“How cloud knowledge management platforms enhance innovation in digital marketing strategies?”

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HOW CLOUD KNOWLEDGE MANAGEMENT PLATFORMS ENHANCE INNOVATION IN DIGITAL MARKETING STRATEGIES?

Abstract

Cloud-based knowledge management platforms provide real-time, collaborative digital environments for storing and distributing organizational intelligence.. This study aims to examine the impact of cloud-based knowledge management platforms and innovation on digital marketing strategies and the mediating role of the marketing decision support system. The study employed a quantitative methodology for data collection, utilizing a specially designed questionnaire. This questionnaire was distributed to marketing managers and marketers at Asiacell Telecommunications in Iraq. This sample was selected because it represents the group responsible for developing marketing strategies. Purposive sampling was used due to the knowledge and field experience. Data were collected between February 2025 and April 2025 by distributing the questionnaire to 160 specialists from the marketing, IT, and decision-making departments. The study findings illustrate the implications of Knowledge Retrieval Efficiency ($\beta = 0.068 < 0.047$), Marketing Decision Support System (MDSS) ($\beta = 0.374 < 0.001$), Knowledge Security ($\beta = 0.043 < 0.080$), and Marketing Decision Support System ($\beta = 0.235 < 0.003$), Innovation in Digital Marketing Strategies ($0.183 < 0.010$), System Usability ($\beta = 0.051 < 0.059$), Marketing Decision Support System ($\beta = 0.277 < p = 0.002$) . The study reveals that companies with robust digital infrastructure and collaborative knowledge practices tend to generate data-driven, adaptive, and customer-centric marketing innovations. Practical implications include strategies for integrating decision support systems into cloud platforms to improve decision quality and marketing agility.

Keywords Marketing Decision Support System, cloud knowledge management, innovation in digital marketing strategies, telecommunications sector

JEL Classification M31, O32, D83, C83

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INTRODUCTION

The rapidly increasing rate of the digital transformation has amplified the importance of innovativeness in digital marketing plans as a critical factor of achieving the competitive advantage and organizational sustainability, especially in rather dynamic markets like the telecommunications market. Amidst escalated competition, increased customer demands, and the introduction of variety in digital touchpoints, companies are now obligated to re-design their marketing processes and implement knowledge-based and data-driven solutions so that they can be quick to adapt to the market. Knowledge-management platforms based in clouds have emerged as strategic enablers and have enabled organizations to gather, archive and distribute knowledge within organizations in a flexible and efficient manner. Such platforms enable the marketing teams to analyze data, create creative solutions, and enrich the digital experience of the customer. They are particularly significant in the telecommunications industry which is typified by high complexity of operations, huge databases and new innovations in service delivery which cannot be stopped (Yusuf Kibar et al., 2023).

This trend is clearly evident in Iraq's telecommunications sector, which is undergoing rapid digital transformation due to the proliferation of mobile applications, the increasing need for internet access, and the emergence of a tech-savvy consumer segment (Kristinae et al., 2023). However, the sector faces specific challenges, including uneven infrastructure development across provinces and the reliance of local companies on advanced digital services to enhance their marketing strategies and promote service quality in a highly competitive environment with constantly evolving customer demands. In this context, the ability to leverage cloud knowledge and translate it into marketing innovations becomes a strategic priority for ensuring the competitiveness of Iraqi telecommunications companies (Al-Daradkah et al., 2024).

Marketing Decision Support System (MDSS) comes into the scene as a driving force that incorporates knowledge, analysis and decision making. MDSS is based on the principles of retrieving the data found in the cloud-based knowledge-management solutions and combining it with the predictive models and sophisticated analytics to allow organisations, including the Iraqi telecommunications companies, to make creative and successful marketing choices (Boiko, 2023). Although the importance of such systems became more accepted, the existing literature shows a distinct research gap (Nasareddin, 2023; Hammi et al., 2023). The literature has already provided an insight into how knowledge management influences innovation or how decision-support system is used to enhance performance, but the authors of these works have not adequately tested the functioning of MDSS as a mediator that transforms cloud knowledge into innovation in digital marketing strategies, especially in such an emerging market as Iraq (Tiwari et al., 2024).

1. LITERATURE REVIEW

A growing number of organisations nowadays use cloud-based knowledge-management platforms (CKMPs) in fast-paced worlds as a knowledge infrastructure that will enable them to store, retrieve, and circulate knowledge in an efficient manner. Research on the topic in the past already revealed that these platforms are more efficient in making marketing decisions because they improve the flow of information and offer real-time access; it has also been revealed that usability, retrieval speed, and security are the key factors that define user adoption. Nevertheless, even having knowledge does not ensure marketing innovation unless it is systematically analysed and integrated using decision-making processes.

In this light, MDSS has been poised as an essential element that converts the knowledge that is cloud-based into novel marketing choices. The scholars show that MDSS facilitates the use of big-data analytics and predictive modelling, which helps marketing managers to develop evidence-based strategies (Allahham & Ahmad, 2024). The systems with the high degree of security and reliability promote the increased use of data and encourage the innovation (Mohsen, 2023). In addition, companies that use MDSS to share information between cloud knowledge and marketing solutions obtain a more profound understanding and capabilities to create digital campaigns (Peter & Dalla Vecchia, 2021).

