors in Cloud Computing Adoption

In the case of the organization, particular drivers explain the extent of the implementation of cloud computing among SMEs. One of the key antecedents of digital technology adoption is top management support (Hussein et al., 2020). Studies have identified that high managerial support enhances organizational culture, guarantees requisite resources, and synchronizes organizational technology vision with business objectives (Aligarh et al., 2023; Faiz et al., 2024). As may be observed in SMEs, managerial support is imperative to overcome the barriers to adoption, which may be keenly felt in such organizations due to inadequate resources.

Another key structural feature is organizational readiness, which is the ability and willingness of the organization to embrace and implement change. Concepts such as organizational motivation and culture are essential in successfully implementing technology. This involves social capital, such as the availability of infrastructure, financial capital, and technology capital (Salim & Ali, 2020; Ayadi, 2022). Other factors include organizational digital culture and how open organizations are to change operations.

Faiz et al. (2024) established that technologically and resource-ready organizations tended to adopt cloud computing technologies optimally. However, as pointed out in the present meta-synthesis, there is an insignificant link between the independent variable of concern, organizational readiness, and the dependent variable of interest, cloud computing adoption, for which it is posited that readiness may not be the sole driver. Still, factors like managerial support or the external environment are the key drivers.

2.5. Role of Technological Compatibility

Technological factors are also influential in determining the implementation of cloud computing. Technological compatibility is the extent to which new technologies can accommodate themselves with the existing ways of working. Saghafian et al. (2021) suggested that a major cause is that SMEs prefer to implement cloud computing systems that are within their capacities and do not disrupt existing setups while avoiding high costs.

This was also evident in their studies, as they stated that incompatible technologies enhance operational costs and degrade productivity. Banimfreg, 2023). Hence, there is recognition that the fit between the cloud computing technology and the existing resources in SMEs determines the technology's adoption level since it can either enhance or hinder the process.

2.6. Barriers to implementation in SMEs

Although the phenomenon of cloud computing is widely understood and analyzed to be beneficial in many aspects, some barriers prevent its implementation in SMEs. Lack of capital and lack of resources are the main hindrances to SME implementation of various solutions, mainly because SMEs cannot afford to invest in advanced cloud solutions (Aligarh et al., 2023).

Furthermore, this unawareness and a lack of employee knowledge about using cloud technologies will only slow adoption (Ayadi, 2022; Hussein et al., 2020). Knowledge and experience of the employees have an impact since organizations with skilled employees can adopt this technology and utilize the cloud computing systems effectively. Nonetheless, small and medium enterprises' essential finances to engage in the training of employees or procurement of equipment may face a lot of resistance to adoption (Skafi et al., 2020).

2.7. Interaction of Organizational and Environmental Factors

In addition to organizational factors, other external environmental factors also play a role in adopting cloud computing. One of the external domains that SMEs are likely to face when implementing new technologies comprises government support, regulations, and competition within the industry (Roy et al., 2021). Hadwer et al., 2021). Jennice (2024) noted that SMEs are highly interested in cloud computing adoption. However, there are some external challenges, including the high cost of adoption and a lack of adequate policy support. One should also consider the interaction between organizational readiness and the external environment because internal organizational factors may not function as intended due to external pressures (Faiz et al., 2024; Hadwer et al., 2021).

2.8. Novelity and Comparison of the Work with Other Contributions

A previous literature review found many factors that may lead to implementing cloud computing in SMEs, including managerial support, organizational readiness, and industry regulations (Hussein et al., 2020). However, many of the researchers have investigated only a few numbers of organizational factors or based on small, geographically localized samples that have been conducted (Hussein et al., 2020; Faiz et al., 2024). Furthermore, prior studies focus only on the adoption process, which does not examine the function of technology, institutions, and the environment. Despite the mentioned works indicating that readiness and management support are influential factors in adoption, their overall influence, especially among SMEs, has not been sufficiently articulated.

The research gap of this study is as follows: This research paper aims to do a literature review from 2020 to 2025 on the latest literature available regarding the impact and specific organizational aspects influencing the implementation of cloud computing in SMEs. Previous works, for example, by Faiz et al. (2024), targeted limited variables or small sample sizes. This paper evaluates factors for speculating adoption to consider more constitutional ones involving management support, organizational preparedness, and employees' knowledge across various SMEs. In comparison, this research employs the TOE structure and random-effects models to mitigate research heterogeneity, which have not been utilized in previous research where the fixed-effects models were used. To address the research gap in the literature, this work considers a compendium of organizational factors more than earlier studies. It uses a superior statistical technique for estimating cloud computing adoption in SMEs.

