

KNOWLEDGE MANAGEMENT-BASED CLOUD COMPUTING ADOPTION: A DECISION-MAKING FRAMEWORK FOR SOFTWARE DEVELOPMENT AND INNOVATION

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Abstract

Knowledge management (KM) involves identifying, organizing, and distributing information within an organization to achieve its goals. Cloud computing significantly enhances KM by enabling efficient performance, decision-making, and coordination. This study explores adopting cloud-based software services using KM practices. Cloud computing, with its operational strategies, improves database capability, scalability, and reduces cost and risk in KM. It requires a model that aligns with company environments and specifications from both client and provider perspectives. High maintenance costs and poor usability of KM tools pose challenges. Cloud services like IaaS, PaaS, and SaaS, delivered through private, hybrid, and multi-cloud designs, use remote servers for processing, storing, and managing data. Modern cloud computing delivers up-to-date knowledge in real-time, ensuring consistency, stability, security, and flexibility in organizational KM.

I. INTRODUCTION

The use of Smartphones and computer devices has increased significantly. This trend has increased global conflicts, and the demand for careers has expanded into different areas to be feasible. To address this need, cloud computing has undergone a transformation to try to meet these requirements [1]. Cloud computing provides computer services like databases, servers, and storage over the cloud to present quick revolution and flexible resources. It allows businesses to store and allocate data. That helps in the development of the organization and enables the team to work in real-time. Cloud software is progressively dominant today. It

manages how data is stored, modified, and accessed by computer resources [2].

The Knowledge Management (KM) system is a technology in which the system stores and retrieves knowledge to understand, store, refine, and share information. It sets up goals, develops management policy, provides direction, accesses, constructs an implementation roadmap, and implements. It allows the growth of the organization, captures knowledge, and is used in further projects. Knowledge-based organizations must generate a particular and experienced information technology for both hardware and software. Cloud accessibility could be internal, social, public, and hybrid access knowledge [3]. Cloud computing works as a tool to support KM and can be beneficial for

organizations. This knowledge is practical in mitigating costly risks and cloud-to-cloud migration projects. Therefore, a KM system/platform related to cloud migration is a fundamental requirement and a strategic imperative for any organization [4].

Cloud computing based on KM provides a transformative decision-making framework for software development and innovation. This approach integrates the robust, scalable infrastructure of cloud computing with the systematic organization and utilization of knowledge resources. By leveraging cloud-based solutions, organizations can enhance their ability to capture, store, and disseminate critical knowledge, facilitating more informed and agile decision-making processes. The framework supports real-time collaboration and seamless access to a vast repository of information, which accelerates innovation cycles and improves the overall efficiency of software development projects. Furthermore, the adoption of cloud-based KM systems helps in managing the complexities of modern software development, such as distributed teams and dynamic project requirements. It enables the creation of a centralized knowledge base that can be easily updated and accessed by team members across the globe, thus ensuring consistency and reducing the risk of information silos. The synergy between KM and cloud computing thus not only fosters a culture of continuous learning and improvement but also provides the technological agility needed to stay competitive in the fast-evolving landscape of software development and innovation [1].

Information Management (IM) and cloud computing are two dynamic fields that together create a solid framework for improving organizational decision-making. The adoption of cloud services in information management is revolutionizing the way organizations store, process, and use their collective knowledge and information. This integration enables seamless access to large volumes of data, advanced analytics, and collaboration tools, all hosted on cloud platforms, enabling real-time decision-making and strategic planning. By leveraging cloud-based KM systems, organizations can ensure that information is not only efficiently collected but also distributed across

departments and teams. It breaks down the culture of continuous learning and innovation. Additionally, cloud computing offers scalability, flexibility, and cost-effectiveness, making it an attractive option for organizations of all sizes. The decision-making framework for deploying KM-based cloud computing includes assessing the organization's current technology infrastructure, understanding specific information needs, evaluating the potential return on investment, and addressing potential security and compliance issues. Such a comprehensive approach ensures that the transition to cloud-based KM systems meets the organization's goals, strengthens its competitiveness, and supports sustainable growth [2].