Numbers of scholars shows The necessity of cybersecurity in instilling user trust and maintaining decision making processes is emphasized in many studies. Definitely more secure data systems have been observed to elevate analytical utilisation and lead to decisions that are more innovative (Hidayat et al., 2022). By other studies, the advantages of knowledge platforms in flexibility and usability suggest that they drive managers to utilize MDSS in developing in-depth and analysis based digital marketing strategies (Marouf, 2017). However, the relationships between these factors in the environment of digital marketing are still not researched sufficiently.

Furthermore, the current research project explores the proposition that the easiness of use, efficiency of the retrieval process, security and advancement of the data protection capability of digital knowledge-management systems lead to efficacy of Digital Marketing Decision Support System (MDSS) and that MDSS mediates the evolution of

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organisational knowledge to innovation in digital-marketing strategies. The offered model is a considerable contribution to theory, as it combines the digital knowledge-management tools with the analytical and decision-making tools thus explaining their connection within the marketing innovation aspect first (Allahham et al., 2023).

The knowledge retrieval efficiency refers to the ability of the users to find the useful information in the knowledge systems in clouds in a fast and precise manner. Effective recall is a prerequisite in the high-speed marketing environments to access real-time insights of customers, past performances of campaigns and market analytics; these are invaluable in creating innovation. How fast the retrieval process is is determined by smart indexing, tagging of keys, search capability, and tagging by metadata. The speed of retrieval is directly related to the time to market with campaigns and responsiveness of the organization to changing consumer behaviour in the telecommunications sector, where massive amounts of data must be generated on an almost continuous basis (Siraj et al., 2024; Han & Balabanis, 2024). Hard-to-reach knowledge, knowledge that has been neglected, and knowledge that is sparsely indexed often went to waste hence eroding the usefulness of otherwise well-built knowledge systems. Companies that invest in next-generation search and machine-learning classifiers as well as smart recommender engines enable their marketing departments to innovate more quickly and more accurately (Ramadhanti Sugita & Handayani, 2024).

However, the retrieval efficiency varies on the training of the employees and their digital literacy, which is a problem in various companies (Beckford, 2020). Even detailed cloud repositories in this case do not guarantee the realization of marketing value in the event that there are no distinct retrieval processes and design-friendly nature (Capitello et al., 2014). Besides, system usability determines the ease, accessibility, and functionality of a cloud-based knowledge-management system among the user activities. The Technology Acceptance Model (TAM) indicates that perceived ease of use is among the main factors affecting the adoption of systems (Bhuiyan et al., 2024). The logic behind which the interface is organized, the ease of navigation, and the responsiveness of the system across devices increase the chances of marketing departments to interact with CKMPs. Being used by organizations that require teams with cross functions to work in real time (as it is the case in Asiacell), inefficiency may be hindered by poor usability leading to negative motivation and workflow disruptions (Allahham et al., 2023). Customizable dashboards, real-time notifications, and guided navigation among others are some of the features that make the application user-friendly and engaging. Studies have shown that when the system is used better, then it will take shorter time to develop the campaign and respond to the customers but ease of use is not a guarantee of transfer of knowledge. Knowledge transfer is among the factors that must be properly transferred through proper onboarding practices, consistent system updates, and a feedback mechanism that will adapt to the needs and market trends of users (Aljabari et al., 2024).

The marketing decision support system (MDSS) is a set of tools (digital tools) combined with analysis methods to improve information, knowledge, and data exchange, which helps strategic marketing decisions. These solutions allow managers to design, track and optimise marketing campaigns by combining customer real-time information, market analytics and intelligence (Zhai et al., 2020). Regarding a TAM view, MDSS can be seen as a mediator, which converts the current knowledge into actionable insights to become more innovative. Besides, knowledge platforms based on clouds are strategically beneficial to be combined with AI-based dashboards, customer segmentation engines, and scenario simulators (Barrera et al., 2024). These integrations allow the marketing teams in the organization to be able to predict and react fast to market transformations, thus strengthening organizational competitiveness.It reduces the gap between static information repositories and dynamic marketing execution by enabling decision-makers to pre-view solutions, to try their alternatives and to monitor their outcomes (Al-Okaily et al., 2024). The existing evidence shows that the implementation of a successful MDSS leads to an increased use of knowledge, marketing responsiveness, and increased effectiveness of innovation (Govindarajan & Ananthanpillai, 2024). However, the success of MDSS integration depends on system interoper-

ability, data quality, and user trust. If decision tools are perceived as complex or inaccurate, users may revert to intuition or legacy practices, undermining innovation potential (Md Nasir Uddin Rana et al., 2024). However, Marketing Decision Support System is an integrated set of technologically based tools that make a corporation's information knowledge base, found in knowledge management clouds (KMCs), actionable in markets (Olazo, 2022). In CKMPs, the MDSS is a key enabler that enables the creation of a knowledge pool, which is shared and utilized to help ensure the success of a digital marketing campaign (Purnomo, 2023). These include dashboards, predictive analytics, creative tools, customer segmentation tools, and recommendation engines, which aim to help marketers plan, test, and optimize their campaigns (Seybert, 2022). But some companies face difficulties in adopting and making MDSS tools compatible with their working systems. Challenges that may affect DSS utilization include little or no employee training and the complexity of data and the failure of system communication and coordination (Hasanah et al., 2021). In order to remove the obstacles, the CKMP architecture has to be combined with the MDSS features and digital literacy has to be planted in both marketing and IT departments. By doing so, MDSS acts as a change enabler, not just a mediator.

