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Management information systems: Evaluating the adoption and impact of cloud computing in enterprise information systems

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ABSTRACT

The objective of this study is to investigate the integration of cloud computing into business IT systems, with a specific focus on the motivations for this shift and its impact on company performance. The research employs a mixed-methods approach to investigate the relationship between company size, cloud service models, data transfer, and security concerns. Quantitative data was collected using a standardized questionnaire to evaluate the level of cloud computing adoption and its effects. Qualitative insights were obtained through semi-structured interviews with representatives from selected organizations. The study deliberately included organizations of different sizes and sectors to create a representative sample. The quantitative data was analyzed using statistical methods, which revealed intricate patterns in the adoption of cloud technology. On the other hand, the qualitative interviews were subjected to thematic analysis, which brought to light repeating themes and provided fresh insights into the usage of cloud computing. The incorporation of these data sets enabled a thorough comprehension of the function of cloud computing in modernizing company IT. This study aims to provide management information systems decision-makers and practitioners with valuable insights and actionable recommendations for effectively implementing cloud computing in various business scales and sectors. It offers a detailed analysis of cloud computing adoption, helping them navigate the complexities of cloud integration.
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Contribution/ Originality: This study employs a mixed-methods approach to thoroughly examine the complex effects of cloud computing on organizations of different sizes. It offers a comprehensive analysis that establishes a relationship between the specific aspects of cloud adoption and both quantitative measures of organizational performance and qualitative managerial perspectives.

1. INTRODUCTION

1.1. Background and Context

Businesses now have to be more creative in how they satisfy their IT requirements because of the way technology is advancing at such a rapid pace. For many organizations, cloud computing has become a paradigm shift in how they handle their data, apps, and IT systems. The National Institute of Standards and Technology (NIST) is a U.S. federal agency responsible for developing technology, metrics, and standards to drive innovation and economic competitiveness, including foundational frameworks for cloud computing. In the words of the NIST, "cloud computing" is "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of

configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (Alashhab et al., 2021)."

Computing resources are made available to users through the internet, a notion known as "cloud computing," which frees businesses from investing in costly and space-consuming on-site hardware. Businesses may adapt their use of IT resources to meet ever-changing demands and requirements thanks to the cloud model's scalable and adaptable infrastructure (Ghari, 2022). The ability to quickly adapt to new circumstances in the market is extremely useful in today's fast-paced, competitive business climate (Yang & Pan, 2021).

1.2. Objectives of the Study

The purpose of this study is to analyze how the field of management information systems has responded to the introduction of cloud computing into enterprise information systems. The major objective is to learn about the present tendencies and patterns of cloud adoption, discover what variables influence decisions, and investigate what effect this has on the efficiency of businesses (Sharma, Raut, Sehrawat, & Ishizaka, 2023). The use of cloud computing and its effects on financial and operational performance, agility, security, and data privacy will be examined (Khayer, Jahan, Hossain, & Hossain, 2021). The report will also examine how this shift affects internal communications and cooperation within businesses. The research's end goal is to help policymakers and practitioners make educated decisions about cloud adoption and maximize the benefits of doing so. The results will fill in some of the blanks in our understanding of cloud computing and enterprise information systems, and provide a foundation for future research in the field.

1.3. Significance and Contribution

The importance of this research to the discipline of management information systems lies in the fact that it can provide light on the prevalence and effects of cloud computing in business information systems. If their performance and efficiency are to improve in the face of increased cloud use, businesses need to have a strong grip on the implications of this transition (Raja, Kumar, Yadav, & Singh, 2023). This research adds significantly to the existing body of knowledge by addressing a significant gap in the existing literature. Despite cloud computing's popularity, greater study of its effects on various aspects of productivity in the business world is required. The purpose of this study is to provide a holistic understanding of cloud computing's role in modern enterprises through the examination of its effect on various critical performance measures (Nair & Tyagi, 2023).

2. RESEARCH METHODOLOGY

2.1. Research Design

A mixed-methods research strategy was used to assess cloud computing's uptake and influence in enterprise information systems. With the mixed-methods strategy, researchers collect and analyse data in both quantitative and qualitative ways, yielding richer insights into the study subject at hand (Anil & Batdi, 2023; Hendren, Newcomer, Pandey, Smith, & Sumner, 2023; Mwangi, Njiraini, & Waweru, 2023).

2.1.1. Research Questions

1) How does organisation size (employee count) impact cloud usage duration?
2) What is the correlation between cloud usage length and the adoption of different cloud service models (IaaS, PaaS, SaaS)?
3) How do data migration and security issues affect the duration of an organization's cloud computing engagement?

2.1.2. Quantitative Data Collection

A standardised survey questionnaire collected quantitative data from varied organisations. The poll covered cloud computing adoption, including cloud usage, cloud service kinds, and reasons for choosing cloud solutions. The poll examined how cloud computing affects cost effectiveness, operational agility, security, and cooperation in organisations. Using a Likert scale and multiple-choice questions, respondents were asked about cloud adoption and its effects (Roy & Patil, 2023)

2.1.3. Qualitative Data Collection

Semi-structured interviews with chosen representatives from the surveyed organisations were undertaken to better understand cloud computing adoption and its effects (Roy & Patil, 2023; Schneider & Sting, 2020; Valbø, 2023). The interviews allowed participants to share their cloud adoption experiences, obstacles, and accomplishments. Participants were asked open-ended questions about cloud computing's benefits, drawbacks, and overall impact on their enterprise information systems (Hui, Kwok, Kong, & Chiu, 2023).

2.1.4. Sampling

The research selected a varied sample of firms across industries and sizes to ensure the findings are reflective of different organisational contexts (Alkaraan, Elmarzouky, Hussainey, & Venkatesh, 2023). Strategic random sampling ensured a proportional representation of organisations from diverse sectors and sizes (Hui et al., 2023).

2.1.5. Data Analysis

Statistical methods, such as the visual portrayal of graphs, were used to analyse the survey's quantitative data. The results of these studies will shed quantifiable light on the dynamics of cloud adoption and the effects on several facets of business performance (Bautista Villalpando, April, & Abran, 2014; Kor, Yitmen, & Alizadehsalehi, 2023).