This meta-analysis aims to determine the implications of various organizational factors on SMEs' use of cloud computing services. This study lowers the number of random errors, providing accurate results on the organizational aspects influencing SMEs' use of cloud computing. To achieve this purpose, the study was guided by the following research question: *What roles do organizational factors play in SMEs' cloud computing implementation?*

3. Materials and Methods

The current meta-analysis sought to synthesize evidence concerning the effect of one or more organizational variables, including top management support and staff familiarity, on SMEs' disposition to implement cloud computing. In this part, the authors present the data collection and analysis procedure used for this work.

3.1. Data Collection

Secondary research in this study was obtained from a review of journal articles that focused on organizational aspects that affect the implantation of cloud computing among SMEs. Therefore, the search for relevant information is conducted through a rigorous search strategy. Keywords used for the search were derived from the following potential drivers of successful cloud computing adoption in organizations. The authors' first three concepts in this study were as follows: Organizational factors, cloud computing implementation, and its appropriateness and implementation issues in Small and Medium Enterprises (SMEs) are some of the topics of interest.

The authors then isolated the keywords relevant to the two concepts. Keywords related to organizational factors were as follows: organizational factors, management practices, management endorsement or support, technological readiness, IT infrastructure, organization size, employee knowledge and experience, and resource availability. Keywords related to the concept of cloud computing implementation were as follows: cloud computing Acquisition, cloud-based results, SaaS (Software as a Service), PaaS (Platform as a Service), IaaS (Infrastructure as a Service), and cloud services adoption. Lastly, keywords related to the concept of SMEs were as follows: SMEs, small and medium-sized enterprises, small firms, small-scale businesses, and medium-sized firms.

The following search strings were constructed for querying relevant academic sources:

- Search string 1: ("organizational factors" OR "management practices" OR "management endorsement" OR "management support" OR "technological readiness" OR "IT infrastructure" OR "organization size" OR "employee knowledge" OR "employee experience" OR "resource availability") AND ("cloud computing adoption" OR "cloud-based solutions" OR "SaaS" OR "PaaS" OR "IaaS" OR "cloud services adoption") AND ("SMEs" OR "small

and medium-sized enterprises" OR "small firms" OR "small-scale businesses" OR "medium-sized firms")

- Search String 2: ("management practices" AND "cloud computing adoption" AND "small firms") OR ("technological readiness" AND "SaaS" AND "medium-sized firms") OR ("IT infrastructure" AND "PaaS" AND "SMEs")
- Search String 3: (("organizational factors" OR "employee knowledge" OR "management support") AND ("cloud-based solutions" OR "IaaS" OR "cloud services adoption") AND ("small-scale businesses" OR "small and medium-sized enterprises"))

The following databases were queried for relevant scholarly articles: Google Scholar, Web of Science, Scopus, JSTOR, ProQuest, SAGE Journals, IEEE Xplore, ACM Digital Library, ScienceDirect (Elsevier), SpringerLink, EBSCOhost, Taylor & Francis Online, and Wiley Online Library. A total of 241 studies were identified from both databases (N=219) and the register (Research Gate) (N =22). Over half (N=130) of the identified records were removed since they were duplicates. The automation tool used removed another 12 of the identified studies. A review of the studies' titles and abstracts revealed that nine were removed. This left a total of 90 studies to be screened, out of which 51 studies were excluded.

Thirty-nine studies were retrieved, but a third (N=13) were not. Hence, only 26 studies were assessed for eligibility. Based on the exclusion criteria, 10 studies did not use SEM or MLR to establish association; five were published before 2020, and three did not focus on the impact of organizational aspects on the usage of cloud computing. Therefore, only eight studies were identified and incorporated into the meta-analysis, as indicated in Figure 1. The PRISMA flow chart in Figure 1 maps out the phases of identifying, retrieving, and filtering studies, which are relied on for this meta-analysis.