However, these studies reveal a significant research gap a lack of models that examine MDSS as an intermediary mechanism linking Knowledge Management Systems (CKMPs) (such as usability, retrieval speed, security, and data protection systems) to innovation in digital marketing strategies (Gharaibeh et al., 2020). Most studies have examined the relationship between knowledge management and innovation within a general organizational framework, without focusing on the marketing context or considering the systems that transform raw knowledge into actionable strategic decisions (Thanapongporn et al., 2024). The literature has also not explored the extent to which characteristics of content knowledge management platforms (CKMPs) including higher-level data security and simplicity of information retrieval lead to the success of medical decision support systems (MDSSs). Even though these features will form a crucial part of the alignment of the two systems in the modern digital setting, there is a lack of empirical evidence (Van Nguyen et al., 2024).

In the digital marketing arena, innovation involves implementation of new tools, channels, and approaches aimed at promoting brand exposure, interaction with customers and campaign performance. In the current hyper-connected world, not only is the concept of innovation no longer an option itself, but it is also an inseparable aspect of competitive advantage (Zellmer et al., 2024). The innovation of cloud technologies, implementation of real-time analytics and artificial-intelligence-driven personalization tools is a characteristic of successful digital marketing innovation and can satisfy the growing expectations of customers (Olaoye and Potter, 2024). Fundamentally, marketing innovation relies on the ability of an organization to utilize both knowledge within and without the organization. CDMPs provide the infrastructure to control the content, automate processes, and organize campaigns, and decision-support systems allow refining the strategy based on the data (Lopez, 2024). In Asiacell, the marketing innovation can be seen in the form of predictive analytics, precision-promotional offers, and interactive marketing platforms. However, there are still various challenges. It is possible that organizational inertia, complexity of regulations, and lack of talent in the field of data analytics can interfere with the complete implementation of marketing innovation (Firman et al., 2020). The innovativeness, therefore, requires adaptive knowledge systems, dedicated digital leadership, and long-term investment in cloud infrastructure. The companies that integrate the functionality of CKMP with the possibility of MDSS, such companies are best placed to continually and efficiently innovate in their digital marketing strategies (Moinuddin et al., 2024).

The Technology Acceptance Model (TAM) developed by Davis (1989) is utilized in this study to explain how perceived ease of use and usefulness shape the acceptance and effective use of technology. In the realm of CKMPs, employees are more willing to participate since these systems are easy to use and help them in decision-making. Still, CKMPs are capable of retaining, on their own, the information on large scales of structured as well as unstructured knowledge. To make effective use of this understanding, a harmonized MDSS translating this into actionable knowledge based on predictions and focused recommendations

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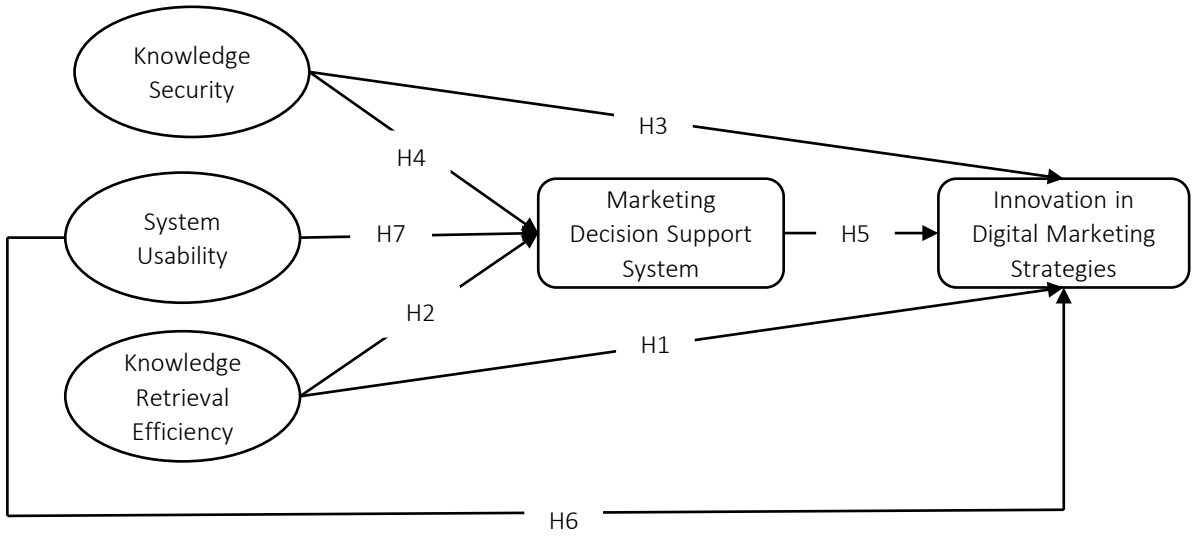

Figure 1. Research model

is required. Such integration improves the effectiveness of knowledge transfer and the speed and quality of executive decisions, an innovative force of digital marketing strategy in the final analysis (Moinuddin et al., 2024).

Moreover, information efficiency summarizes the ease and effectiveness with which users can find and utilize information in the cloud. Such an ability becomes vital for creating real-time, customer-centric plans in rapid digital marketing contexts. The strong reporting systems could see marketers use the real time data of marketing intelligence, live performance of campaigns hence making it easier to formulate and launch new strategies promptly. The knowledge access speed helps marketing teams to keep up with changing trends and consumer behavior changes immediately to minimize delays and increase the speed and creativity of the process of strategy creation (Olaoye & Potter, 2024).