The purpose of this thematic analysis was to discover overarching themes, patterns, and emergent concepts associated with cloud computing adoption from the qualitative data collected through the interviews (Ali, Soar, & Yong, 2016; Nguyen & Sondano, 2023). The qualitative findings complemented the quantitative data, providing a better grasp of the elements driving adoption decisions and the methods via which cloud computing influences organisational information systems.

2.2. Ethical Considerations

Ethical issues were rigorously followed throughout the research process. The data obtained were encrypted and stored in a safe location to protect the privacy of the participants and their respective organisations. Before anyone took part in the study, they were given a consent form that detailed the goals of the research and how their information would be used.

Data collection was difficult since the study used a wide variety of modalities, including email, phone, and in-person interviews, all of which had their own sets of ethical and logistical considerations. Furthermore, special care was taken with any sensitive or security-related material supplied by participants, with the data being either generalised or redacted in reports. After the specified time period, the data will be deleted from the encrypted drives on which they were stored and from which only the core research team had access. Ethical issues necessitated modifying the protocols in light of the chosen method of contact, such as gaining verbal agreement during phone interviews.

Lastly, participants were given the option of viewing summary findings, which promoted openness without compromising participants' anonymity.

3. RESULTS AND DISCUSSION

3.1. Data Analysis

In order to establish solid conclusions on the adoption and impact of cloud computing in enterprises, we analysed the data using a combination of quantitative and qualitative methodologies, including statistical tests and thematic analysis.

The Table 1 classifies firms into four categories based on the number of employees, which represents the variety in our study on the adoption of cloud computing. The data illustrates a distribution across several business scales, with small enterprises (less than 50 employees) constituting the largest segment at 31.9%, and major businesses (more than 1000 people) accounting for 19.5%. This distribution guarantees a thorough examination, emphasizing the study's emphasis on comprehending the influence of cloud computing on enterprises of varying sizes, ranging from small to large.

Table 1. Distribution of organizations by employee count.

Employee count					
Status		**Frequency**	**Percent**	**Valid percent**	**Cumulative percent**
Valid	Less than 50	59	31.9	31.9	31.9
	50 to 250	48	25.9	25.9	57.8
	251 to 1000	42	22.7	22.7	80.5
	More than 1000	36	19.5	19.5	100.0
	Total	185	100.0	100.0	-

3.2. Survey Section

This Table 2 classifies the companies that responded to the survey depending on the number of employees they have, giving insight into the range of sizes represented in the sample.

Table 2. Cloud adoption rates across organizations.

Cloud adoption					
Status		**Frequency**	**Percent**	**Valid percent**	**Cumulative percent**
Valid	No	52	28.1	28.1	28.1
	Yes	133	71.9	71.9	100.0
	Total	185	100.0	100.0	-

The following Table 2 provides a glimpse of the current level of cloud adoption by presenting the percentage of organisations that have implemented cloud computing.

Table 3. Utilization of infrastructure as a service (IaaS).

Status		**Frequency**	**Percent**	**Valid percent**	**Cumulative percent**
Valid	No	108	58.4	58.4	58.4
	Yes	77	41.6	41.6	100.0
	Total	185	100.0	100.0	-

In this Table 3, we can see what percentage of businesses have implemented IaaS, the most fundamental category of cloud service.

Table 4. Utilization of platform as a service (PaaS).

Status		**Frequency**	**Percent**	**Valid percent**	**Cumulative percent**
Valid	No	140	75.7	75.7	75.7
	Yes	45	24.3	24.3	100.0
	Total	185	100.0	100.0	-

This Table 4 outlines the adoption rate of PaaS, another key cloud service, among the surveyed organizations.

Table 5. Utilization of software as a service (SaaS).

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	99	53.5	53.5	53.5
	Yes	86	46.5	46.5	100.0
	Total	185	100.0	100.0	-

This Table 5 illustrates the prevalence of SaaS in the realm of cloud services by detailing the percentage of businesses that use it.

Table 6. Duration of cloud usage among organizations.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	Less than 5 months	51	27.6	27.6	27.6
	Less than 1 year	51	27.6	27.6	55.1
	1 to 3 years	27	14.6	14.6	69.7
	4 to 7 years	22	11.9	11.9	81.6
	More than 7 years	34	18.4	18.4	100.0
	Total	185	100.0	100.0	-

This Table 6 provides data on how long organizations have been using cloud services, offering a temporal perspective on cloud adoption

Table 7. Impact of cloud adoption on cost efficiency.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	0.00	52	28.1	28.1	28.1
	Significantly	31	16.8	16.8	44.9
	Moderately	56	30.3	30.3	75.1
	Slightly	46	24.9	24.9	100.0
	Total	185	100.0	100.0	-

This Table 7 examines the perceived cost efficiencies gained through cloud adoption, categorized by significance.

Table 8. Impact of cloud adoption on operational agility.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes agree	52	28.1	28.1	28.1
	Improved response to changing market demands	36	19.5	19.5	47.6
	Faster time-to-market for products/Services	21	11.4	11.4	58.9
	Enhanced ability to scale resources	36	19.5	19.5	78.4
	No significant impact	40	21.6	21.6	100.0
	Total	185	100.0	100.0	-

This Table 8 explores the operational benefits, such as agility and time-to-market, that organizations have experienced due to cloud adoption.

Table 9. Impact of cloud adoption on data security.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	Yes agree	52	28.1	28.1	28.1
	Improved security and privacy measures	55	29.7	29.7	57.8
	Concerns about data security and privacy	38	20.5	20.5	78.4
	No significant change	40	21.6	21.6	100.0
	Total	185	100.0	100.0	-

This Table 9 presents the organizations' perspectives on data security post-cloud adoption, including both improvements and concerns.

Table 10. Impact of cloud adoption on collaboration.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	Agree	52	28.1	28.1	28.1
	Yes, significantly	56	30.3	30.3	58.4
	Yes, to some extent	46	24.9	24.9	83.2
	No, not significantly	31	16.8	16.8	100.0
	Total	185	100.0	100.0	-

This Table 10 investigates the effect of cloud adoption on internal and external collaboration within organizations.