The goal of the proposed study is to provide a complete framework that, in the context of software development and innovation, merges cloud computing with KM. Using the synergies between these areas to improve software development processes' efficiency, agility, and capacity for innovation is the major goal. The difficulties of knowledge distribution, teamwork, and resource optimization that are common in modern software development settings will be addressed by this approach. KM is pivotal in capturing, storing, and sharing the vast amounts of tacit and explicit knowledge generated during software development. By leveraging KM principles, the proposed framework will facilitate the systematic organization of knowledge assets, ensuring that critical insights and expertise are accessible to all stakeholders. This will not only streamline decision-making processes but also foster a culture of continuous learning and improvement. Cloud computing, on the other hand, offers scalable, on-demand computing resources that can significantly reduce the time and cost associated with software development. The proposed framework will utilize cloud services to provide a flexible and collaborative platform where developers can access tools, environments, and data from any location. This will enhance collaboration across distributed teams, support rapid prototyping and testing, and enable seamless integration of new technologies and methodologies. The integration of KM and cloud computing within

the proposed framework will be achieved through the development of a set of guidelines, tools, and best practices. These will include strategies for effective knowledge capture and sharing, cloud-based development environments, and collaborative workflows. Additionally, the framework will incorporate mechanisms for continuous feedback and improvement, ensuring that it evolves in response to the changing needs of the software development landscape.

By implementing this framework, organizations will be able to optimize their software development processes, reduce time-to-market, and increase their capacity for innovation. The proposed work will involve an extensive literature review, empirical studies, and case analyses to validate the framework and demonstrate its practical applicability. Ultimately, this research aims to contribute to the body of knowledge in software engineering and provide a valuable resource for practitioners seeking to leverage KM and cloud computing for competitive advantage.

II. LITERATURE REVIEW

Cloud Computing

With its fast-growing industry investment and usage, cloud computing is being hailed as the rising era of computing paradigms. Interestingly, business spending on cloud computing is expanding five times faster than spending on traditional IT systems [3].

Depending on the user's viewpoint, there are several ways to characterize the notion of cloud computing. Institute of Standards and Technology (NIST) defines cloud computing as "a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction" [4].

Cloud Computing Service Models

Cloud services are generally divided into three types: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). SaaS provides Internet-based software, PaaS provides application development platforms, and IaaS provides virtualized computer hardware [5].

Cloud Computing Deployment Models

While cloud deployment models talk about how services are hosted, cloud service models explain the administration possibilities for cloud computing services. Alternative deployment strategies, such as community cloud and hybrid cloud, have also been public and private clouds are the two main types of deployment models that have been established [6].

Public cloud: Services are provided over the internet and accessible to any user. It's cost-effective and scalable but has security and data location concerns [6].

Private cloud: Dedicated to a single organization, offering better security and control at a higher cost [7].

Hybrid cloud: Combines public and private clouds, offering scalability and security by using public clouds for non-critical tasks and private clouds for critical applications [8].

Community cloud: Shared by several organizations with similar needs, combining the benefits of private and public clouds [8].

Moving to the cloud is usually a single impactful decision that affects the entire organization's IT infrastructure and service offerings [9]. Cloud computing offers several benefits:

1. Technical: Enhances scalability, flexibility, and resource utilization [10].

2. Economic: Reduces capital expenditure and shifts to an operational expense model [11].

3. Security: Providers invest heavily in security measures [12].

4. Organizational: Allows businesses to focus on core operations rather than IT infrastructure management.

The migration to cloud computing is a strategic decision with significant implications for an organization's IT infrastructure and service delivery, necessitating a comprehensive framework for successful adoption [13].

Knowledge Management

Knowledge Management (KM) is crucial for maximizing intellectual assets in businesses. It involves systematically gathering, disseminating, and utilizing knowledge to enhance performance, promote continuous learning, and support information exchange. Recognizing knowledge as a strategic resource, KM methods are essential for decision-making, innovation,

and maintaining a competitive edge. KM frameworks and technologies capture collective expertise and turn it into actionable insights, boosting productivity and advancing strategic goals [14].

Categories of Knowledge

- Tacit knowledge: Skills, instincts, and experiences that are difficult to communicate and often subconscious [14].
- Explicit knowledge: Formal, easily articulated, and shared information recorded in theories, concepts, and facts [14].

Knowledge management strategies capture, organize, share, and utilize knowledge within organizations through documenting explicit knowledge, fostering communities of practice, and leveraging technology platforms. They promote cross-functional collaboration, training programs, and reward systems to enhance decision-making, innovation, and performance. These strategies align with organizational goals and culture to effectively leverage knowledge resources [15].

Enterprise knowledge sharing promotes collaboration and innovation by systematically disseminating organizational knowledge. It involves fostering a sharing culture, implementing KM systems, establishing communities of practice, providing training, offering incentives, gaining leadership support, and continuously improving processes. Effective knowledge sharing enhances performance and competitiveness by leveraging collective knowledge [16, 17].

