AI-Powered Knowledge Ecosystems: How Knowledge Management Systems Drive Business Intelligence and Marketing Capabilities in Gulf Cooperation Council Enterprises

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ABSTRACT

The use of Knowledge Management Systems (KMS) and Artificial Intelligence (AI) remains limited in developing countries. These technologies can help organizations understand their Business Intelligence (BI) and Marketing Capability (MC), but few studies have explored this area. The present research examines the relationship between KMS and Business Intelligence Capability (BIC) across companies in the Gulf Cooperation Council (GCC), highlighting the role of AI in enhancing the marketing skills. Using a quantitative approach, data were gathered from top management via a structured questionnaire. The study breaks down KMS into three key components: Knowledge Acquisition (KA), Knowledge Sharing (KS), and Knowledge Application (KAP), examining how each affects BIC. The results show that all three processes have a positive impact on BIC. Additionally, AI serves as a moderator between the KA, application, and BICs, which also positively influence MC. This research offers valuable insights into how KMS and AI can be combined to enhance BI, providing helpful guidance for practitioners and researchers.

Keywords-business capability; marketing capability; knowledge acquisition; GCC

I. INTRODUCTION

The dynamic and constantly evolving business environment requires regional companies to make accurate and quick decisions to ensure their survival and competitiveness [1]. MC and BI are vital for companies to understand the market and changing customer trends. Following the COVID-19 pandemic, customers shifted to online platforms, and their preferences can offer valuable insights into their needs. However, due to the large volume of customer data, BI becomes necessary. One of the key tools in marketing is BI. Marketers gather, analyze, and interpret data for decision-making using various technologies. Businesses use BI to identify patterns, gain insights, and make strategic, informed choices [2]. A company's ability to manage the customer knowledge and its use of AI can significantly impact its marketing and BIC [3]. This is because theories, such as the Knowledge-Based View (KBV) suggest that organizations can leverage the internal knowledge to gain a competitive advantage. Likewise, the Resource-Based View (RBV) indicates that utilizing an organization's resources and capabilities, such as investing in AI, is crucial for strengthening its competitive position and improving the organizational outcomes [4, 5].

An effective KMS helps keep the customer knowledge current, which is vital for the modern businesses requiring such systems [6]. As technology and data become increasingly complex, these systems enable companies to utilize information for making informed, strategic decisions [7]. The GCC, consisting of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE), covers various sectors including oil, gas, and financial services, and faces challenges in its digital transformation journey. When combined with AI, KMS offers tools for harnessing data, enhancing decision-making, and augmenting the MC [8]. KMS allows organizations to efficiently acquire, organize, and share information [9]. By utilizing KMS, companies can more effectively leverage their skills, data, and knowledge to innovate, remain competitive, and enhance productivity [10]. GCC companies must adopt advanced BI to adapt to competitive markets and shifting conditions. Several GCC countries have launched national visions, such as the UAE's Vision 2031, Saudi Arabia's Vision 2030, and Bahrain's Vision 2030, all of which aim to increase digitalization and transform their economies from oil-based to knowledge-based. Regional companies face pressure to adopt new technologies and support these national visions. The ability to make data-driven

decisions can drive development and sustainability [11], ultimately enhancing the marketing skills by recognizing trends and meeting evolving customer needs. Industries like oil, gas, technology, and banking flourish in the GCC. KMS and AI play crucial roles in helping GCC economies diversify and digitize. To innovate and remain competitive, organizations must understand how these platforms influence BIC [12]. The integration of KMS and AI can help firms improve their BI and, consequently, their marketing skills. AI speeds up the data management and analytics, enabling KMS to leverage machine learning, data processing, predictive analytics, and data interpretation [13]. AI can enhance KMS by providing deeper insights, increasing accuracy, and enabling faster decision-making [14].

Despite the growing use of AI and KMS in business environments, few studies have examined their combined effects, especially in GCC and other developing countries. GCC nations have launched digital transformation initiatives and need to adopt technology effectively to manage this shift. This research examines the impact of KMS on BIC in GCC firms and how BI influences MC, with a focus on the moderating role of AI. It examines how KMS components (KA, KS, and KAP) impact BIC, enabling firms to optimize their knowledge management. It also examines how AI amplifies these benefits. The study aims to guide professionals and scholars in integrating KMS with AI to strengthen BIC and contribute to the GCC digital transformation efforts.