Table 11. Future plans for cloud adoption.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	47	25.4	25.4	25.4
	Yes	97	52.4	52.4	77.8
	between	41	22.2	22.2	100.0
	Total	185	100.0	100.0	-

This Table 11 reveals the organizations' future plans regarding cloud adoption, indicating the trajectory of this technological shift.

Table 12. Challenges faced in data migration.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	119	64.3	64.3	64.3
	Yes	66	35.7	35.7	100.0
	Total	185	100.0	100.0	-

This Table 12 identifies the challenges organizations face in data migration as part of their cloud adoption process.

Table 13. Challenges faced in data security.

Status		Frequency	Percent	Valid percent	Cumulative percent
Valid	No	101	54.6	54.6	54.6
	Yes	84	45.4	45.4	100.0
	Total	185	100.0	100.0	-

This Table 13 highlights the security challenges that organizations encounter when adopting cloud services.

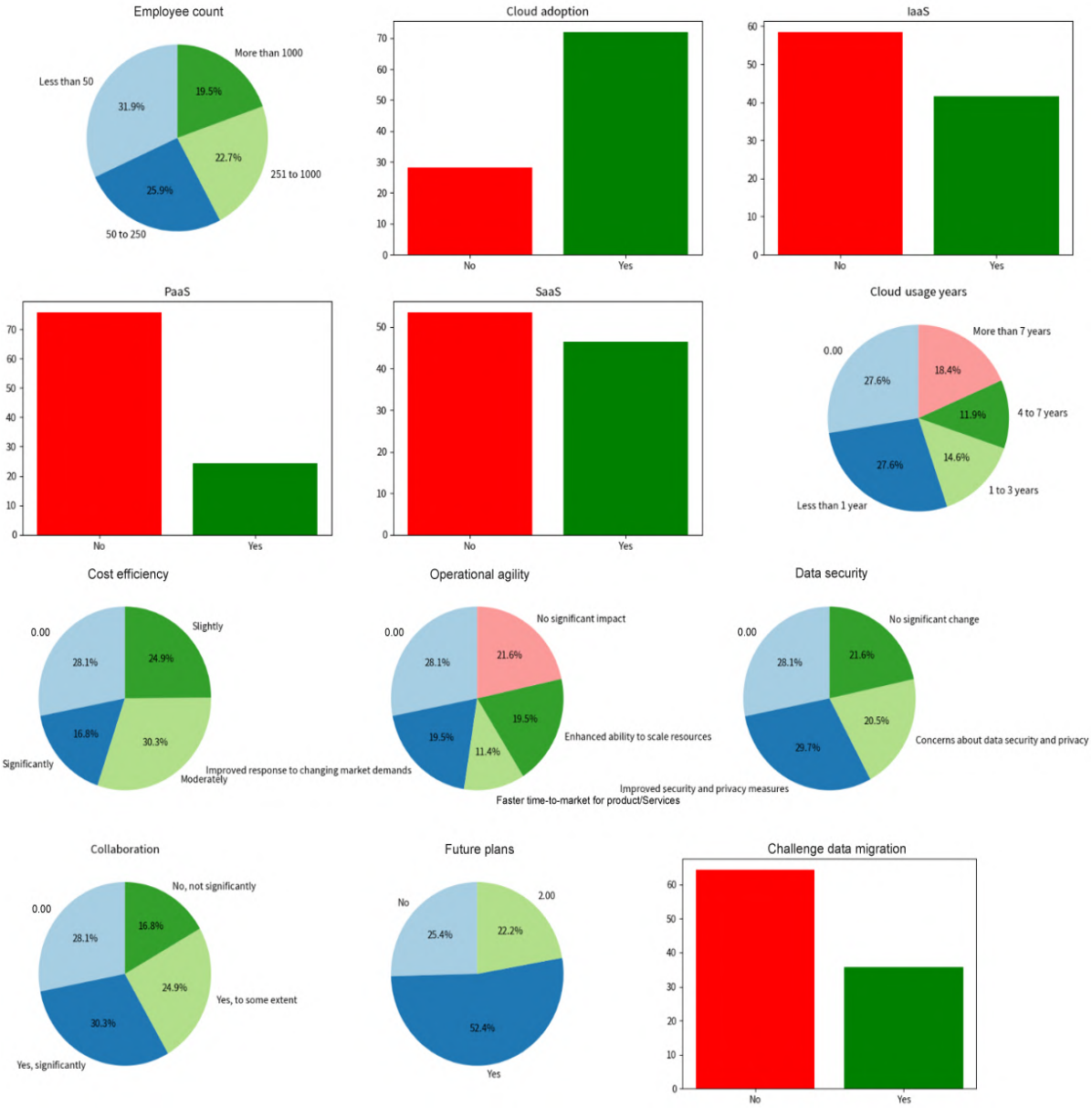

Figure 1. Visualizing the impact of cloud computing adoption on organizational metrics.

This caption aims to encapsulate the essence of the multi-faceted data presented in the various tables, now visualized in a combined graphical format.

In a comprehensive survey of 185 organizations of diverse sizes, a substantial 71.9% have embraced cloud computing, signaling a robust inclination towards digital transformation as discussed in previous studies (Micoli, n.d; Variyamparambath, 2019). Types of cloud services adopted vary, with 41.6% using Infrastructure as a Service (IaaS), 24.3% using Platform as a Service (PaaS), and 46.5% using Software as a Service (SaaS). Interestingly, 55.1% are either newcomers to the cloud or have less than a year of usage, indicating a recent surge in adoption.

Table 14. Correlations between cloud computing adoption and organizational metrics with control variables.