Related Work

Various frameworks and models have been developed to aid in cloud migration and adoption. However, a common limitation across existing approaches is their focus primarily on developed countries, with limited studies addressing adoption issues in technologically developing regions like Saudi Arabia. Studies in countries such as Saudi Arabia and Malaysia emphasize factors like security, technical readiness, and regulatory concerns specific to their contexts, underscoring the need for tailored frameworks that account for regional

differences in cloud adoption challenges and benefits [13].

Risk and Benefit Analysis

Migrating services and systems to the cloud entails both business and technological inference, often posing challenges that hinder cloud computing's growth. Existing

Focus: Decision-making stages, cost-benefit analyses, and risk assessments.

Limitations: Concentration on developed environments, limited broader applicability [17].

Decision Support

Several studies have explored decision-making processes for cloud computing migration, focusing largely on developing tools for technical and cost analysis.

Focus: Technical and cost analysis tools.

Limitations: Neglect organizational and strategic considerations [15].

Application Migration

Several studies offer frameworks for moving apps to the cloud, but they frequently ignore organizational considerations. Software Development Life Cycle (SDLC) for managing application migration developed a framework specifically for migrating corporate legacy systems, focusing solely on legacy considerations. Framework developed for migrating corporate legacy systems through analysis, design, deployment, and evaluation phases, albeit restricted to legacy systems. Cloud migration has also been examined from the perspective of choosing deployment models and CSPs.

Focus: Frameworks for moving applications to the cloud.

Limitations: Often ignore organizational considerations, emphasizing technical and economic factors [16].

Assessment of Organizational Readiness

Several studies have explored various facets of cloud migration, focusing on factors like cost, risks, and technical considerations. However, existing models and frameworks often address only specific aspects such as application migration or organizational readiness, without

providing a comprehensive strategy that integrates all critical factors. For instance, while metrics and maturity models assess readiness and governance challenges, they often overlook migration strategies and comprehensive decision-making criteria needed by

stakeholders. The fragmented nature of current approaches highlights the need for a unified framework that can guide strategic decision-making across all levels of cloud adoption [17]. The table I below gives a gap analysis for this research work.

Adoption Decision Framework” (KMCADF). Figure 2 below describes the layers of this framework: how the knowledge repository holds

Table I. Gap Analysis

Reference	Methodology	Performance Measures	Limitations
[4]	Feature modules using the Linguistic Inquiry and Word Count (LIWC) tool	Cognitive distance, the problem-solving design of teams to collaborate successfully	To characterize personality traits, team trust, and motivation, the GSD project should be analyzed with text mining and machine learning
[7]	SECI model	Analysis of organizational factors using business, organizational, and learning factors	Organizational operation factors not identified.
[12]	TOE framework and the RBV analysis	Exploratory innovation perspective, dynamic environments	Should work on other factors like culture, leadership, innovation
[1]	Systematic literature review PRISMA flowchart	Knowledge management in terms of data collection and analysis through IS manager	Limited data repositories
[13]	Technology Acceptance Model (TAM) and Technology-Organization-Environment (TOE) with KM	Software development using ubiquitous computing	Analyze TAM with other technology models. Individual characteristics and social factors missing
[3]	Cloud computing technologies: SaaS, IaaS, PaaS, ICT tools	Manageability issues to improve adaptive system	Core areas like digital drives, universal internet access, and knowledge drives are missing.
[14]	KMaaS in a public cloud	KM trends in the area of IT using cloud computing	Implementation details missing
[2]	Depth knowledge testing of recommended content, Mastered knowledge testing	To define the borderline of effectiveness	Limited information within knowledge transfer and increasing requirements

III. PROPOSED METHODOLOGY

A. Framework Development

A decision-making framework for Knowledge management-based cloud computing adoption is proposed in this research work. It is termed the “Knowledge management-based Cloud

all knowledge-based data, including the database, while security and monitoring management hold storage services over the internet, where all data is managed over the cloud by clients and infrastructure, and knowledge-based data is provided to end users.