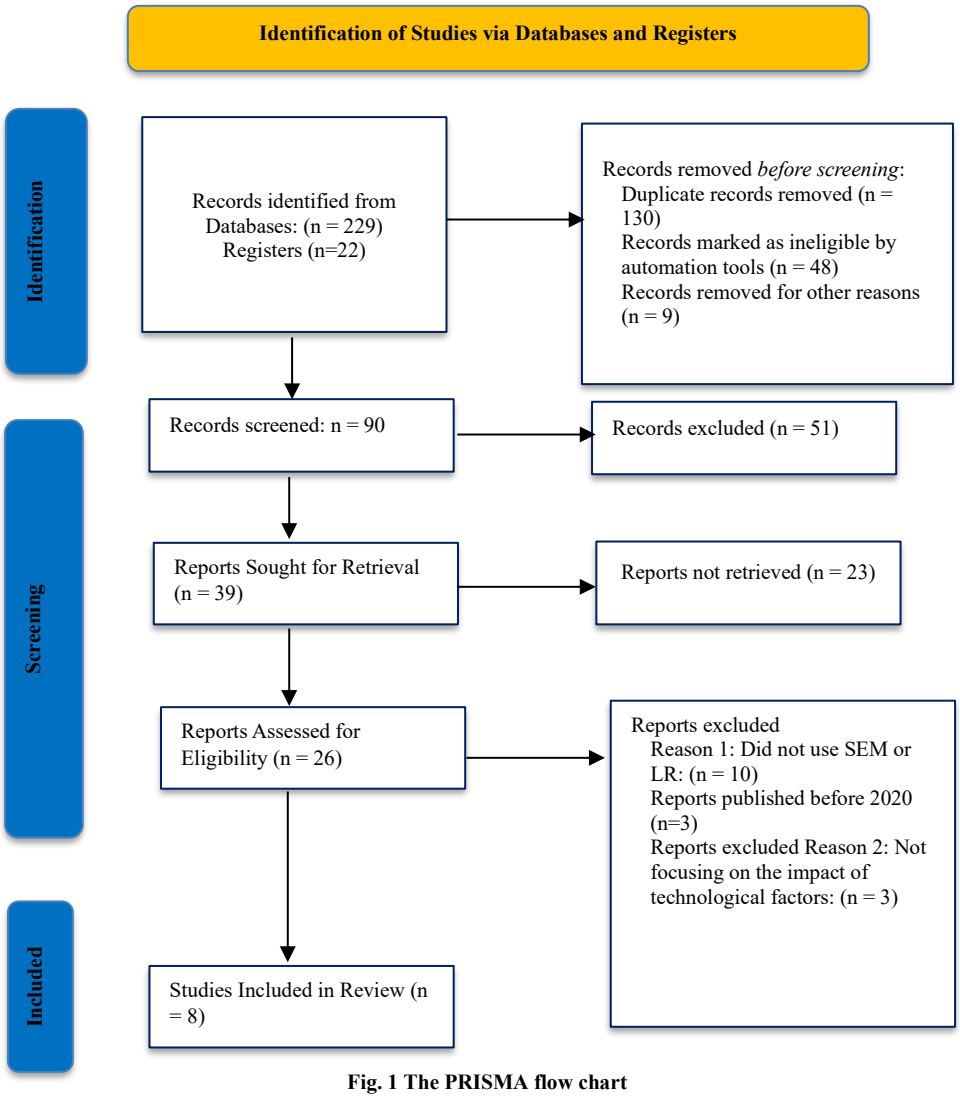

Fig. 1 The PRISMA flow chart

The eight articles were retrieved, and the data extraction exercise began. Since this meta-analysis focused on studies examining the association between organizational factors and cloud computing using a linear regression approach, the specific data elements gathered from the scholarly articles included the specific organizational factor(s) studied, a beta coefficient signifying the strength of association between each factor and usage of cloud computing, standard error of the beta coefficient, and sample size. The data was recorded in an Excel sheet. For studies where multiple organizational factors were regressed against cloud computing adoption, data was recorded for each organizational factor. Due to some studies examining multiple organizational factors in a single regression model, the final dataset used for meta-analysis was much larger (with n = 15 rows) than the number of studies from which the data was retrieved (n = 8). A snapshot of the data used in this meta-analysis is shown in Table 1 below:

3.2. Data Analysis

A meta-analysis was conducted to assess whether a meaningful connection exists between organizational factors and cloud computing implementation. The meta-analysis was executed using R version 4.3.3 software. Specifically, the *metagen* package was used. Two random effects models were estimated on the data collected. The first random effects model was estimated to establish the cumulated impact of organizational aspects on cloud computing implementation. The statistics of interest in this initial random effects model were the mean effect size, standard error, 95% confidence intervals, and heterogeneity statistics (Cochrane's Q, Tau, and the I2 statistic). Significant differences were observed among studies based on heterogeneity statistics obtained, which are reported in the results section. A subgroup analysis was then conducted to explore these differences further. The organizational factors were collapsed into five categories: management support, organizational readiness, facilitating conditions, available resources and funding, and employees' knowledge and experience. The second random effects model involved subgroup meta-analysis, where the effects of specific types of organizational aspects on cloud computing adoption were estimated. The five organizational factors were specified as subgroups in this second meta-analysis model. The results of the two random effects models are reported in the results section.