However, this gap in research is marked in the literature available: a lack of models that question the role of Marketing Decision Support Systems (MDSS) as an intermediate process that connects the Knowledge Management Systems (CKMPs) to innovation in digital marketing plans: usability, speed of retrieval, security, and protection of the system (Gharaibeh et al., 2020). The existing studies have mostly assumed the connection between knowledge management and innovation under the generic organizational setting and have thus omitted the marketing environment or the systems that transform raw knowledge into strategic strategic decisions (Thanapongporn et al., 2024). Also, a small number of studies have investigated the potential contribution of CKMP features such as advanced data security or simplicity of accessing information to MDSS success, even though such functions are also essential to the integration of the two systems in the digital environment (Van Nguyen et al., 2024).

A number of previous studies indicate that implementation of cloud-based knowledge management and Decision Support System within telecommunications companies can help in improving marketing innovation among marketing managers. However, the existing studies on the nexus of cloud knowledge management and DSS in creating marketing innovation are limited (Tiwari et al., 2024). The current study attempts to explore the impact of cloud-based knowledge management systems (CKMPs) in driving innovation in the digital marketing practices at Asiacell Telecommunications. The paper is a specific study of the strategic marketing impacts of principal CKMP attributes knowledge security, retrieval efficiency, and system usability that depend on the mediating role of the Marketing Decision Support System (MDSS). Thus, the hypotheses formulated are the following:

H1: Knowledge Retrieval Efficiency positively influences Innovation in Digital Marketing Strategies.

H2: Knowledge Retrieval Efficiency positively influences the Marketing Decision Support System.

H3: Knowledge Security positively influences Innovation in Digital Marketing Strategies.

H4: Knowledge Security positively influences the Marketing Decision Support System.

H5: The Marketing Decision Support System positively influences Innovation in Digital Marketing Strategies.

H6: System Usability positively influences Innovation in Digital Marketing Strategies.

H7: System Usability positively influences the Marketing Decision Support System.

2. METHODOLOGY

The rigor of the data collection was preserved in the present study through the use of a quantitative approach. Questionnaires were also administered to the marketing, information technology, and decision-making experts at Asiacell who is an Iraqi telecommunications company. Furthermore, ten semi-structured interviews with marketing managers and senior experts in IT were to be carried out to shed light on the applied use of Customer Knowledge Management Platforms (CKMPs) and Marketing Decision Support Systems (MDSSs) into the normal decision-making cycle. The interview information was used to provide the context of the survey data and it was used to support the fact that usability of a system and integration of information is the main barriers to innovation. These respondents were strategically chosen because they have the first hand experience of accessing cloud systems, applying data-driven marketing programs, and have the ability to provide important information about the knowledge-based innovation. The survey tool has been designed based on theoretical constructs based on the antecedent literature. The seven items used to measure Knowledge Security were in accordance with the scale developed by Jennex and Zyngier (2007). Knowledge Retrieval Efficiency was measured on the basis of an eight-item scale modified according to Sutanto et al. (2018). System Usability has been operationalized with six items based on Hashim and Sultan (2009), whereas Digital Marketing Innovation was measured with a scale comprising of seven items as developed by Abbas (2024). The construct of the Marketing Decision Support System was rated using six items borrowed by Alyoubi (2015). Every item was presented using a five-point Likert response pattern that ranged between a strongly disagree to strongly agree. It was tested out first by a pre-test which was done among both the academic scholars and some of the industry marketing professionals, and the expert reviews obtained contributed to the validity of the content of the questionnaire. The purposive sampling method was used, which demonstrates the specific experience and field expertise of the target group. The last questionnaire was distributed through Google Forms between February 2025 and April 2025 and accepted over a period of eight weeks. There were 160 participants, the majority of them were men (63 %), and women (37 %). The majority were in managerial or top marketing roles (average) of nine years. Besides the questionnaire, the ten semi-structured interviews also provided a better representation of the relation between CKMPs and MDSSs in practice and one of the main challenges they presented was the ease of use and systems integration, which supported the quantitative findings. Triangulation of the answers to the structured items with the open-ended feedback materialized in the form of qualitative feedback contributed to the credibility and readability of the study. Structural equation modelling after the data collection was done with SmartPLS 4, which is based on the Technology Acceptance Model (TAM) to determine both direct and mediated effects based on the proposed conceptual framework.

3. RESULTS

The data set entailed 160 valid responses that were analysed and examined using SmartPLS 4.0, a powerful PLS extremely basic application that has the capacity of handling complicated models with various latent variables and mediating variables. It was used to allow the comprehensive analysis of direct and indirect tracks which were proposed in the conceptual framework as the main aim was

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to determine the impact of CKMP dimensions on marketing innovation either directly, or mediating by MDSS. The validity and reliability assessment results are available in Table1. The results show that the measurement instruments are suitable to undergo analysis further, as all of them have satisfactory validity and reliability. Within the construct of Inno., Digital. Marketing Strategies, factor loadings are displayed between 0.733 and 0.855 which is stronger than the advised factor loading 0.70 and indicates a high degree of item reliability. High internal consistency and convergent validity are all attested by Cronbachs Alpha (0.913), Composite and Reliability (0.930) and Average Variance Extracted (AVE = 0.655). Similarly, the psychometric properties of this construct are strong since Knowledge Retrieval Efficiency has 0.748 to 0.881 factor loadings, Cronbachs Alpha of 0.927, Composite Reliability at 0.940 and AVE of 0.664 which validates that Knowledge Retrieval Efficiency measures what it claims. The Knowledge Security construct also meets all the reliability and validity requirements having loadings ranging between 0.782 to 0.873, Cronbach's Alpha of 0.931, Composite Reliability of 0.944 and highest AVE of all constructs at 0.708, which demonstrate a high internal consistency and explanatory power of a latent variable. In the case of the "Marketing Decision Support System construct, item loadings are all greater than 0.775, with Cronbach, Alpha of 0.917, Composite Reliability of 0.935, and AVE of 0.706 which proves its efficacy as a mediating mechanism in the model. Measurement quality in State Usability is also high with a loading rang-