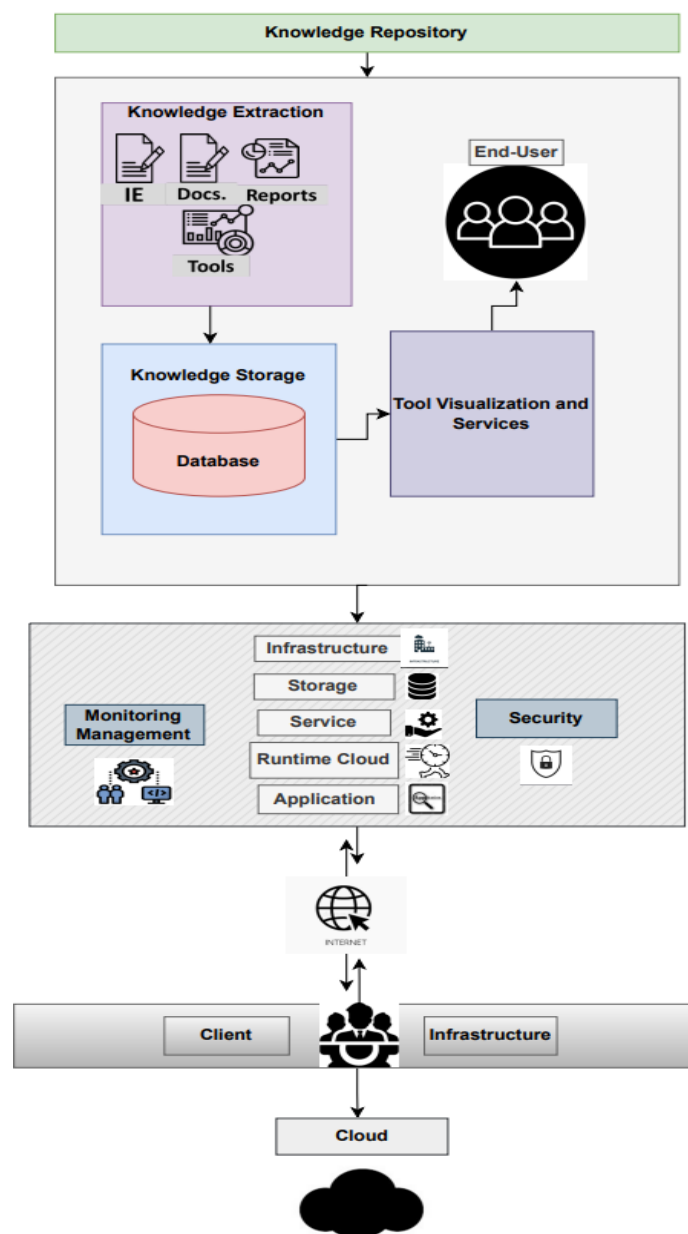


Figure 2: Knowledge management-based Cloud Adoption Decision Framework (KMCADF)

Knowledge Repository

In Cloud computing, a knowledge repository is an invaluable tool that can support self-directed learning, protect institutional knowledge, and improve the efficacy and efficiency of education. A well-managed knowledge base can dramatically improve the client experience by giving rapid access to crucial data through a secure client portal.

Including both the intellectual and physical components of data routing and transmission regarding Protocols, like Ethernet or Wi-Fi, that

allow for dependable data transport between network nodes. The data link layer is used by knowledge repositories to safely transfer data packets between user devices and storage systems. The use of IP addressing and routing protocols, such as IPv4 and IPv6, enables communication across various networks and devices. Network layer protocols are used by knowledge repositories to route data packets to and from storage systems.

The following guidelines for developing a successful knowledge base are considered while physically developing the repository [21,22].

- o **Keep Titles Brief and Specific:** When arranging information in your repository, make sure that the titles are written in a clear, succinct manner. This guarantees that customers know precisely what they will get when they click a link. "Invoice Software Login Information," "How to Upload Documents Into Company Name Portal," and "Company Name Frequently Asked Questions" are a few examples of simple titles.

- o **Link to Both Internal and External Content:** Make use of your gateway by including links to other internal sites and documents. Client navigation is facilitated by this. In addition, if your clients require instant access to pertinent information, think about including links to external tools or websites.

- o **Use the Search Bar:** Make sure your titles are written such that readers can quickly and simply use the global search bar to find the answers they need. Users can find the information they need more quickly if you tag your material.

- o **Employ Templates for Neatness:** To maintain the organization of your repository while producing material, think about utilizing templates. This helps your clients as well as making content management easier for you.

Knowledge Storage

A database that runs in a public or hybrid cloud environment is called a cloud database. Data management, storage, and organization are the goals of it. Cloud databases can be made available as managed databases-as-a-service (DBaaS) or installed on a virtual machine (VM) hosted on the cloud and independently maintained by an internal IT department.

They offer flexibility, reliability, and security. Cloud databases, whether via self-deployment in the cloud or managed services, are essential for effectively maintaining and accessing data within enterprises. Coordinates end-to-end communication sessions and guarantee dependable, systematic data delivery. To ensure data integrity during extraction procedures, knowledge extraction systems may make use of transport layer protocols like TCP

(Transmission Control Protocol). Session layer protocols may be used by knowledge extraction systems to manage and coordinate interactions between user applications and the knowledge repository during data retrieval. Organizations need KM to improve performance and make wise decisions. In this context, cloud-based knowledge management systems, or C-KMS, are essential. The five main KM processes are impacted by C-KMS:

- **Acquiring knowledge:** Compiling pertinent data.
- **Knowledge creation:** Producing new knowledge.
- **Knowledge Storage:** Preserving artifacts of knowledge.
- **Sharing knowledge:** Encouraging cooperation and communication.
- **Knowledge usage:** Applying knowledge effectively.