Table 1. A Snapshot of Metadata on the Impact of Organizational Factors on Cloud Computing

Author	Predictor	Type	Sample Size	Beta Coefficient	Standard Error
Kabuye (2023)	Organizational Factors	General Organizational Factors	329	0.776	0.13130000
Skafi et al. (2020)	Top Management Support	Management Support	139	2.674	0.85660000
Ali et al. (2020)	Top Management Support	Management Support	139	0.889	0.11900000
Ali et al. (2020)	Organization Size	Organization Size	140	0.254	0.19550000
Skafi et al. (2020)	Employees' Knowledge	Employees' Knowledge	140	0.155	0.10740000
Salim & Ali (2020)	Intention to Adopt	Management Support	123	1.169	0.62645000
Salim & Ali (2020)	Facilitating Conditions	Organizational Readiness	123	1.478	0.06644300
Qatawneh (2024)	Organisational Related Factors	General Organizational Factors	373	0.190	0.05900000
Qatawneh (2024)	Top Management Support	Management Support	373	0.078	0.00590000
Aligarh et al. (2023)	Top Management Support	Management Support	197	0.173	0.04500000
Aligarh et al. (2023)	Organizational Readiness	Organizational Readiness	197	0.216	0.03190000
Ayadi (2022)	Adequate resources	Organizational Readiness	123	0.198	0.00640000
Hussein Alghumami et al. (2020)	Top Management Support	Management Support	328	0.163	0.04750000
Hussein Alghumami et al. (2020)	Technology Readiness	Organizational Readiness	328	0.158	0.03685000

4. Results

This research examined how various institutional aspects and cloud computing implementation are related among small and medium-sized enterprises. To accomplish the aim of this study, evidence was gathered from scholarly academic papers published between 2020 and 2025. After a thorough systematic search, only eight studies that met the eligibility criteria were identified. The studies generally focused on the connection between various organizational factors and cloud computing. The organizational factors reviewed mainly centered around the themes of management support (Ali et al., 2020; Aligarh et al., 2023; Ayadi, 2022; Hussein et al., 2020; Salim & Ali, 2020; Skafi et al., 2020), employees' knowledge and experience as far as cloud computing is concerned (Ali et al., 2020), availability of enough resources and funding (Ayadi, 2022), organizational readiness (Hussein et al., 2020; Salim & Ali, 2020), facilitating conditions (Salim & Ali, 2020), and organization size (Ali et al., 2020). Other studies focused on 'organizational factors' as a general umbrella term to refer to the elements within SMEs that influence cloud computing adoption. Such studies include Kabuye (2023) and Qatawneh (2024). While data on the impact of organizational factors was collected from only eight studies, the resulting dataset consisted of 15 rows since some studies, such as Ali et al. (2020), reported evidence of more than one organizational factor. For instance, Ali et al. (2020) insisted on management support and organization size as the main organizational factors believed to affect cloud computing adoption among SMEs.

4.1. Overall Random Effects Model

An overall RE model was estimated using the dataset gathered from the eight studies that met the eligibility criteria for inclusion in this study. Before settling on the RE model, a heterogeneity test was conducted to determine if the differences among studies included in the model resulted from chance. As shown in Table 2, results suggest the presence of significant heterogeneity; hence, the differences observed across studies are not a result of random chance. In particular, the I2 statistic obtained was 100%, suggesting that 100% of the variability observed across different studies was due to actual differences rather than random chance. A significant Q statistic was also obtained ($p = 0.00$), indicating considerable heterogeneity. After ascertaining that heterogeneity was present, a random effects model was considered over a fixed effects model. Model results in Table 2 show that the net impact of institutional aspects on cloud computing implementation was positive (SMD = 1.21). However, the effect size was not statistically significant ($p = 0.162$).

4.2. Subgroup Analysis

Due to the significant heterogeneity observed across studies, further sub-group analysis was necessary to isolate the impacts of specific organizational aspects on cloud computing usage rather than relying on the results of a pooled model. Subgroup analysis was conducted with five groups considered: management support, employees' knowledge and experience, organizational readiness, organizational size, and general organizational factors. Executive support refers to the degree to which the management endorsed and was ready to allocate resources to cloud computing implementation (Skafi et al., 2020). The second organizational factor, employees' knowledge, referred to the degree to which employees were knowledgeable or experienced with cloud computing systems. Third, organizational size across studies reviewed was quantified regarding the number of employees employed in that organization. Fourth, institutional preparedness refers to the extent to which an institution is prepared to procure and integrate cloud computing into its operations.