Table 1. Validity and reliability test

Constructs	Items	Factor loadings	Cronbach's Alpha	C.R.	AVE
Innovation in Digital Marketing Strategies	IDMS1	0.801	0.913	0.93	0.655
	IDMS2	0.805			
	IDMS3	0.844			
	IDMS4	0.831			
	IDMS5	0.787			
	IDMS6	0.733			
	IDMS7	0.855			
Knowledge Retrieval Efficiency	KRE1	0.748	0.927	0.94	0.664
	KRE2	0.771			
	KRE3	0.881			
	KRE4	0.777			
	KRE5	0.849			
	KRE6	0.841			
	KRE7	0.827			
	KRE8	0.813			
Knowledge Security	KS1	0.873	0.931	0.944	0.708
	KS2	0.857			
	KS3	0.828			
	KS4	0.848			
	KS5	0.864			
	KS6	0.834			
	KS7	0.782			
Marketing Decision Support System	MDSS1	0.807	0.917	0.935	0.706
	MDSS2	0.834			
	MDSS3	0.88			
	MDSS4	0.871			
	MDSS5	0.869			
	MDSS6	0.775			
System Usability	SU1	0.829	0.902	0.924	0.67
	SU2	0.822			
	SU3	0.796			
	SU4	0.825			
	SU5	0.835			
	SU6	0.805			

ing between 0.796 to 0.835; the construct has a Cronbach. Alpha of 0.902, Comprise Reliability of 0.924, and Abacus of 0.670, and so both the validity of the state easiness and user-intuitive interface have been validated. In conclusion, the findings support the reliability and convergent validity of the measurement model, and as such, the structural equation modelling is justified as the method of testing the hypotheses.

Table 2 shows that all the measurements used in the research can be considered as valid and reliable for further analyses in the structural model. For the dimension Innovation in Digital Marketing Strategies, the factor loading values vary from 0.733 to 0.855, which are over the recommended cut-off point of 0.70, showing that items have high reliability. Cronbach's Alpha is 0.913, Composite Reliability (CR) is 0.930, and Average Variance Extracted (AVE) is 0.655, indicating high internal consistency and convergent validity. Likewise, the psychometric properties of Knowledge Retrieval Efficiency are strong with factor loadings from 0.748 to 0.881, Cronbach's Alpha of 0.927, CR of 0.940 and AVE of 0.664. These values imply that the items are consistently and accurately measuring the construct. Validity and reliability criteria: the construct that is Knowledge Security also fits absolutely all the criteria for reliability and validity. The loadings of the items vary between 0.782 and 0.873, and the Cronbach's Alpha of 0.931, CR of 0.944, and AVE of 0.708 the highest AVE in all constructs demonstrates good internal reliability and that most of the variance is explained by the latent variable. In the Marketing Decision Support System, all items load above 0.775, and the Cronbach's Alpha is 0.917, CR is 0.935, and AVE is 0.706. The findings further substantiate the reliability and validity of the MDSS construct therefore, it is an effective mechanism in the conceptual model which can mediate NA. The quality of the measures has also been proven for System Usability, with loadings that range between 0.796 and 0.835. It possesses a Cronbach's Alpha of 0.902, CR of 0.924 and AVE of 0.670, confirming the straightforwardness and it intuitive to interact with the system both are critical elements of TAM. On the whole, the measurement model demonstrates good reliability and convergent validity of all constructs and that the latent variables are accurately and consistently measured. This confirms that the study's instrument is stable and justifies the use of structural equation modeling in order to test the hypotheses.

The discriminant validity of the model constructs was evaluated with the Heterotrait-Monotrait (HTMT) ratio, which is summarized in Table 2. The discriminant validity examines if the phenomena really are, as it is at the core of the structural equation modeling. HTMT estimates should be less than 0.85 or 0.90 to prove satisfactory discriminant validity. All HTMT values in this study are lower than the recommended cutoff value, suggesting that the constructs show satisfactory discriminant validity. The HTMT value between Innovation in Digital Marketing Strategy and Knowledge Retrieval Efficiency is 0.207, and between Innovation in Digital Marketing Strategy and Knowledge Security, it is 0.18. In the same manner, the HTMTs for Innovation in Digital Marketing Strategies and Marketing Decision Support System (0.187), and System Usability (0.125) are additional support to low inter-construct correlation. On the other hand, Knowledge Retrieval Efficiency shows higher HTMT values with Knowledge Security (0.81), MDSS (0.817), and System Usability (0.84). While these values

Table 2. HTMT

Constructs	Innovation in Digital Marketing Strategies	Knowledge Retrieval Efficiency	Knowledge Security	Marketing Decision Support System	System Usability
Innovation in Digital Marketing Strategies					
Knowledge Retrieval Efficiency	0.207				
Knowledge Security	0.18	0.81			
Marketing Decision Support System	0.187	0.817	0.768		
System Usability	0.125	0.84	0.795	0.795	

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Table 3. Fornell-Larcker criterion

Constructs	Innovation in Digital Marketing Strategies	Knowledge Retrieval Efficiency	Knowledge Security	Marketing Decision Support System	System Usability
Innovation in Digital Marketing Strategies	0.809				
Knowledge Retrieval Efficiency	0.203	0.815			
Knowledge Security	0.175	0.75	0.841		
Marketing Decision Support System	0.183	0.764	0.718	0.84	
System Usability	0.119	0.772	0.729	0.738	0.819

remain within acceptable limits, they suggest a strong conceptual linkage among knowledge and system-related constructs. Overall, the HTMT results confirm that all constructs maintain discriminant validity, justifying the use of structural equation modeling.