II. LITERATURE REVIEW

A. Theoretical Framework

This study examines the impact of KMS on BIC. The KBV provides a framework for understanding this relationship, highlighting the strategic importance of knowledge. It suggests that organizations that leverage their knowledge effectively can gain a competitive edge and boost the organizational performance [15]. KMS involves processes that help organizations maximize their intellectual capital and performance by gathering accurate knowledge and sharing it among members. It also includes applying this knowledge to inform decision-making. Proper management of organizational knowledge can lead to better outcomes, such as enhanced BIC. KMS enhances the corporate intelligence by acquiring, sharing, and utilizing knowledge [16]. Linking KMS with the BI objectives supports improved strategic decision-making and performance [17].

The KBV is derived from the RBV, which posits that organizations can leverage their resources and capabilities to enhance performance. AI capabilities are organizational resources that require significant investment in infrastructure development and maintenance to be used effectively. The RBV complements the KBV by highlighting valuable, scarce, distinctive, and non-substitutable resources as key to gaining a competitive advantage [18, 19]. It views KMS as a valuable resource that can help organizations gain a competitive advantage. A KMS improves BI, enabling companies to gain insights and make informed decisions to stay competitive [20]. As noted in [21], the RBV architecture requires firms to possess unique and well-managed knowledge resources to compete successfully. Both KMS and AI can streamline the BI processes and leverage knowledge assets to create a competitive edge.

B. Conceptual Framework

This study investigates the relationships between KMS, BI, and AI. It employs KBV and RBV theories to analyze how KMS and AI influence BIC. KMS, encompassing KA, KS, and KAP, is anticipated to have a positive effect on BIC. Additionally, AI is expected to moderate the relationship between KMS and BIC. The conceptual framework for this research is depicted in Figure 1.

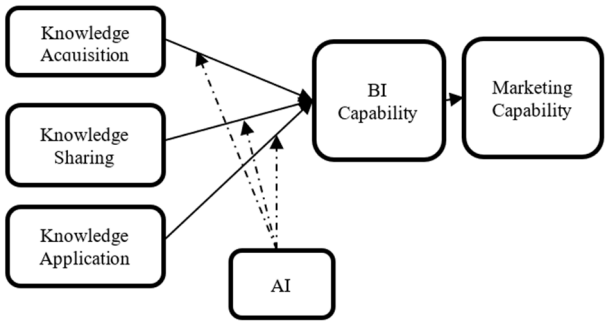

Fig. 1. Conceptual framework of the study.

1) Knowledge Acquisition and Business Intelligence

Acquiring knowledge involves systematically gathering relevant information from multiple sources [22]. To stay up-to-date, complete, and pertinent, organizations must gather expertise from both internal and external sources [23]. Effective KA helps firms stay informed and supports data-driven business decisions. Research indicates that KA has a significant impact on outcomes, including competitiveness, business performance, and innovation [24]. It also provides companies with timely BI data. The KBV emphasizes the importance of learning key information to enhance BIC and improve performance [25]. Consequently, this study suggests that KA plays a crucial role in influencing BI. Therefore, the following hypothesis is proposed:

H1: KA has a positive impact on BIC.

2) Knowledge Sharing and Business Intelligence Capability

Organizational KS involves exchanging information and is vital for teamwork and critical thinking [26]. Employees communicate ideas and best practices through collaborative platforms, social networks, and official repositories [27]. This process enhances the corporate intelligence, decision-making, and innovation. Effective sharing enables staff to communicate ideas and expertise more efficiently [28], resulting in better decisions and enhanced BI. By sharing knowledge, organizations can harness collective intelligence and best practices to generate accurate, actionable insights. Prior research indicates that collaborative KS can improve the organizational performance and competitive advantage [29]. This study predicts that KS will have a significant and positive impact on BIC. The following hypothesis is proposed:

H2: KS has a positive impact on BIC.