End-User

In KM, an end user is a person or group of people who use the tools and resources for knowledge within an organization to carry out their tasks effectively and efficiently. To obtain pertinent information, resolve issues, come to conclusions, and innovate in their jobs, these users engage with databases, systems, and knowledge repositories. Making sure that the information is readily available, accurate, and relevant to the particular needs of end users is the main problem in knowledge management. Doing so will improve decision-making, productivity, and overall organizational performance. To get the most out of their knowledge assets, organizations must continuously evaluate and improve their knowledge management strategies to meet the changing demands and expectations of end users.

By taking care of data representation and guaranteeing format compatibility. The presentation layer facilitates user interactions with the knowledge repository by converting obtained knowledge into a format that is easy for users to interact with, such as text, graphics, or multimedia. The network layer is where most user interactions with the knowledge repository take place using application-level protocols (e.g., HTTP for web-based interfaces). Within the

knowledge repository, the application layer facilitates data manipulation, user authentication, and permissions.

Privacy and Security Management Perspective

Effective monitoring, management, and security are essential for adopting cloud computing and guaranteeing the dependability, efficiency, and security of infrastructure, storage, services, runtime environments, and apps within an organization's cloud ecosystem. To maximize the effectiveness of the cloud environment, monitoring includes tracking key metrics in real time, such as system performance, resource consumption, and availability. This enables the prompt identification and resolution of any problems or anomalies. Effective management of cloud resources and services entails orchestrating and optimizing them to meet operational demands. Encryption, access controls, and frequent audits are among the strong defenses that cloud-based data, apps, and infrastructure must withstand to prevent cyberattacks and unauthorized access. This comprehensive knowledge management strategy guarantees the cloud ecosystem's compliance, scalability, and resilience, enabling the reliable and secure delivery of services and applications to users.

IP address management, routing security, and putting IPsec (Internet Protocol Security) technologies into practice for safe network communication are the main security challenges at the network layer. Ensuring data confidentiality, integrity, and authentication during data transmission is achieved by putting transport layer security protocols like TLS (Transport Layer Security) into practice.

In cloud computing and internet-connected environments, each component (infrastructure, storage, services, runtime cloud, and applications) plays a crucial role in privacy and security management.

Internet Required for Client Infrastructure

The internet is the backbone of connectivity, giving client devices and infrastructure access to a wide range of remote-hosted, resource-rich apps and data. Through this partnership, businesses can take advantage of cloud computing platforms, which eliminate the need

for local infrastructure by delivering necessary services like computing, storage, and software applications online.

Client infrastructure can easily connect to cloud services through Internet connections, allowing users to access data and apps from anywhere with an internet connection. The move to cloud-based solutions offers scalability, flexibility, and cost-effectiveness by eliminating the need for substantial on-premises gear and software. But it also emphasizes how important reliable connectivity and cybersecurity practices are.

B. Hypotheses Development

Technology Acceptance Model (TAM) is used on knowledge and cloud-based systems to develop hypotheses for this research. Figure 2 below gives a view of these hypotheses.

1. Data Security:

H1: Ensure Knowledge assets are protected from unauthorized access.

2. Scalability:

H2: Scale the knowledge management system to accommodate growing knowledge bases.

3. Collaboration:

H3: Facilitate knowledge sharing and collaboration among teams.

4. Data Privacy:

H4: Privacy protects sensitive knowledge assets from data breaches.

5. Reliability:

H5: Ensure the knowledge management system is available and accessible.

6. Cost-Effectiveness:

H6: Optimize knowledge management costs and resource utilization.

7. Flexibility:

H7: Adapt the knowledge management system to changing business needs.

8. User Experience:

H8: Provide intuitive knowledge management interfaces for users.

9. Integration:

H9: Ensure cloud solutions integrate with existing systems and tools.

10. Monitoring and Management:

H10: Utilize robust monitoring and management tools.

11. Compliance:

H11: Ensure cloud providers meet relevant regulatory requirements.

12. Data Ownership:

H12: Clarify ownership and control of data in the cloud environment.

13. Perceived Usefulness:

H13: The degree to which someone thinks that utilizing a system won't need any work or trouble.

14. Perceived ease of use:

H14: The degree to which an individual thinks that employing a system would improve their output or performance at work.