Table 3 demonstrates the results obtained in terms of Fornell-Larcker criterion. There is affirmation of discriminant validity when the square root of average variance extracted (AVE) of a construct (its diagonal element) is greater than its correlations with all the other constructs (the off-diagonal elements). In the case of construct, the square root of the AVE, of the construct In Digital Marketing Strategies is equal to 0.809 which is higher than its correlation with other constructs Knowledge Retrieval Efficiency (0.203), Knowledge Security (0.175), MDSS (0.183), and System Usability (0.119). The construct of *Knowledge Retrieval Efficiency is also satisfactory, containing diagonal value of 0.815, which is higher than any inter-construct correlation. The criterion is also met in the case of Knowledge Security where the diagonal AVE is 0.841 which is higher than that of its relationships with both MDSS (0.718) and System Usability (0.729). Diagonal values are captured in the constructs, MDSS and System Usability with a value of 0.84 and 0.819 respectively, which is larger than both their inter-constructs and respects a better result. The entire findings of this study validate the fact that each of the constructs is empirically distinct, thus supporting the validity of the measurement model.

Source: Researchers' analysis based on SMART PLS (2024).

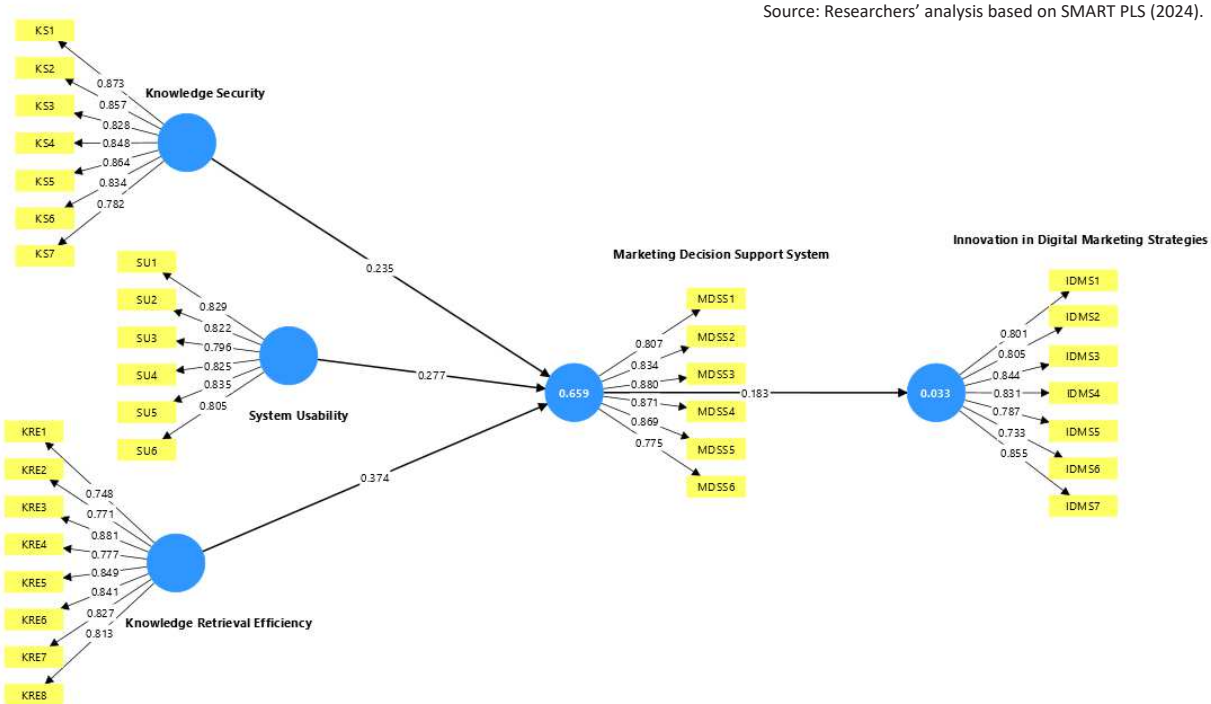

Figure 2. Measurement model

Table 4. R-square adjusted

Constructs	R-square	R-square adjusted
Innovation in Digital Marketing Strategies	0.033	0.028
Marketing Decision Support System	0.659	0.653

Table 4 includes the R 2 and adjusted R 2 of the model constructs. With regards to the Marketing Decision Support System (MDSS), the R2 equals 0.659 and adjusted R 2 equals 0.653, meaning that the knowledge retrieval efficiency, knowledge security and systems usability explain the variance of the MDSS to the tune of 65.9 percentage. This moderately large R 2 indicates high explanatory power and a level of model fit that is satisfactory to represent the model of MDSS construct. Meanwhile, the R 2 is 0.033, and the adjusted R 2 is 0.028, indicating that the current model explains only 3.3 per cent of its variance in the case of InnoVation in Digital Marketing Strategies. Even though one might find statistically significant relationships, the real impact of the variables that are currently utilized to predict this outcome is not as impressive. The next round of the model could utilize more predictors in the model to get a better explanation.