Control variables			Employee_ count	IaaS	PaaS	SaaS	Cloud_usage_ years	Cost efficiency	Operational _agility	Data _security	Collaboration	Future_ plans	Challenge_data migration	Challenge _security
Cloud_adoption	Employee_count	Correlation	1.000	0.121	0.025	0.123	0.149	-0.173	-0.263	-0.057	-0.100	-0.029	0.062	-0.174
		Significance (2-tailed)	.	0.102	0.733	0.097	0.043	0.019	0.000	0.446	0.176	0.692	0.404	0.019
		df	0	182	182	182	182	182	182	182	182	182	182	182
	IaaS	Correlation	0.121	1.000	0.159	-0.471	0.302	-0.115	0.009	0.012	0.106	0.072	0.450	-0.178
		Significance (2-tailed)	0.102	.	0.031	0.000	0.000	0.120	0.905	0.867	0.152	0.328	.000	0.016
		df	182	0	182	182	182	182	182	182	182	182	182	182
	PaaS	Correlation	0.025	0.159	1.000	-0.136	-0.028	-0.065	-0.204	-0.150	-0.011	-0.072	-0.011	0.118
		Significance (2-tailed)	0.733	0.031	.	0.065	0.702	0.381	0.006	0.042	0.883	0.329	0.887	0.111
		df	182	182	0	182	182	182	182	182	182	182	182	182
	SaaS	Correlation	0.123	-0.471	-0.136	1.000	0.036	-0.140	-0.237	-0.193	-0.317	0.033	-0.210	-0.010
		Significance (2-tailed)	0.097	0.000	0.065	.	0.632	0.058	0.001	0.009	0.000	0.654	0.004	0.890
		df	182	182	182	0	182	182	182	182	182	182	182	182
	Cloud_usage_years	Correlation	0.149	0.302	-0.028	0.036	1.000	-0.433	-0.408	-0.420	-0.456	0.248	0.093	-0.679
		Significance (2-tailed)	0.043	0.000	0.702	0.632	.	0.000	0.000	0.000	0.000	0.001	0.207	0.000
		df	182	182	182	182	0	182	182	182	182	182	182	182
	Cost_efficiency	Correlation	-0.173	-0.115	-0.065	-0.140	-.433	1.000	0.399	0.283	0.315	0.096	0.171	0.342
		Significance (2-tailed)	0.019	0.120	0.381	0.058	0.000	.	0.000	0.000	0.000	0.194	0.020	0.000
		df	182	182	182	182	182	0	182	182	182	182	182	182
	Operational_agility	Correlation	-0.263	0.009	-0.204	-0.237	-0.408	0.399	1.000	0.168	0.659	-0.160	0.311	0.338
		Significance (2-tailed)	0.000	0.905	0.006	0.001	0.000	0.000	.	0.023	0.000	0.030	0.000	0.000
		df	182	182	182	182	182	182	0	182	182	182	182	182
	Data_security	Correlation	-0.057	0.012	-0.150	-0.193	-0.420	0.283	0.168	1.000	0.173	-0.009	0.188	0.381
		Significance (2-tailed)	0.446	0.867	0.042	0.009	0.000	0.000	0.023	.	0.019	0.908	0.011	0.000
		df	182	182	182	182	182	182	182	0	182	182	182	182
	Collaboration	Correlation	-0.100	0.106	-0.011	-0.317	-0.456	0.315	0.659	0.173	1.000	-0.232	0.122	0.432
		Significance (2-tailed)	0.176	0.152	0.883	0.000	0.000	0.000	0.000	0.019	.	0.002	0.098	0.000
		df	182	182	182	182	182	182	182	182	0	182	182	182
	Future_plans	Correlation	-0.029	0.072	-0.072	0.033	0.248	0.096	-0.160	-0.009	-0.232	1.000	0.130	-0.295
		Significance (2-tailed)	0.692	0.328	0.329	0.654	0.001	0.194	0.030	0.908	0.002	.	0.077	0.000

		df	182	182	182	182	182	182	182	182	182	0	182	182
	Challenge_datamigration	Correlation	0.062	0.450	-0.011	-0.210	0.093	0.171	0.311	0.188	0.122	0.130	1.000	-0.208
		Significance (2-tailed)	0.404	0.000	0.887	0.004	0.207	0.020	0.000	0.011	.098	0.077	.	0.005
		df	182	182	182	182	182	182	182	182	182	182	0	182
	Challenge_security	Correlation	-0.174	-0.178	0.118	-0.010	-0.679	0.342	0.338	0.381	0.432	-0.295	-0.208	1.000
		Significance (2-tailed)	0.019	0.016	0.111	0.890	0.000	0.000	0.000	0.000	0.000	0.000	0.005	.
		df	182	182	182	182	182	182	182	182	182	182	182	0

Table 14 examines the relationships between cloud computing adoption and key organizational metrics, showing how different elements interact with one another in the cloud computing environment. The correlation analysis elucidates nuanced relationships between cloud adoption and various organizational factors (Etsebeth, 2012). A weak positive correlation (r=0.121, p=0.102) between cloud adoption and employee count suggests a marginal propensity for larger organizations to adopt cloud computing, although this is not statistically significant (Low, Chen, & Wu, 2011).

Table 15. Summary of multiple regression model predicting cloud usage years based on various organizational factors.

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.894[a]	0.799	0.786	0.677

Note: "a" indicates that the model statistics are based on the first iteration of the regression analysis.

Table 15 provides a statistical summary of the results from a multiple regression model that was used to estimate the length of time that firms would use cloud technology. This model took into account a number of organizational parameters. The multiple regression model demonstrates a strong predictive capability with an $2R2$ value of 0.799, indicating that approximately 79.9% of the variance in Cloud Usage Years can be explained by the model. The adjusted $2R2$ of 0.786 accounts for the number of predictors and suggests a good fit. The standard error of the estimate is 0.67560, providing a measure of the model's accuracy in predicting the dependent variable.

Table 16. Analysis of variance (ANOVA) for the multiple regression model.

Model		Sum of squares	df	Mean square	F	Sig.
1	Regression	313.039	12	26.087	57.153	0.000[b]
	Residual	78.507	172	0.456	-	-
	Total	391.546	184	-	-	-

Note: "b" indicates that the F-statistic is highly significant, with a p-value of less than 0.001.

Table 16 details the analysis of variance (ANOVA) for the multiple regression model, providing statistical evidence of the model's significance and the relationship between predictors and cloud usage duration. The ANOVA table reveals that the regression model is statistically significant with an F-value of 57.153 and a p-value less than 0.001. This indicates that at least one of the predictors in the model has a significant relationship with the dependent variable, Cloud Usage Years. The sum of squares for the regression model is 313.039, and for the residual, it is 78.507, with a total sum of squares amounting to 391.546. The model's mean square is 26.087, further supporting the model's robustness in explaining the variance in cloud usage duration within organizations.

Table 17. Regression coefficients for predicting cloud usage years based on organizational factors.