15. Intention to use:

H15: Depending on how simple and easy a system is to which a person's willingness or

intention to use knowledge management systems. It evaluates whether users think the system will be simple to use and intuitive, which affects how motivated they are to implement it for efficient knowledge management.

16. Actual Usage:

H16: The practical implementation and uptake of knowledge management systems, indicating how much users find the system useful for improving productivity or job performance. It evaluates if the system's apparent value corresponds with the real results and effects that users encounter, impacting the system's ongoing use and integration into regular workflows.

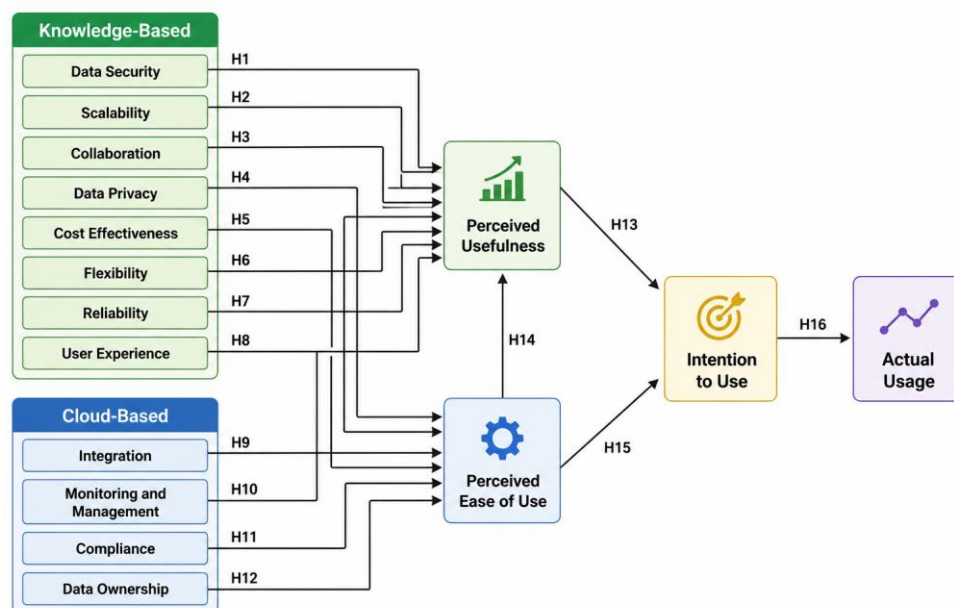


Figure 2: Technology Acceptance Model on Knowledge and Cloud-based

IV. RESULTS AND DISCUSSION

In this study, four surveys involving stakeholders from cloud service providers (CSPs) and cloud customers validated the proposed framework and models. CSP participants had also taken part in earlier interviews, and the cloud consumers were nominated by the CSPs. A potential limitation was CSPs' influence on the validation process. In order to address this, a case study was used, which allowss cloud users apply the framework to their individual cloud adoption experiences. Another limitation was the use of closed questions, which might have

restricted participant responses. To address this, the evaluation process included both closed questions using an eight-point Likert scale (3 representing "strongly agree" and 5 "strongly disagree") and open questions. This combination allowed the interviewer to express their opinions fully and provide detailed feedback.

Both descriptive and inferential statistics were employed in the study. Descriptive statistics, including measures of central tendency, frequency, and percentage, provided insights into cloud adoption rates by company size,

industry sector, and status. Measures like the mean and median assessed cloud computing drivers and obstacles. Inferential statistics, such as logistic regression and the chi-square test, were used to test hypotheses and examine associations between cloud adoption and enterprise characteristics.

A. Industry sectors: With 64.3% of respondents, the telecommunication and information technology industry have the highest response rate. Figure 3 below describes the distribution of cloud computing based on industry sectors.

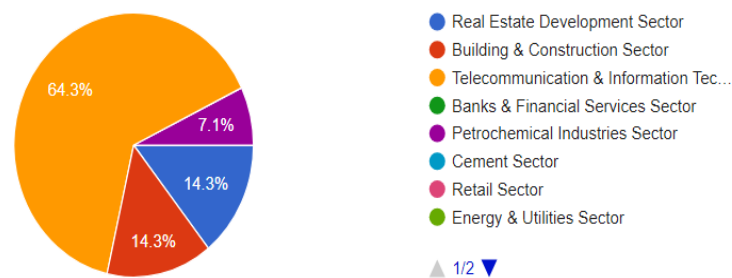


Figure 3: Distribution of cloud computing adoption based on industry sector

B. IT assessment level: The survey determined six applications to investigate the relationship between cloud computing

adoption and IT readiness to assess IT readiness inside businesses. Figure 4 gives these applications and their percentages.