According to Table 4, R-square and adjusted R-square values provide insight into the explanatory power of the model's independent variables on the dependent constructs. For the construct Marketing Decision Support System (MDSS), the R-square value is 0.659, and the adjusted R-square is 0.653. This indicates that approximately 65.9% of the variance in MDSS is explained by its predictors in the model (Knowledge Retrieval Efficiency, Knowledge Security, and System Usability). The high R^2 value signifies a substantial level of explanatory power and model fit for this dependent variable.In contrast, for the construct Innovation in Digital Marketing Strategies, the R-square value is 0.033, and the adjusted R-square is 0.028. This suggests that only about 3.3% of the variance in innovation outcomes is explained by the model variables. Such a low R^2 value implies that while there may be statistically significant relationships, the practical impact of the current independent variables on this dependent outcome is weak, and other influential factors may need to be considered to improve the model's explanatory strength.

Table 5 summarized the results of hypothesis testing, which have found some meaningful and non-significant interactions between the constructs under study. Hypothesis 1, as one that Knowledge Retrieval Efficiency has a positive effect upon Innovation in Digital Marketing Strategies, is supported empirically at a path coefficient of 0.068, t-value of 1.985, and p-value of 0.047. Despite the insignificant effect size, the data indicates that knowledge retrieval efficiency contributes to digital marketing innovation marginally. The claim

Table 5. Hypothesis testing estimates

Hypothesis	Path	Original sample	Sample mean	Standard deviation	t-statistics (|O/STDEV|)	p-values	
H1	Knowledge Retrieval Efficiency → Innovation in Digital Marketing Strategies	0.068	0.077	0.034	1.985	0.047	Supported
H2	Knowledge Retrieval Efficiency → Marketing Decision Support System	0.374	0.372	0.096	3.893	0	Supported
H3	Knowledge Security → Innovation in Digital Marketing Strategies	0.043	0.049	0.025	1.751	0.08	Unsupported
H4	Knowledge Security → Marketing Decision Support System	0.235	0.237	0.08	2.941	0.003	Supported
H5	Marketing Decision Support System → Innovation in Digital Marketing Strategies	0.183	0.205	0.071	2.569	0.01	Supported
H6	System Usability → Innovation in Digital Marketing Strategies	0.051	0.057	0.027	1.891	0.059	Unsupported
H7	System Usability → Marketing Decision Support System	0.277	0.279	0.089	3.12	0.002	Supported

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that Knowledge Retrieval Efficiency is a determinant of the Marketing Decision Support System (MDSS) (Hypothesis 2) is highly supported and illustrates a significant effect (bitably = 0.374, t = 3.893, p = 0.001). This result highlights the significance of available knowledge to support decision-making. Conversely Hypothesis 3, which hypothesizes a positive relationship between Knowledge Security and Innovation in Digital Marketing Strategies, is not established (b = 0.043, t = 1.751, p = .080) and, therefore, security is a necessity but not a driver of innovation unless it is incorporated into other decision making systems. Hypothesis 4, on the other hand, is empirically supported by the statistically significant path coefficient (b = 0.235, t = 2.941, p = 0.003), meaning that secure knowledge environments have a positive role to play in MDSS effectiveness. The hypothesis that MDSS has a positive impact on Innovation in Digital Marketing Strategies, (b = 0.183, t = 2.569, p = 0.010) is also confirmed, which is Hypothesis 5. On the other hand Hypothesis 6: System Usability has a direct effect on Innovation in Digital Marketing Strategies, is not accepted (b = 0.051, t = 1.891, p = 0.059). This outcome implies that usability cannot be a sufficient source of innovation without giving it a strategic approach with the help of complementary systems. Lastly Hypothesis 7 that System Usability positively impacts MDSS, is validated (b = 0.277, t = 3.120, p = 0.002), meaning that systems that are user-friendly have a tremendous positive impact on the functionality of the MDSS. Overall, empirical evidence of the five of seven hypotheses that were postulated indicates the mediating role of the MDSS as intermediary of knowledge-based variables to digital marketing innovation. Knowledge retrieval and system usability also turn out to be defining facilitators, though the achievement of the consequences of innovation mostly relies on the efficient use of MDSS.