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	-0.014	0.153	-	-0.092	0.927
	Cloud_adoption	4.341	0.358	1.341	12.112	0.000
	Employee_count	-0.021	0.050	-0.016	-0.414	0.680
	IaaS	0.617	0.161	0.209	3.841	0.000
	PaaS	-0.205	0.140	-0.061	-1.462	0.145
	SaaS	0.015	0.157	0.005	0.093	0.926
	Cost_efficiency	-0.237	0.094	-0.186	-2.512	0.013
	Operational_agility	-0.101	0.081	-0.107	-1.242	0.216
	Data_security	-0.306	0.086	-0.233	-3.548	0.001
	Collaboration	-0.251	0.110	-0.181	-2.274	0.024
	Future_plans	0.107	0.080	0.051	1.340	0.182
	Challenge_data migration	0.023	0.162	0.008	0.142	0.887
	Challenge_security	-0.960	0.178	-0.329	-5.378	0.000

Table 17 displays the regression coefficients for predicting the years of cloud usage as a function of organizational characteristics. These coefficients show how strong and significant each predictor is when considering the duration of cloud adoption. The coefficients table provides detailed insights into the influence of each predictor on the dependent variable, Cloud Usage Years. The constant term is not significant (t=-0.092, p=0.927), indicating that it does not play a role in predicting cloud usage years when all other variables are zero.

3.3. Interview Section-Qualitative Analysis

The adoption of cloud computing by these organisations is captured in Figure 1, mainly due to the cost-effectiveness and scalability it offers. Key motivators such as'scalability,' 'cost savings,' and 'innovation,' as seen in this word cloud,' highlight the strategic shift towards cloud solutions for dynamic demand management and technological advancement. In Figure 2, we can see a graphic representation of the cost-saving effects of cloud computing, which include substantial savings on hardware and maintenance. Words like "savings," "resource monitoring," and "cost efficiency" are highlighted in the word cloud, drawing attention to the monetary advantages and managerial difficulties of using cloud computing.

Data migration, security, and integration are some of the words that come up in a word cloud that illustrates the difficulties encountered during cloud adoption (Figure 3). Data security, internal opposition, and the complexity of integrating cloud services with current systems are the main challenges that this expose. Figure 4 depicts the many advantages of moving to the cloud, such as increased agility and scalability. Scalability, disaster recovery, and creativity are some of the most prominent topics in this word cloud, which highlights the strategic and operational benefits of cloud computing. As seen in Figure 5, cloud computing can greatly improve an organization's agility. Words like "agility," "deployment speed," and "real-time collaboration" dominate this word cloud, which highlights how cloud computing helps businesses adapt quickly to changing market conditions through increased creativity and responsiveness. Figure 6 shows the improvement in data security and privacy after using the cloud. The use of important phrases like 'data security,' 'encryption,' and 'compliance' emphasises the significance of internal expertise in administering the increased security measures. Figure 7 depicts the revolutionary effect of cloud computing on internal company collaboration. Cloud computing has greatly improved collaboration and decision-making; terms like "real-time editing," "virtual workspaces," and "remote communication" are all part of it. The use of cloud computing is depicted in Figure 8 along with future plans and objectives. The words "cloud-native technologies," "multi-cloud strategy," and "AI integration" in this word cloud represent the strategies that organisations are planning to use in the future to make the most of cloud computing. Figure 9 provides a concise overview of how cloud computing has affected decision-making. In this case, the word cloud emphasises "data-driven decisions," "real-time insights," and "scenario modelling," all of which show how cloud computing helps with better, more thorough decision-making. To see how well cloud computing adoption is going, look at Figure 10. Words like "resource scalability," "cost savings," and "agility" predominate in this word cloud, suggesting the primary metrics that businesses use to assess the success of a cloud migration. Figure 11 shows how firms' competitiveness is affected by cloud usage. Here, the word cloud highlights'market expansion,' 'innovation,' and 'customer satisfaction,' illustrating how these companies' competitive advantage has been reinforced by cloud computing. The benefits of cloud computing to innovation initiatives within organisations are shown in Figure 12. It emphasises concepts like "data analytics," "cross-functional collaboration," and "AI and IoT" to demonstrate how cloud computing spurs novel approaches to corporate problems. Figure 13 depicts the effect of moving to the cloud on the connections with external stakeholders. 'Service quality,"supply chain collaboration,' and 'investor relations' are all parts of this word cloud, which shows how cloud computing has improved interactions with outside parties. Finally, businesses thinking about moving to the cloud can find some helpful hints in Figure 14. Focusing on "staff training," "phased migration," and "strategic alignment," the word cloud offers insights into the best practices for integrating the

cloud. Figures 1–14 provide word clouds that summarise the many ways in which cloud computing has affected different parts of an organisation. They show the advantages, disadvantages, and strategic consequences of cloud computing.

Figure 2. Key factors influencing cloud computing adoption.