Organizational readiness metrics observed across multiple studies included facilitating conditions, technology readiness, and the presence of adequate resources. Lastly, since some studies reported evidence of organizational factors as a composite variable (Kabuye et al., 2023; Qatawneh, 2024), it was imperative to include this category in the RE model for comparison purposes. As shown in Table 3, results for the subgroup analysis indicate that all five organizational factors examined had positive effect sizes (SMDs). Since p-values are not shown explicitly, significance was determined using confidence intervals. An effect is considered statistically insignificant if a confidence interval includes a zero.

As shown in Table 3, confidence intervals for all five organizational factors include zeros, suggesting a lack of statistical significance. However, none of these effect sizes was statistically significant. Top management support had a favorable but statistically insignificant standardized effect size (SMD = 2.11, 95% C.I. [-1.11; 5.33]). Of the eight studies that provided evidence on management support, only Skafi et al. (2020). Ayadi (2022), Hussein et al. (2020), and Salim and Ali (2020) reported statistically significant effect sizes. The rest of the studies found no evidence of the impact of management support on cloud computing implementation among SMEs. Organizational readiness also had a positive but analytically insignificant effect(SMD = 0.51, 95% C.I. [-0.13; 1.15]). While all four studies included in this subgroup reported a meaningful connection between organizational readiness and cloud computing acquisition, the pooled random effects model results indicate otherwise. The general organizational factors composite variable also had no meaningful relationship with cloud computing in SMEs (SMD = 0.45, 95% C.I. [-0.19; 1.08]). While the pooled effect was analytically insignificant, the individual effects reported in the two studies included in this subgroup were statistically significant. Organization size (SMD = 0.25, 95% C.I [-0.05; 0.56]) and employees' knowledge

(SMD = 0.30, 95% C.I [-0.08; 0.69]) also had an analytically insignificant relationship with cloud computing implementation. However, a standardized effect size could not be computed for employees' knowledge and organization size since only one study supported these factors.

Table 2. Overall Radom Effect Model Results

Study or Subgroup	SMD	SE	Weight (common)	Weight (random)	SMD [95% CI]
Kabuye (2023) - Organizational Factors	0.7760	0.1130	2.5%	6.7%	0.78 [0.15; 1.00]
Skafi et al. (2020) - Top Management Support	2.6740	0.6800	6.7%	6.2%	1.66 [0.48; 2.84]
Ali et al. (2020) - Top Management Support	0.2540	0.1900	1.7%	2.6%	0.12 [-0.07; 0.32]
Ali et al. (2020) - Organisation Size	0.5400	0.1950	1.7%	3.2%	0.26 [0.16; 0.57]
Ali et al. (2020) - Employees' Knowledge	0.3050	0.1950	1.9%	4.1%	0.16 [-0.08; 0.40]
Salim & Ali (2020) - Intention to Adopt	1.4780	0.6600	2.1%	5.0%	0.27 [-0.94; 1.10]
Salim & Ali (2020) - Facilitating Conditions	0.6480	0.2560	2.5%	6.7%	0.30 [0.14; 0.48]
Qatawneh (2024) - Organisational Related Factors	0.1300	0.0901	1.9%	3.4%	0.10 [0.00; 0.31]
Qatawneh (2024) - Top Management Support	0.2380	0.1333	3.4%	6.5%	0.16 [-0.10; 0.59]
Aligarh et al. (2023) - Top Management Support	0.1580	0.1060	2.7%	3.8%	0.15 [0.02; 0.43]
Ayadi (2022) - Adequate Resources	0.9460	0.2540	3.2%	5.3%	0.30 [0.15; 0.57]
Hussein Alghumami et al. (2020) - Technology Readiness	0.1580	0.0366	6.5%	9.6%	0.16 [0.08; 0.25]
Total (common effect, 95% CI)			100%	100%	1.13 [1.09; 1.15]
Total (random effect, 95% CI)			100%	100%	1.21 [1.02; 1.73]
Prediction Interval					[-5.44; 7.87]
Heterogeneity Tau^2 = 8.8988	Chi^2 = 2918.84, df = 14 (P < 0.01); I^2 = 100%				