4. DISCUSSION

Findings of the study show that ease of use is a positive factor in the MDSS and digital marketing innovation. These findings support this connection showing that design intuitiveness, fast access, and cross device compatibility stimulate marketer to make rapid changes as consumer demands change fast. This observation is in line with Oyewole et al. (2024) and Wolf et al. (2023) that reveal the impact of ease of use on the use of digital tools and on encouraging innovation among users by reducing user resistance. This second hypothesis, which is about the mediating role played by MDSSs on the attitude of digital knowledge management software developers (CKMPs) towards innovation is affirmed. The statistics indicate that digital decision support systems convert knowledge stored into useful information so that the marketers make right decisions at right time. This finding is consistent with Salihi et al. (2024), who demonstrate that the decision-support tools strengthen the connection between knowledge systems and market performance. The third hypothesis, which suggests the idea that safe and confidential digital space inculcates trust and enhances positive user interaction, is proven by the research that credibility issues and compliance dictate the adoption and collaborative effectiveness. This is comparable to the results of Tuamyil et al. (2022) who reveal that digital trust is a useful predictor of system acceptance and knowledge sharing when using cloud systems. The fourth supposition is that access to knowledge will be high in digital knowledge management systems (CKMPs), which will lead to greater benefits in innovation. The performance evidences this assumption, since it is observed that, easy access and retrieval of knowledge contributes to good use of expertise in marketing. This result is similar to those of Thanapongporn et al. (2024), who state that available digital knowledge systems contribute to turning responsive and competitive. The fifth hypothesis is concerning the extended digital asset management (TAM) model, which shows that the effect of digital knowledge management systems (CKMPs) on innovation is indirect and comes through adoption and decision-making. These findings resonate with this framework through ease of use and secure access, and quick response increasing the adoption and consequently increasing innovation capacity. This finding confirms Sutanto et al.'s (2018) report highlighting the effectiveness of connecting knowledge platforms with decision-support tools in improving productivity of organizational innovation. The sixth hypothesis,

that that ease of use of a system positively influences innovation with regard to digital marketing strategies is verified. The findings are similar to the previous research of Sharabati et al. (2024). The seventh hypothesis that proves the positive effect of ease of use on marketing decision support systems is also proved as expected, as it is the case with prior studies made by Tiwari et al. (2024). Together with these findings, it is perspuny enough to note that ease of use, security, and decision-support integration play crucial roles that foster innovation in a dynamic, data-driven environment.

CONCLUSIONS

This study aims to examin how cloud-based knowledge management systems (CKMS) can be utilized to support a new type of innovation in the digital marketing approach to telecommunication. The results show that system acceptability, knowledge retrieval effectiveness, and data security greatly determine the effectiveness of marketing decision-making. In that regard, the CKMPs that allow delivering the intuitive, secure, and on-demand access, allow the marketer to make the decision based on data and react promptly on the insights that arise, thus tailoring the execution. This also highlights the mediated role played by the Marketing Decision Support Systems (MDSS) which translates the information stored into strategic wisdom through the act of connecting the availability of data with action. In line with Technology Acceptance Model (TAM), the research shows perceived easiness and usefulness are crucial in the adoption as well as innovation of marketing practices.

In practice, the research recommends telecommunication organizations to implement strong knowledge infrastructures that incorporate usability, security, and decision-support systems in an effort to quicken marketing innovation. Proposition 9 brings to the fore the cross-departmental collaboration and digital expertise as two critical facilitators of CKMP and MDSS effectiveness. Even with its theoretical implication, this study can only be generalized as one firm, Asiacell Telecommunications in Iraq. The study should be confirmed in future with numerous industries and cultures using a mixed-method approach, to better learn how adoption barriers and acceptance of the model by the users are perceived. Altogether, sustainable digital marketing innovation cannot be attained merely due to the availability of knowledge alone, but due to the practical implementability of that knowledge to develop a strategy that, in its turn, will register a higher agility and competitive advantage within organisations.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Research questionnaire

Cloud-based knowledge management								
Knowledge Security								
No.	**Statement**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Our knowledge management system ensures secure access to information.							
2	Data confidentiality is maintained through strict security protocols.							
3	Unauthorized access to knowledge repositories is effectively prevented.							
4	Employees in our organization are trained in knowledge security policies.							
5	Our cloud platforms provide reliable backup and recovery mechanisms.							
6	Knowledge security systems protect sensitive organizational information.							
7	Trust in the security of our knowledge platforms increases employees' willingness to use them							
Knowledge Retrieval Efficiency								
No.	**Statement**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Our cloud-based platforms allow employees to retrieve knowledge quickly.							
2	Employees can access the required information at any time without delay.							
3	Knowledge retrieval systems reduce time spent on redundant searches.							
4	Digital platforms ensure that information is accessible across departments.							
5	Stored knowledge is easy to search, filter, and retrieve when needed.							
6	Knowledge retrieval tools in our organization improve task efficiency.							
7	Employees are confident about the accuracy of retrieved information.							
8	Our retrieval systems integrate both internal and external knowledge resources.							
System Usability								
No.	**Statement**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Our knowledge management platforms are user-friendly.							
2	Employees can easily learn to operate the system without extensive training.							
3	The platform is designed with a simple and intuitive interface.							
4	The system integrates smoothly with other organizatio							
5	Employees are satisfied with the usability of the system.							
6	High usability of the system increases employees' willingness to use it regularly.							
Marketing Decision Support System								
No.	**Statement**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Our decision-making is supported by advanced marketing analytics tools.							
2	The MDSS provides real-time insights that improve marketing strategies.							
3	Marketing decision support systems enhance the accuracy of strategic planning.							
4	Data from the MDSS enables quick and effective responses to market changes.							
5	The MDSS helps align marketing strategies with customer preferences.							
6	Using the MDSS improves overall organizational performance in marketing activities.							
Innovation in Digital Marketing Strategies								
No.	**Statement**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	Our organization frequently adopts new and innovative digital marketing strategies							
2	Our organization continuously integrates innovative digital tools into marketing strategies.							
3	We use customer data analytics to generate innovative marketing initiatives.							
4	Our digital marketing strategies are flexible and adapt quickly to market changes.							
5	Social media platforms are effectively used to create innovative marketing experiences.							
6	Our marketing team leverages technology to experiment with new digital approaches.							

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