3) Knowledge Application and Business Intelligence Capability

Applying learned and shared information improves the organizational processes and decision-making [30]. This component involves translating information into practical insights for strategic and operational decisions. Effective KAP helps firms enhance BI by enabling informed decisions with complete and relevant data [31]. Sharing and applying knowledge enable organizations to transform information into action, informing their strategic and operational decisions. Proper data use in decision-making boosts the corporate intelligence [32]. This hypothesis supports the KBV, which emphasizes that organizations leverage their knowledge to gain a competitive advantage and improve the outcomes.

H3: KAP has a positive effect on BIC.

4) Business Intelligence Capability and Marketing Capability

Companies utilize advanced analytics to identify the market trends, customer preferences, and competitive dynamics. This data-driven approach allows marketers to plan and implement initiatives that enhance the customer engagement and grow the market share. By increasing targeting and personalization, BI technologies have improved the effectiveness of marketing campaigns by 20% [33]. Authors in [34] indicated that GCC companies employing BI for market segmentation saw better customer acquisition and retention. BI aids in uncovering the consumer interactions, comments, and buying behaviors, strengthening CRM. These data enable companies to tailor customer experiences, forecast needs, and resolve issues efficiently, thereby boosting loyalty and satisfaction. A strong CRM, combined with BI, can differentiate a company and provide sustained value in competitive GCC markets. Authors in [35] revealed that CRM firms using BI increased the customer lifetime value and repeat purchases. BI analytics enhanced the marketing efficiency by 25%, resulting in higher profits. Predictive BI tools improved the strategic alignment and market agility [36]. Overall, BIC is poised to have a positive impact on the marketing performance.

H4: BIC has a positive effect on MC.

5) AI as a Moderator

AI enhances KMS by utilizing data analysis, automation, and predictive modeling. It automates the gathering and processing of knowledge management data [37], making the system more streamlined and reducing the need for human intervention, allowing organizations to concentrate on the strategic decisions [38]. Advanced analytics utilize AI to detect patterns and project outcomes from large datasets [39], yielding more precise and comprehensive analyses that enhance BI by facilitating an increased knowledge collection and utilization [40]. Additionally, AI can forecast future events based on historical data, enabling organizations to anticipate the market changes and make proactive, informed decisions. Automating data handling, predictive insights, and advanced analytics with AI improves KA [41]. The use of AI in KMS enhances BI by raising the organizational efficiency and expanding KA and by enhancing the information quality and relevance, which strengthens the link between knowledge gathering and BIC [42]. It is, consequently, hypothesized that:

H5: AI moderates how KA influences BIC.

The current study examines the impact of AI on KS and BI. KMS and AI-driven chatbots improve communication, encouraging knowledge exchange and insights within the company through staff collaboration [43]. AI boosts the efficiency and effectiveness of sharing knowledge, which benefits BI [44]. The research suggests that AI could influence how KS affects BIC.

H6: AI moderates the impact of KS on BIC.

AI can enhance KAP by leveraging advanced analytics and providing relevant insights [20]. It can help organizations develop predictive models from complex data, improving the decision-making processes [45]. More precise and actionable insights from AI can boost both KAP and BI. This research proposes the following:

H7: AI moderates the effect of KAP on BIC.

III. RESEARCH METHODOLOGY

This quantitative study was carried out across GCC countries, targeting all companies operating within the region. Since not all companies utilize AI or BI, purposive sampling was used to focus on a specific group. The study concentrated on senior management executives, who, due to their strategic oversight and decision-making roles, provided crucial insights into how KMS and AI influence BIC and marketing effectiveness. Executives from finance, healthcare, manufacturing, and technology sectors were deliberately chosen to ensure a diverse representation across GCC industries. This approach aimed to produce broadly applicable and comprehensive results. The study examines how KMS affects BIC and investigates the moderating role of AI in this relationship. It tests hypotheses and explores the links between variables within the conceptual framework through systematic data collection and analysis. Data were collected using a standardized questionnaire. Items measuring KMS variables were based on [46], covering KA, KS, and KAP. The questionnaire also assessed the moderating effects of BI and AI using measurement scales from [43, 47], respectively. MCs were adopted from [48, 49].