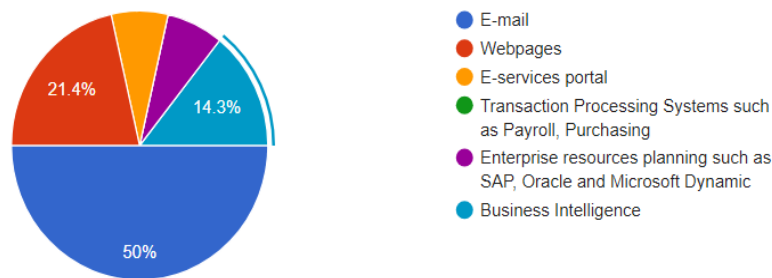


Figure 4: Percentage of applications involved in cloud adoption

There is no visible correlation between the level of IT maturity and the acceptance of cloud

computing. Table II illustrates the association between IT maturity level and cloud adoption.

Table II: IT maturity level and Relationship between cloud adoption

	E-mail	Web pages	E-services Portal	Business intelligence
Percentage of Application Usage Adopted	50%	21.4%	7.1%	14.3%
	64.3	14.3	21.4	7.1

Table III shows the P-value for cloud applications.

Table III: P-value for cloud adoption applications

	plan to migrate	organization sector
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plan to migrate	Pearson Correlation	1	.072
	Sig. (2-tailed)		.807
	N	14	14
organization sector	Pearson Correlation	.072	1
	Sig. (2-tailed)	.807	
	N	14	14

C. Enterprise size: One of the most well-recognized measures of new technology adoption is the size of the enterprise. Three categories for enterprise size were identified in this study: small (with 11–50 people), medium (with 51–250 employees), and big (with more

than 250 employees). Compared to large corporations, more small and medium-sized businesses have used or plan to utilize cloud services. Table V below compares cloud computing adoption with enterprise sizes, and Table VI illustrates the chi-square testing for those enterprise sizes.

Table V: Relationship between cloud computing adoption and enterprise size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	3	21.4	21.4	21.4
	1	9	64.3	64.3	85.7
	3	2	14.3	14.3	100.0
	Total	14	100.0	100.0	

Table VI: Chi-square test for enterprise size

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.495 ^a	4	.645
Likelihood Ratio	2.799	4	.592
Linear-by-Linear Association	.016	1	.898
N of Valid Cases	14		

8 cells (88.9%) have expected count less than 5. The minimum expected count is .43.

D. Critical Success Factors for cloud deployment model selection: A survey of the literature has revealed several variables affecting the choice of cloud deployment strategies. The most important factors to take into account are cost, security, and the capacity to concentrate on

core capabilities. However, it is crucial to recognize that every component that has been discovered has a substantial impact on the decision-making process. Table VII below illustrates the critical success factors along the cloud deployment model.

Table VII: Critical success factors in selecting cloud deployment model

		Cost of Services	Security concerns	Core competencies	Outsource IT services	Cloud support	Data location
N	Valid	14	14	14	14	14	14
	Missing	0	0	0	0	0	0
Mean		3.64	.79	3.43	2.93	.93	3.00

Std. Deviation	1.393	.426	1.399	1.207	.267	1.177
Minimum	1	0	1	1	0	1
Maximum	5	1	5	5	1	4

E. Cloud adoption motivation: A greater emphasis on core skills, cost savings, and increased IT efficiency are just a few of the many reasons for moving to cloud computing that are highlighted in the literature. As a result, the poll inquired about the motivations behind respondents' decisions to shift to the cloud, both those who have already done so and those

who plan to do so. In decreasing order, the top four reasons given by businesses in this survey for using cloud computing are: supplying dependable IT services; cutting expenses associated with IT; boosting efficiency; and guaranteeing high service availability. Table VIII below describes the drivers to migrate to the cloud.

Table VIII: Reasons to adopt cloud computing

Drivers to migrate to the cloud	Mean	St. Deviation	Rank
Reduce IT costs	3.5	1.55	4
Availability of services	3.36	1.39	5
On-demand services	3.14	1.09	2
Improve security	3.14	1.406	6
Outsource IT services	2.93	1.207	3
Core competency	3.43	1.39	8
Reliable IT services	2.79	1.18	1
Lack of internal IT resources	3.29	1.49	9
Scalability	3.29	1.204	7

Cloud adoption barriers: According to the survey results, data security and service availability are the primary concerns for enterprises considering cloud computing. Similarly, previous research identified data privacy and vendor lock-in as significant

barriers. Conversely, the least concerning factors in this study were the potential loss of IT expertise and the challenges related to migrating existing IT systems to the cloud. Table IX illustrates the barriers to migrating cloud computing adoption.