Table 3. Subgroup Meta-analysis Results

Study or Subgroup	SMD	SE	Weight (common)	Weight (random)	SMD [95% CI]
Type = General Organizational Factors					
Kabuye (2023)	0.7760	0.1130	2.5%	6.7%	0.78 [0.15; 1.00]
Qatawneh (2024)	0.1300	0.0901	8.8%	11.3%	0.27 [-0.07; 0.61]
Total (common effect, 95% CI)			13.4%	13.4%	0.27 [0.10; 0.61]
Total (random effect, 95% CI)			13.4%	13.4%	0.45 [0.19; 1.08]
Heterogeneity Tau^2 = 0.20	Chi^2 = 25.49, df = 4 (P < 0.01); I^2 = 96%				
Type = Management Support					
Skafi et al. (2020)	2.6740	0.8560	0.0%	6.2%	2.67 [1.10; 4.35]
Ali et al. (2020)	0.6030	0.9700	1.3%	3.4%	0.51 [-1.12; 2.13]
Salim & Ali (2020)	11.6900	0.9640	7.6%	6.7%	11.69 [9.14; 14.01]
Qatawneh (2024)	0.1980	0.1660	3.4%	5.1%	0.20 [-0.12; 0.80]
Aligarh et al. (2023)	0.0893	0.0452	0.5%	2.6%	0.08 [0.02; 0.40]
Hussein Alghumami et al. (2020)	0.0280	0.1180	0.2%	0.9%	0.02 [-0.14; 0.26]
Total (common effect, 95% CI)			46.4%	46.4%	1.91 [1.16; 2.11]
Total (random effect, 95% CI)			46.4%	46.4%	2.11 [1.11; 3.33]
Heterogeneity Tau^2 = 8.77	Chi^2 = 2703.03, df = 6 (P < 0.01); I^2 = 100%				
Type = organization size					
Ali et al. (2020)	0.2540	0.1550	1.3%	6.7%	0.25 [0.05; 0.56]
Total (common effect, 95% CI)			1.3%	1.3%	0.25 [0.05; 0.56]
Total (random effect, 95% CI)			1.3%	1.3%	0.25 [0.05; 0.56]
Type = Employees' Knowledge					
Ali et al. (2020)	0.3050	0.1960	0.8%	6.7%	0.30 [0.08; 0.69]
Total (common effect, 95% CI)			0.8%	0.8%	0.30 [0.08; 0.69]
Total (random effect, 95% CI)			0.8%	0.8%	0.30 [0.08; 0.69]
Type = Organizational Readiness					
Salim & Ali (2020)	1.4780	0.6643	7.6%	6.7%	1.48 [1.35; 1.60]
Aligarh et al. (2023)	0.1960	0.0793	2.6%	3.7%	0.15 [0.01; 0.39]
Ayadi (2022)	0.1980	0.0900	3.4%	3.4%	0.21 [0.02; 0.39]
Hussein Alghumami et al. (2020)	0.1580	0.0366	6.5%	9.6%	0.16 [0.08; 0.25]

Total (common effect, 95% CI)			26.8%	26.8%	0.26 [0.13; 0.45]
Total (random effect, 95% CI)			26.8%	26.8%	0.28 [0.13; 0.60]
Heterogeneity Tau^2 = 0.4157	Chi^2 = 332.05, df = 3 (P < 0.01); I^2 = 99%				
Total (common effect, 95% CI)			100.0%	100.0%	1.13 [1.09; 1.16]
Total (random effect, 95% CI)			100.0%	100.0%	1.21 [1.30; 2.73]
Prediction Interval					[-5.44; 7.87]
Heterogeneity Tau^2 = 8.8898	Chi^2 = 29218.84, df = 14 (P < 0.01); I^2 = 100%				
Test for subgroup differences (common effect)	Chi^2 = 1830.21, df = 4 (P = 0)				
Test for subgroup differences (random effect)	Chi^2 = 1.86, df = 4 (P = 0.76)				

4.3. Publication Bias Assessment

Two methods were used to assess publication bias. The first method involved creating a funnel plot and visually inspecting it for evidence of publication bias. The funnel plot created for this purpose is shown in Figure 5. As shown in the plot, most of the studies are clustered around the pooled effect size symmetrically, suggesting the absence of significant publication bias. To further ascertain this visual evidence, a linear regression test of funnel plot asymmetry (Egger's test) was conducted. The results indicated a non-significant t-statistic, suggesting a lack of evidence for significant publication bias. However, as shown in the funnel plot, one study with a large effect size suggests potential methodological differences from other studies. Most of the studies also report large effect sizes, with most of the bottom part of the plot empty.