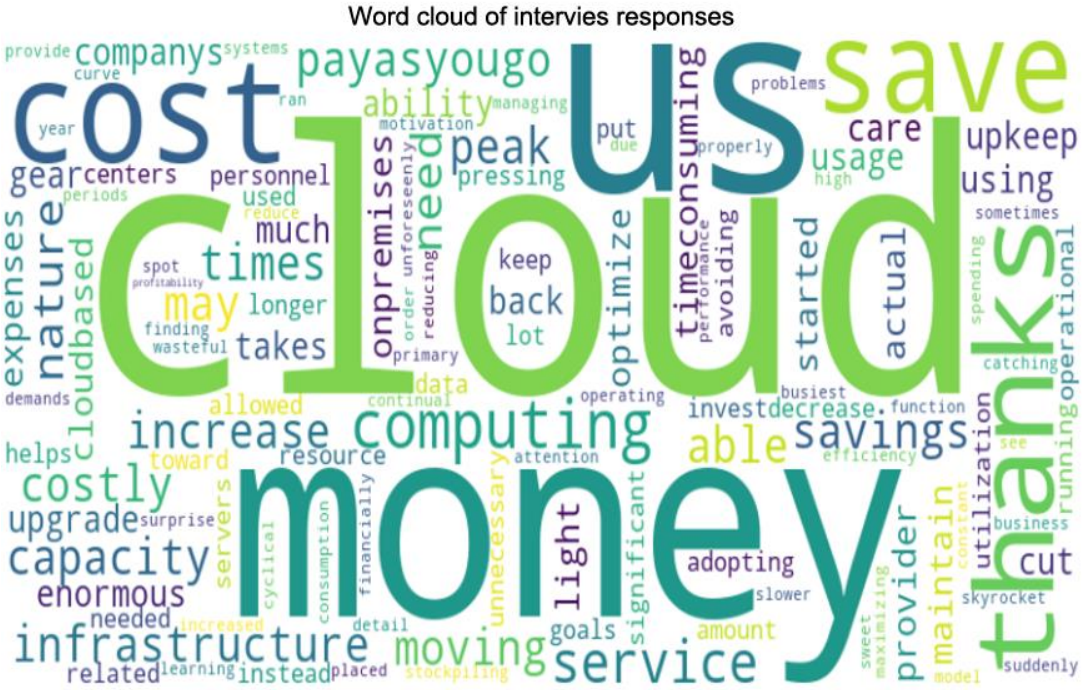

Figure 3. Impact of cloud computing on organization's cost efficiency.

Figure 4. Visual representation for challenges in cloud adoption process.

Figure 5. Key benefits of cloud adoption for the organization.

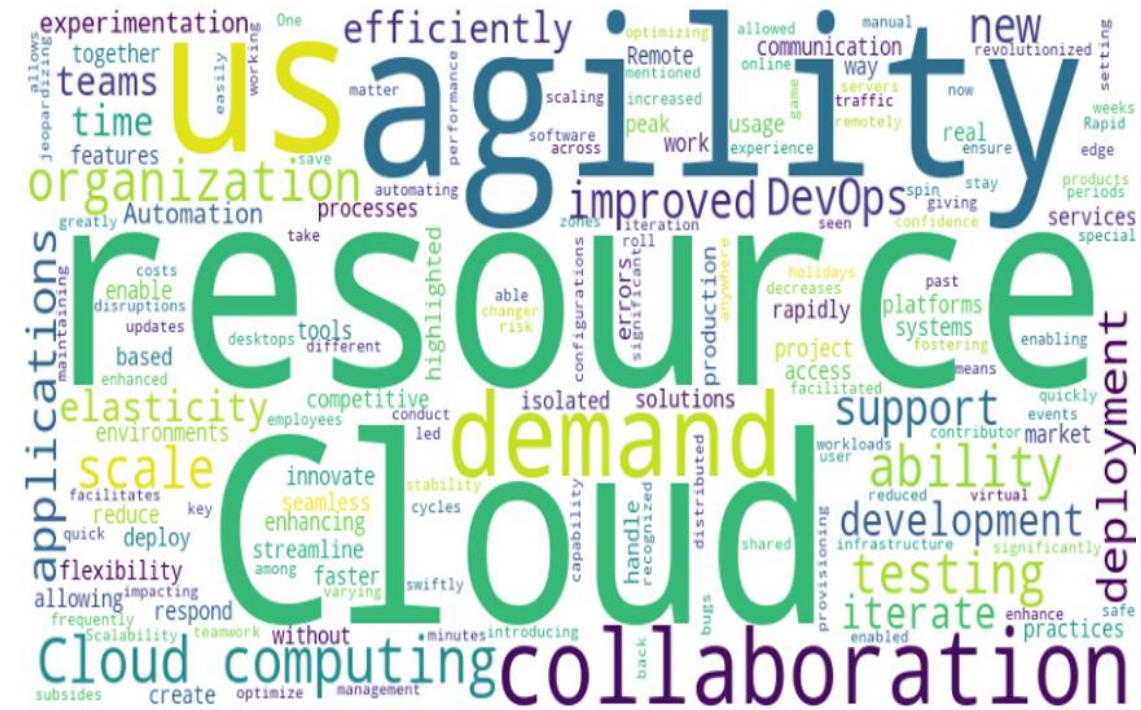

Figure 6. Visual result for enhancements in organizational agility through cloud computing.

Figure 7. Impact of cloud computing on data security and privacy.

Figure 8. Examples of enhanced collaboration through cloud computing.

Figure 9. Future plans for cloud computing adoption.

Figure 10. Influence of cloud computing on decision-making.

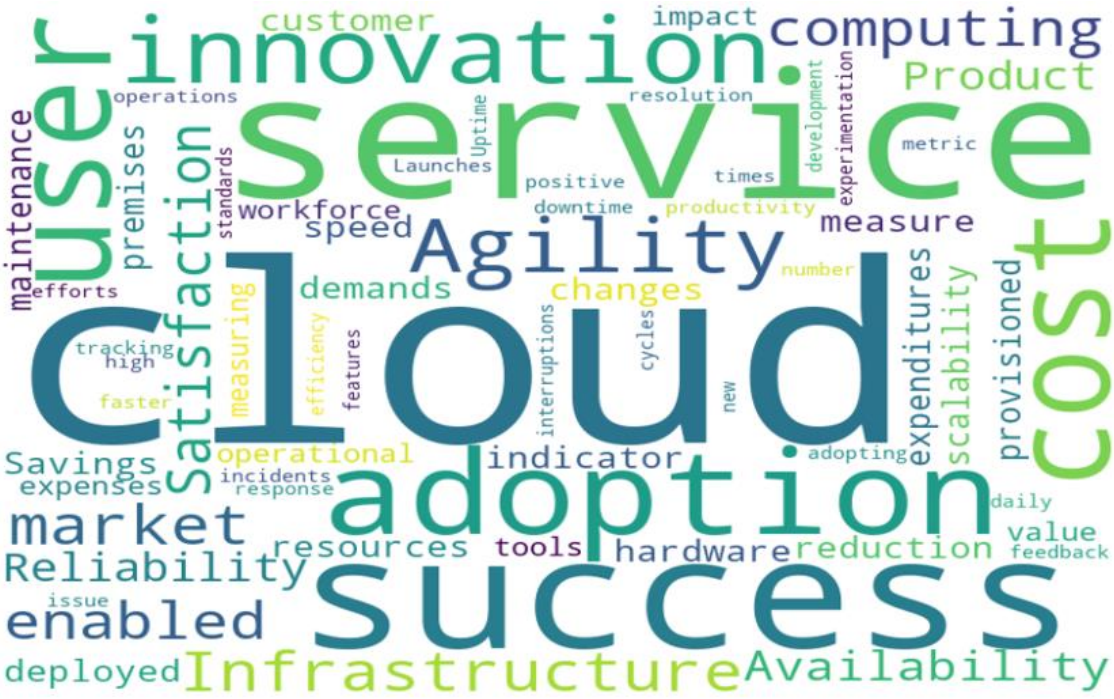

Figure 11. Metrics for measuring cloud computing adoption success.