Table IX: Cloud computing adoption barriers

Barriers to migrating to the cloud	Mean	Std. Deviation	Rank
Data security	3.6	1.336	4
Availability of service	3.5	1.604	5
Cost of services	3.6	1.393	6
Loss of control over resources	3.0	1.269	3
Loss of IT expertise	2.4	1.089	8
Data Location	3.0	1.177	2
Vendor lock-in	2.8	1.167	9
Regulation compliance	2.7	1.188	10
Interoperability with existing systems	3.1	1.099	1
Trust in cloud service providers	3.2	1.383	7
Difficulty in migrating system to cloud	3.1	1.292	11
Lack of knowledge about cloud	2.8	1.292	13
Absence of government regulations	3.2	1.311	12

F. Inferential Analysis: The hypotheses are tested using logistic regression. From the literature research, sixteen hypotheses were developed to investigate the variables affecting the uptake of cloud computing. The adoption of cloud computing is the dependent variable in

the analysis, while these hypotheses serve as the independent variables. A rating of 1 indicated that the organization had implemented cloud computing or planned to do so, whereas a rating of 0 indicated the opposite. Binary values were assigned. Table X describes the description of independent variables.

Table X: Description of independent variables (hypotheses)

	No of items	Minimum	Maximum	Mean	Std. Deviation
Data Security	1	0.02	1	0.93	.267
Scalability	1	0.01	1	0.79	.426
Collaboration	2	1.15	1	0.79	.426
Data Privacy	1	1.55	1	0.86	.363
Reliability	1	0.56	1	0.79	.426
Cost-Effectiveness	3	0.75	1	0.79	.426
Flexibility	2	0.03	1	0.57	.514
User Experience	3	1.09	1	0.86	.267
Integration	1	0.8	1	0.57	.514
Monitoring and Management	2	0.8	1	0.93	.267
Compliance	1	0.09	1	0.71	.469
Data Ownership	1	0.54	1	0.71	.469
Perceived Usefulness	3	1.11	1	0.79	.426
Perceived ease of use	2	1.23	1	3.21	1.188
Intention to use	3	1.09	1	0.86	.267
Actual Usage	2	1.15	1	0.79	.426

Table XI shows the logistic regression test for technical, organizational, environmental, and security factors. Three hypotheses organizational readiness, enterprise status, and top management support were statistically significant in the setting of the organization. Firm status and size did not have any bearing.

Only government support was important in the context of the environment ($p=0.011$). Compatibility was the only DOI element to be significant ($p=0.646$); complexity and relative advantage were not. Notably, organizational readiness encompasses three important criteria.

Table XI: Logistic Regression Test Summary

Step	Variable	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
1 ^a	Compatibility (1)	-41.631	415655125.432	.000	1	1.000	.000	.000	.
	Relative advantage (1)	-20.964	25216.926	.000	1	.999	.000	.000	.
	Government support (1)	19.577	25216.926	.000	1	.999	317946674.266	.000	.
	External support(1)	19.804	67644.569	.000	1	1.000	398957215.192	.000	.
	Competitive pressure(1)	20.510	40192.969	.000	1	1.000	807737421.426	.000	.
	Top management support(1)	-21.826	415655125.168	.000	1	1.000	.000	.000	.
	Organizational readiness (1)	42.790	415655124.754	.000	1	1.000	383216977 5377642500.000	.000	.
	Technology barrier(1)	-19.420	415655121.958	.000	1	1.000	.000	.000	.
	Security concerns(1)	-20.737	41091.679	.000	1	1.000	.000	.000	.
	Complexity			.000	1	1.000			.
	Complexity(1)	40.698	415655124.253	.000	1	1.000	473195787 756993150.000	.000	.
	Constant	.693	1.225	.320	1	.571	2.000		

a. Variable(s) entered on step 1: Compatibility , Relative advantage, Government support , External support, Competitive pressure, Top management support, Organizational readiness , Technology barrier, Security concerns, Complexity.

V. CONCLUSION

Fourteen interviews were conducted to validate factors affecting Knowledge practices based on cloud computing adoption in both descriptive and inferential statistics. For both firm size and status, the percentage of independent variables with respect to enterprises is 78%, while in the industry sector, independent variables regarding technology, organization, and environment improve value by about 92%. Hence, both give somewhat very close results. Still, enterprise sizes for both (firm size, firm status) need to improve. This research also provides a decision-making framework by involving a knowledge repository over the internet with cloud so that our end-user services can be improved.

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