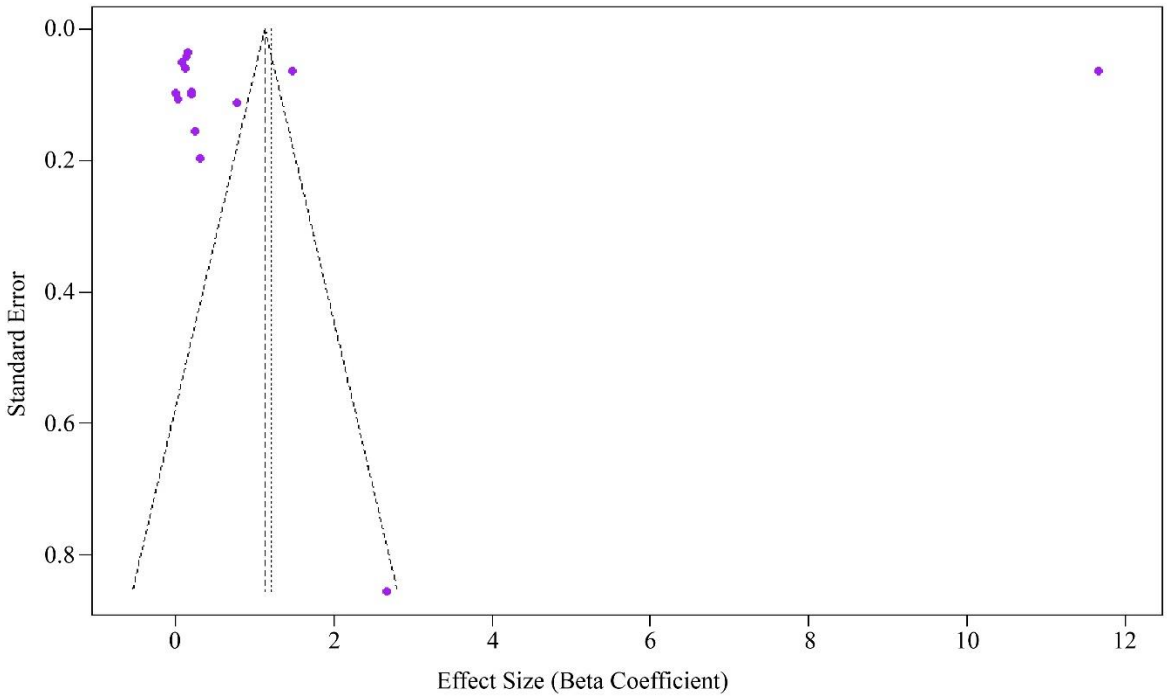

Fig. 5 Funnel Plot for Publication Bias Assessment

5. Discussion

A meta-analysis determined whether a meaningful connection exists between institutional aspects and cloud computing. Two random effects models were estimated on the data collected. The first random effects model was estimated to establish the impact of institutional aspects on cloud computing implementation. The second random effects model involved subgroup meta-analysis, where the impact of specific types of organizational factors on cloud computing adoption was estimated. The findings of this meta-analysis elaborate on aspects affecting the implementation of cloud services in SMEs. Therefore, the research centred its analysis on publications published in the last five years, from 2020 onwards. The authors narrowed their time frame to 2020 and beyond to obtain more recent data due to the emerging antipathy towards cloud computing in SMEs. Through the synthesis of eight unique quantitative studies focusing on the impact of organizational factors on cloud computing adoption in small and medium businesses, this research has demonstrated the importance of organizational factors of the Technology-Organization-Environment (TOE)Framework, which offers a structured lens through which the authors used to explore the impact of organizational elements influencing the usage of cloud services in Small and Medium Sized Businesses. This chapter presents the study outcomes, discusses them, and explains their connection to the current theoretical literature on cloud computing implementation.

The outcomes further revealed that while the obtained effect size is low. The net effect of institutional aspects on cloud computing was positive. The statistically insignificant management support has a favorable but small standardized impact; thus, management support is crucial in promoting the implementation of cloud computing in SMEs. Similarly, research by Salim and Ali (2020), Ayadi (2022), and Hussein et al. (2020) also indicated a statically significant effect size, revealing that the managers in the SMEs should provide the necessary support to the employees to boost their intention towards usage of cloud-computing technologies in business.

The research also discovered that while stimulating management support could enable cloud computing implementation in SMEs, the impact was nonetheless insignificant. However, existing literature states that management support may impact cloud computing by ensuring an effective organization's digital culture, digital infrastructure, regulatory frameworks, workforce, and funding that may hasten the use of such technology (Hadwer et al., 2021; Jennice, 2024). Faiz et al. (2024) noted that institutional factors such as executive backing directly impacted SMEs' acceptance of digital technologies.

Based on the studies analyzed, organizational readiness had a positive but statistically insignificant effect size. The four studies showed a meaningful connection between organizational readiness and cloud computing implementation. However, the pooled random effects model results indicated otherwise, suggesting that organizational readiness was not an analytically meaningful forecaster of cloud computing adoption in SMEs. Additionally, the general organizational factors composite variable had no significant relationship with cloud computing adoption in SMEs. While the pooled effect was statistically insignificant, the individual effects reported in the two studies included in this subgroup were statistically significant. The non-significant pooled effect could be attributed to large confidence intervals that overlap.