Figure 12. Impact of cloud adoption on organizational competitiveness.

Figure 13. Contributions of cloud computing to organizational innovation.

Figure 14. Impact of cloud adoption on external stakeholder relationships.

Figure 15. Advice for organizations considering cloud computing adoption.

Figure 15 depicts a word cloud that offers valuable information on the important factors that firms should examine when deciding whether to utilize cloud computing. Key terms such as "strategy," "security," "cost," and "upskilling" signify crucial components of effective cloud integration. The terms "adoption" and "transition" imply the progression and movement towards utilizing cloud services, while "providers" and "shared" allude to the cooperative and dispersed characteristics of cloud resources. The visual prominence given to "organizations" and

"cloud" highlights the emphasis on these entities actively interacting with cloud technologies. This diagram highlights the importance of planning, management, and skill development in addition to technological considerations while transitioning to a cloud-based infrastructure.

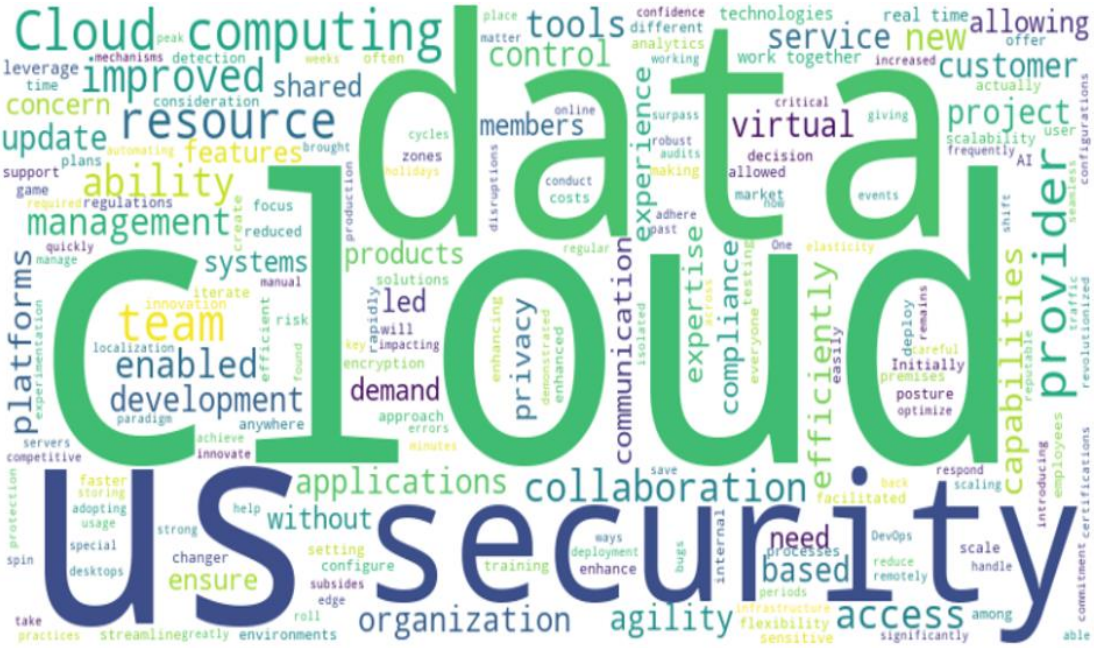

Figure 16. Word cloud: Insights on cloud computing adoption in organizations.

Figure 16 depicts a word cloud that represents the essential terms related to the implementation of cloud computing in enterprises. The prevalence of terms such as "security," "agility," and "access" indicates that organizations prioritize these concerns while adopting cloud services. The terms "collaboration," "team," and "real-time" suggest that cloud computing is crucial for improving teamwork and productivity. The prominent positioning and increased dimensions of "cloud," "security," and "data" underscore their importance in the realm of cloud computing adoption, signifying that they are frequently taken into account by enterprises in this field. In summary, the image effectively represents the diverse and interrelated elements that firms prioritize when adopting cloud-based solutions.

4. CONCLUSION

The paper's findings provide insight on the drivers, obstacles, and far-reaching effects of businesses' adoption of cloud computing. Our research demonstrates the dramatic shift that cloud computing has brought to the business world, and the importance of well-considered decision making in this era of rapid technological change. Cloud computing has become a game-changer, altering how companies handle their information technology (IT) systems and resources. Reasons including as scalability, cost-effectiveness, innovation, and security are driving its widespread adoption. The cloud provides a robust answer to the varying needs of organisations in today's dynamic digital landscape.

While moving to the cloud has unquestionable benefits, adopting it is not without its share of obstacles that must be overcome. Data transfer complexity, internal resistance, integration issues, and the requirement for cloud knowledge are just some of the problems that businesses must overcome. Tackling these difficulties calls for extensive preparation, open lines of communication, and a determination to strengthen in-house resources. Cloud adoption has many significant advantages. Reduced hardware maintenance costs contribute to greater cost effectiveness, while increased scalability enables businesses to adapt quickly to shifting market conditions. The low barrier to entry and supportive community of the cloud promotes innovation. Cloud computing facilitates rapid

deployment, automation, and scalability, which in turn improves organisational agility and facilitates collaboration across geographically dispersed teams.

Data security and privacy, formerly apprehensions that slowed cloud adoption, are now reliable points of excellence. Providers in the cloud typically have multiple layers of protection in place, such as encryption, compliance certifications, and routine audits. They are also top-notch in detecting threats automatically and releasing updates automatically. The cloud's shared responsibility model places a premium on in-house security knowledge and promotes an all-encompassing strategy for keeping data safe. As businesses continue their migration to the cloud, they must acknowledge that cloud adoption is not a cookie-cutter approach. Adaptive plans, consistent training, and a dedication to the development of better security measures are essential. That way lies competitive advantage, a steady stream of new ideas, and the ability to adapt to the ever-shifting needs of the digital age.