A thorough literature review confirmed the validity and reliability of the questionnaire. It was carefully designed to align with previous studies. Back-translation was performed to ensure that the respondents understood the questions accurately. To further improve clarity, a panel of experts reviewed and validated the measurement items in both Arabic and English, providing valuable feedback that was incorporated. Subsequently, top executives participated in a pilot study, offering comments to refine the questionnaire's clarity and accuracy. These insights led to modifications before the instrument was finalized. The data were collected via an online, email-delivered questionnaire sent to 400 top executives, with 166 responses received. A cover letter explaining the study's purpose and emphasizing the importance of participation was sent to non-respondents, resulting in seven

additional responses, for a total of 173. Among these, 12 responses had missing values and 11 contained outliers, leaving 150 valid responses for analysis. The data demonstrated normal distribution, as shown in Table III, with no multicollinearity issues.

IV. FINDINGS

A. Description of Respondents and Variables

Responses were collected from 150 top management executives across various industries in the GCC during the data-gathering phase. The participants were categorized into the following sectors: technology (30%), finance (25%), healthcare (20%), manufacturing (15%), and other sectors (10%). The gender split was 73% male and 27% female. Regarding experience, 45% of the participants had over 15 years of professional experience, 30% had between 10 and 15 years, and 25% had less than 10 years. Furthermore, 70% held postgraduate degrees, while 30% had undergraduate degrees. These demographics offer a wide range of perspectives on the use and impact of KMS and AI. Table I displays the profiles of the respondents.

TABLE I. PROFILE OF RESPONDENTS

Variable	Label	Count	Percentage
Industry	Technology	45	30%
	Finance	38	25%
	Healthcare	30	20%
	Manufacturing	23	15%
	Other sectors	14	10%
Gender	Male	110	73%
	Female	40	27%
Experience	> 15 years	68	45%
	10-15 years	45	30%
	< 10 years	37	25%
Education	Postgraduate	105	70%
	Undergraduate	45	30%

B. Descriptive Statistics

This study evaluated the levels of the variables based on their mean scores and standard deviations. The variable levels are moderate, ranging from 2.91 (AI) to 3.22 (KS). These statistics suggest that the perceived effectiveness is generally moderate across all variables, with particularly high ratings for KS and KAP. Table II presents descriptive information for the variables, including their items, kurtosis, and skewness to assess normality, as well as the Variance Inflation Factor (VIF) to measure multicollinearity.

TABLE II. DESCRIPTIVE INFORMATION OF VARIABLES

Variable	Mean	Std.	Kurtosis	Skewness	VIF
KA	3.21	0.49	0.4	-0.24	2.08
KS	3.22	0.78	0.4	-0.2	2.06
KAP	3.19	0.49	0.36	-0.26	2.09
AI	2.91	0.58	0.4	-0.33	2.13
BIC	2.94	0.71	0.41	-0.34	2.11
MC	2.92	0.71	0.39	-0.32	2.12

C. Structural Equation Modeling Assessment

Following the recommendations of [50], the measurement model was evaluated by assessing the factor loadings, reliability, and validity metrics. All criteria were satisfactorily met: the factor loadings for all items exceeded the threshold of 0.70, while both the Cronbach's Alpha (CA) and Composite Reliability (CR) values were above 0.70, indicating adequate internal consistency. Additionally, the Average Variance Extracted (AVE) values were above 0.50, confirming the convergent validity. The discriminant validity was assessed using the Heterotrait-Monotrait ratio of correlations (HTMT). All HTMT values were below the proposed threshold of 0.85, indicating adequate discriminant validity. The detailed results of the measurement model assessment are presented in Table III.

TABLE III. MEASUREMENT MODEL

Variable	CA	CR	AVE	1	2	3	4	5	6
KA	0.84	0.85	0.61	-					
KS	0.78	0.80	0.58	0.55					
KAP	0.83	0.84	0.62	0.51	0.63				
AI	0.77	0.79	0.57	0.49	0.51	0.44			
BIC	0.83	0.86	0.61	0.44	0.31	0.64	0.47		
MC	0.89	0.91	0.69	0.32	0.39	0.40	0.45	0.44	-