These differences can be attributed to differences in study design, participants, sample sizes, and potential biases in some studies. However, existing literature stated that organizational readiness could influence the implementation of cloud computing (Hussein et al., 2020; Salim & Ali, 2020). Organizational readiness is the degree to which an institution is prepared to procure and integrate cloud computing into its operations (Salim & Ali, 2020). Organizational readiness metrics observed across multiple studies included facilitating conditions, technology readiness, and adequate resources (Kabuye et al., 2023; Qatawneh, 2024). Despite its insignificant effect size, organizational readiness is more likely to influence cloud computing technology implementation in SMEs' operations.

The data analysis revealed that the organization size was not significantly related to cloud computing use in SMEs. Nevertheless, as for other independent variables, such as employee knowledge and the organization's size, the two were only supported by a single study and, therefore, could not be used to compute the standardized effect size. According to Ali et al. (2020), organization size emerged as one of the organizations' characteristics hypothesized to affect the implementation of CC in SMEs operating in Canada. The size of an organization could be a main contributor to cloud computing in SMEs. SMEs, for instance, may lack the necessary infrastructural support and resources to implement efficient and necessary cloud computing systems. However, it is observed that large organizations are capable of and can effortlessly adopt cloud computing due to all their essential resources.

5.1. Comparing The Research to Other Existing Literature

This study offers a broader investigation of organizational aspects affecting the use of cloud computing among SMEs than the previous one. Unlike previous scholars whose research was only paid to a few variables/orbits or a single country, the authors followed the PRISMA in performing a systematic review. In this respect, adopting two different random effects models allowed the authors to control for the sources of heterogeneity across the studies and thus provide a more accurate view of aspects

that might impact cloud computing adoption. This approach differs from most previous meta-analysis studies that primarily used fixed effects, which might not capture the true variability in the operating conditions of SMEs.

Moreover, the authors described a more detailed type of meta-analysis focusing on the aspects of certain institutional aspects, such as management support and institutional preparedness. Prior studies have masked these factors in their model as a composite measure. This study further offers a clearer view of the contribution of different aspects that determine the adoption of cloud computing among SMEs. Besides, the authors provided fresh perspectives on organizational readiness as they continue to bring new elements, considering the state of SMEs' preparedness for adopting digital technologies after 2020, which was not fully covered in the previous literature.

6. Implications

For SMEs to embrace progressive technologies like cloud computing, relevant organizational factors should be put in place. Leaders in these organizations may need to ensure their organizations' readiness, including availing of the requisite infrastructure to help embrace cloud computing. This research's findings may help leaders in SMEs to understand the need to emphasize adequate management support to enhance the implementation of cloud computing technologies. Policymakers in SMEs may learn from the study's results by comprehending the importance of cloud services and thus promote its use by developing policies that enhance positive organizational culture and readiness to use cloud computing technologies.

7. Limitations and Future Research

This research has constraints. First, only studies published in the last 5 years after 2020 were included, indicating that studies published before 2020 were not included despite having relevant data. Note that the authors collected evidence from studies that were not older than five years (from 2020). The second limitation was that only quantitative studies were included in this research. The third limitation was that this study focused specifically on institutional factors or the context of the TOE framework, excluding environmental and technological factors or contexts for further investigation.

Future research should explore how the TOE framework factors of organizational, environmental, and organizational contexts may impact the implementation of cloud computing technologies in SME settings. Further studies should consider investigating institutional aspects such as leadership support and preparedness for adopting cloud computing in SMEs for a specific duration since SMEs continue advancing the use of technology. In this research, only quantitative studies were selected in the inclusion criteria. Therefore, future research should be conducted using qualitative approaches for more comprehensive insights involving specific organizational aspects affecting the implementation of cloud computing in SMEs.

8. Conclusion

This research has offered a valuable understanding of the role of organizational aspects in integrating cloud computing innovations in SMEs. By analyzing the current literature, this research has provided an understanding of how diverse organizational factors such as organizational readiness, management support, and general institutional factors impact the incorporation of cloud computing in SMEs. Thus, these results demonstrated significant consequences for SME leaders, policymakers, other professionals, and cloud computing Vendors and provided a background for subsequent research and practical approaches to enhance the use of cloud computing within the SME sector. The continuous advancement and evolvement of cloud-based services may necessitate understanding diverse organizational factors that may impact cloud computing in diverse sectors, including the SME sector.

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