In short, moving to the cloud is more than just a technology change; it's a must for any business that wants to succeed in the modern era. The findings of this study provide light on the factors driving organisations to adopt cloud computing and the difficulties and advantages of doing so. Successful businesses of the future will be those who adopt cloud computing as the digital landscape continues to change.

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Institutional Review Board Statement: The Ethical Committee of the Regnum resources Ltd. Bangladesh has granted approval for this study on 6 February 2023 (Ref. No. 1878- regnum- res- 2023).
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
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REFERENCES

Alashhab, Z. R., Anbar, M., Singh, M. M., Leau, Y.-B., Al-Sai, Z. A., & Alhayja'a, S. A. (2021). Impact of coronavirus pandemic crisis on technologies and cloud computing applications. *Journal of Electronic Science and Technology*, *19*(1), 100059. https://doi.org/10.1016/j.jnlest.2020.100059

Ali, O., Soar, J., & Yong, J. (2016). An investigation of the challenges and issues influencing the adoption of cloud computing in Australian regional municipal governments. *Journal of Information Security and Applications*, *27*, 19-34. https://doi.org/10.1016/j.jisa.2015.11.006

Alkaraan, F., Elmarzouky, M., Hussainey, K., & Venkatesh, V. (2023). Sustainable strategic investment decision-making practices in UK companies: The influence of governance mechanisms on synergy between industry 4.0 and circular economy. *Technological Forecasting and Social Change*, *187*, 122187. https://doi.org/10.1016/j.techfore.2022.122187

Anil, Ö., & Batdi, V. (2023). Use of augmented reality in science education: A mixed-methods research with the multi-complementary approach. *Education and Information Technologies*, *28*(5), 5147-5185. https://doi.org/10.1007/s10639-022-11398-6

Bautista Villalpando, L. E., April, A., & Abran, A. (2014). Performance analysis model for big data applications in cloud computing. *Journal of Cloud Computing*, *3*, 1-20. https://doi.org/10.1186/s13677-014-0019-z

Etsebeth, E. (2012). *Trialability, perceived risk and complexity of understanding as determinants of cloud computing services adoption.* South Africa: University of Pretoria.

Ghari, S. (2022). *Devops for digital business: Optimizing the performance and economic efficiency of software products for digital business.* Paper presented at the Proceedings of the 17th Symposium on Software Engineering for Adaptive and Self-Managing Systems.

Hendren, K., Newcomer, K., Pandey, S. K., Smith, M., & Sumner, N. (2023). How qualitative research methods can be leveraged to strengthen mixed methods research in public policy and public administration? *Public Administration Review*, *83*(3), 468-485. https://doi.org/10.1111/puar.13528

Hui, S. C., Kwok, M. Y., Kong, E. W., & Chiu, D. K. (2023). Information security and technical issues of cloud storage services: A qualitative study on university students in Hong Kong. *Library Hi Tech*. https://doi.org/10.1108/LHT-11-2022-0533

Khayer, A., Jahan, N., Hossain, M. N., & Hossain, M. Y. (2021). The adoption of cloud computing in small and medium enterprises: A developing country perspective. *VINE Journal of Information and Knowledge Management Systems*, *51*(1), 64-91. https://doi.org/10.1108/vjikms-05-2019-0064

Kor, M., Yitmen, I., & Alizadehsalehi, S. (2023). An investigation for integration of deep learning and digital twins towards construction 4.0. *Smart and Sustainable Built Environment*, *12*(3), 461-487. https://doi.org/10.1108/sasbe-08-2021-0148

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

Micoli, S. (2021). Digital transformation and internationalization: How digital transformation affects internationalization strategies of SMEs.https://hdl.handle.net/20.500.12608/23410

Mwangi, N. K., Njiraini, R. N., & Waweru, M. K. (2023). The impact of digital transformation on small and medium-sized enterprises (SMEs) in Kenya. *International Journal of Entrepreneurship, Innovation, and Business Strategies*, *2*(1), 1-8.

Nair, M. M., & Tyagi, A. K. (2023). AI, IoT, blockchain, and cloud computing: The necessity of the future. In Distributed Computing to Blockchain. In (pp. 189-206): Elsevier. https://doi.org/10.1016/B978-0-323-96146-2.00001-2.

Nguyen, D. S., & Sondano, J. (2023). Resilience and stability in organizations employing cloud computing in the financial services industry. *Journal of Computer and Communications*, *11*(4), 103-148. https://doi.org/10.4236/jcc.2023.114006

Raja, P., Kumar, S., Yadav, D. S., & Singh, T. (2023). The internet of things (IOT): A review of concepts, technologies, and applications. *International Journal of Information Technology & Computer Engineering*, *3*(02), 21-32.

Roy, A., & Patil, K. (2023). *Framework for cloud security initiatives in small and medium-sized enterprises*. Paper presented at the 2023 International Conference on Advancement in Computation & Computer Technologies (InCACCT).

Schneider, P., & Sting, F. J. (2020). Employees' perspectives on digitalization-induced change: Exploring frames of industry 4.0. *Academy of Management Discoveries*, *6*(3), 406-435.

Sharma, M., Raut, R. D., Sehrawat, R., & Ishizaka, A. (2023). Digitalisation of manufacturing operations: The influential role of organisational, social, environmental, and technological impediments. *Expert Systems with Applications*, *211*, 118501. https://doi.org/10.1016/j.eswa.2022.118501

Valbø, T. (2023). Cloud adoption and cyber security in public organizations: An empirical investigation on Norwegian municipalities. Master's Thesis, University of Agder.

Variyamparambath, J. D. (2019). The scope of cloud farming in Ireland. Doctoral Dissertation, Dublin Business School.

Yang, Y., & Pan, W. (2021). Automated guided vehicles in modular integrated construction: Potentials and future directions. *Construction Innovation*, *21*(1), 85-104. https://doi.org/10.1108/ci-07-2019-0073