The structural model was evaluated and found to explain 0.663% of the variation in BIC and 0.395% of the variation in MC. All effect sizes were above 0.02, except for the moderating effect of AI on the link between KS and BIC. Figure 2 illustrates the structural model. The study indicates that KA enhances BIC ($\beta = 0.431$, $p < 0.05$), supporting the idea that acquiring knowledge boosts BI. BI systems develop as organizations acquire and apply relevant knowledge. This indicates that KA improves BIC. Additionally, KS significantly increases BIC, supporting Hypothesis 2 ($\beta = 0.207$, $p < 0.05$). Effective KS, which promotes information exchange and collaborative decision-making, is key to improving BIC. Hypothesis 3 suggests that KAP enhances BIC, which is confirmed by its positive effect on BIC ($\beta = 0.405$, $p < 0.01$). These results highlight that applying knowledge improves BIC, emphasizing its practical value. H4 is supported, as BIC's impact on MC is positive, with a coefficient of 0.629 and $p < 0.05$. Table IV presents the results of hypothesis testing, including both the direct and moderating effects.

TABLE IV. RESULTS OF HYPOTHESES

H	Path	β	T	P-value
H1	KA→ BIC	0.431	4.312	0.000
H2	KS→BIC	0.207	3.091	0.031
H3	KAP→BIC	0.405	4.912	0.000
H4	BIC→MC	0.629	6.212	0.000
H5	KA*AI→BIC	0.151	2.009	0.044
H6	KS*AI→BIC	0.033	0.925	0.594
H7	KAP*AI→BIC	0.146	2.529	0.017

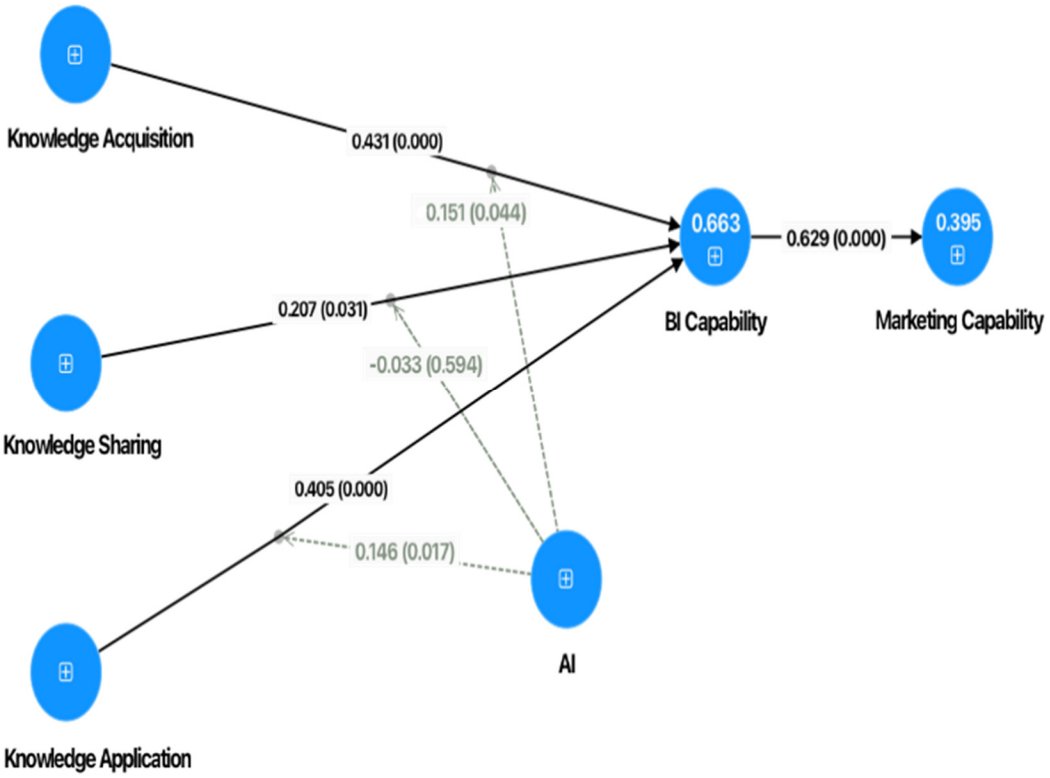

Fig. 2. Structural model.

V. IMPLICATIONS

This study offers several new insights that deepen both the theoretical and practical understanding of the knowledge management and digital capabilities. Unlike prior research that often studied KMS and AI separately, this study is among the first to examine how AI moderates the relationship between the KMS components (KA, KS, KAP) and BIC in the unique context of the GCC. This regional focus provides empirical depth to an area that has been largely underexplored in the literature. Additionally, the finding that AI significantly enhances the effects of KA and KAP but not KS on BIC provides a nuanced perspective that challenges the studies claiming that AI has a uniform impact. This selective moderation highlights the importance of tailoring the AI strategies to specific knowledge processes. Finally, by empirically linking BIC to MC, the study introduces new theoretical extensions to the RBV and KBV, demonstrating how the internal resources and knowledge processes, when supported by AI, can lead to improved market performance.

This research expands the KBV by demonstrating that specific KMS components enhance BIC. The KBV emphasizes that effective knowledge management is crucial to competitiveness and organizational performance. This study indicates that acquiring and applying knowledge boosts BI. It emphasizes the significance of KMS components in using organizational knowledge for strategic insights and better decision-making. It also supports the idea that resources and capabilities, like BIC can enhance MC. Additionally, this research explores how the AI and KMS components influence the BI outputs. AI's moderating effects on KA, BICs, KAP, and BIC underline its importance in strengthening these KMS components. This study contributes to the RBV knowledge by demonstrating how AI can enhance the knowledge management. The role of AI in moderating the connection between KS and BI skills suggests that while AI enhances KAs and KAP, its impact on KS may be less pronounced. Further research is needed to optimize the AI integration during the KS process.

The study's results highlight how companies can integrate KMS with AI to enhance BI. Organizations should start by upgrading every KMS component. Strong BI systems require efficient KA to access relevant and timely data. Investing in effective knowledge collection and integration solutions can improve BIC. KS is essential, and organizations should foster teamwork and information sharing. AI solutions, such as collaborative platforms and KMS, can enhance KS by improving the communication and information flow. These technologies can strengthen the strategic thinking and decision-making. Organizations should use shared information to guide strategic and operational decisions. AI-driven analytics and predictive modeling can deepen insights and forecast trends, which enhances KAP and provides a competitive edge. The research indicates that AI is essential to KMS. AI's robust analytical skills and fast information exchange can increase KAs and KAP. Businesses should invest in AI technologies to enhance their KMS and BIC. However, AI's limited impact on KS suggests that other methods may be necessary, possibly involving better data collection or knowledge integration technologies. The study indicates that the GCC would be benefited from strategic investments in the KMS and AI technologies. Combining technological advances with a

supportive knowledge management culture can enhance the knowledge utilization and BI. The ongoing evaluation of AI's impact on the knowledge management processes remains essential. To maximize the benefits of KMS investments, companies must be flexible and open to adopting new technologies.

VI. CONCLUSION

This study examines the impact of Knowledge Management Systems (KMS) on Business Intelligence Capability (BIC), with a focus on the moderating the role of Artificial Intelligence (AI). It demonstrates that acquiring, sharing, and applying knowledge enhances Business Intelligence (BI) and Marketing Capability (MC). These results support the Knowledge-Based View (KBV), which argues that managing the knowledge resources enhances the organizational BI. The paper also explains how AI can improve KA and use, aligning with the Resource-Based View (RBV) by increasing the value of KMS. However, the findings suggest that AI does not significantly impact the relationship between KS and BIC, indicating a need for further research on the role of AI in this area. The insights can help organizations leverage KMS and AI to enhance BI, offering both theoretical and practical benefits. Nonetheless, the study has limitations, such as its focus on GCC countries, which may limit its relevance to other regions, and its reliance on self-reported data from top leaders, which could introduce bias. Its cross-sectional design misses the change over time and the dynamics of integrating KMS and AI. The study emphasizes the KMS components and AI's moderating role but does not consider organizational culture or industry-specific factors, which could further clarify BIC. Addressing these limitations in future research, such as exploring different countries, industries, and employing longitudinal methods, could make the findings more applicable. Additionally, examining moderating and mediating factors, such as organizational culture, leadership styles, and industry challenges, would deepen the understanding of how KMS and AI influence BI. Investigating advanced AI technologies, such as machine learning and natural language processing, could also reveal how these tools enhance the knowledge management processes. Future research can build on these findings to help organizations, researchers, and practitioners effectively leverage KMS and AI to strengthen BIC.

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