“Investigating the effect of knowledge management systems on university performance: The interplay of intellectual and human capital”

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INVESTIGATING THE EFFECT OF KNOWLEDGE MANAGEMENT SYSTEMS ON UNIVERSITY PERFORMANCE: THE INTERPLAY OF INTELLECTUAL AND HUMAN CAPITAL

Abstract

This study examines the impact of knowledge management systems on the performance of universities while considering the mediating role of intellectual capital and the moderating effect of human capital. In today's knowledge-driven economy, improving university performance through effective knowledge management is essential. The study collected data through an online survey targeting academic and administrative staff at 18 accredited private universities in Jordan. These participants were selected for their involvement in knowledge-related activities within their institutions. The survey was conducted via email between July and September 2024, yielding 273 valid responses out of 384 invitations, ensuring a relevant and representative sample for the analysis. The study analyzed the data using structural equation modeling, focusing on partial least squares. The results show that knowledge management systems have a significant direct effect on university performance (beta = 0.317, $p < 0.001$) and a strong effect on intellectual capital (beta = 0.714, $p < 0.001$). Intellectual capital also significantly affects university performance (beta = 0.310, $p < 0.001$) and mediates the relationship between knowledge management systems and performance (beta = 0.221, $p < 0.001$). Additionally, human capital positively moderates this relationship (beta = 0.104, $t = 2.201$, $p = 0.006$). These findings highlight the need for universities to invest in both intellectual and human capital to fully realize the benefits of knowledge management systems and enhance institutional performance. The study provides valuable evidence that strengthening knowledge management systems, along with intellectual and human capital, is key to driving meaningful performance improvements in universities.

Keywords collective knowledge, academic productivity, knowledge resources, workforce competency, higher education institutions

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INTRODUCTION

Universities have already been able to use Knowledge Management Systems (KMSs) to gain a competitive advantage based on managing and leveraging intellectual assets. KMSs are tools and technologies used to capture, organize, store, and share knowledge within an organization to improve decision-making and organizational performance. These systems function to leverage the knowledge that is accessible to individuals and transform it into organizational assets that can be utilized and evolved repeatedly (Yumhi et al., 2024). Indeed, an integrated KMS will serve any competing academic institution effectively in storing, organizing, and sharing knowledge in the knowledge economy. Several studies suggested that KMS can improve the performance of an organization by building its intellectual capital (IC), which is composed of human, structural, and relational capital.

Research identified that intellectual capital was a strategic resource for KM in institutions. It fosters the spirit of innovation by enhancing academic and administrative efficiencies, respectively. Iqbal et al. (2019) assert that the KMS can positively affect IC by supporting the steps involved in creating, sharing, and using knowledge in higher education institutions and improving performance.

Furthermore, human capital (HC) is the moderating factor, defined as the skills, knowledge, and competencies of university staff. Good management and developmental practices could enhance the benefits accruable from KMS. Strong human resource (HR) practices that support KM will have significant enhancements in IC and hence organizational performance (Al-Tit et al., 2022). The university context underscores the importance of aligning HR with KM practices to foster continuous learning and innovation within the organization. Through the lenses of entrepreneurial orientation and innovation, this study further elaborates on the interplay among KMS, IC, and HC. Institutions that effectively leverage KMS tend to develop a greater entrepreneurial capability to innovate and adapt in the highly competitive and changing educational environment. University staff's development of ICs often mediates this relationship. This shows how important IC is for getting the most out of KMS (Yu et al., 2022). However, previous research has explored these concepts in business or industrial contexts. There is still limited research that deeply examines how knowledge management systems interact with intellectual and human capital in higher education institutions, particularly in developing countries. This highlights the need to better understand how and under what conditions knowledge management systems contribute to improved university performance, especially considering the roles that intellectual and human capital play in shaping this relationship.

1. LITERATURE REVIEW

Researchers have scrutinized KMS several times and in various contexts to understand their influence on organizational performance. Numerous researchers have underlined the positive influence of KM practices on organizational performance. For example, Hussen (2020) has demonstrated that all KMS practices positively influence performance. In the same line of thinking, Wati et al. (2022) stated that KM has a significant positive effect on performance through innovation. These findings underline that KM contributes greatly to enhancing the effectiveness and performance of organizations. Moreover, it has been evident that incorporating KM into other aspects of an organization propels the organization's performance (Pramandita et al., 2021; Rezaei et al., 2021). Some studies have insinuated that KM can enhance organizational performance only when combined with authentic leadership, strategic management skills, and HC (Alzghoul et al., 2018, 2023). Many studies have found that organizational learning, talent management, and organizational culture all play a role in the link between KM and organizational performance (Anwar, 2020; Setyawan, 2021; Bahrun et al., 2021). That is why it seems that you need to look at many different aspects of your organization, not just KM, to improve overall performance.

Scholars have researched the expected impacts of KM across various sectors and industries. According to Nasution and Sulaiman (2021), KM, in conjunction with employee performance and work behavior, significantly enhances organizational performance. Ali et al. (2023) insisted that the implication of KM in performance was positive. All of these studies on sectoral effects show how KM can be used as a driver in a number of different settings, such as different environments and workplaces. Additionally, other studies have focused on the role of KM in fostering innovation and enhancing organizational resilience. KM, by nurturing new ideas for further development and improving the organization's performance, has proven to lead to a more innovative organization (Verawati et al., 2023). Suryaningtyas et al. (2019) also demonstrate how organizational culture and resilience mediate the KM-organizational performance relations. These findings suggest that apart from the performance improvement, innovation and adaptability might be other benefits of KM.

The COVID-19 pandemic has brought the KM function to light. The literature available explains that the successful application of KM is likely to increase business performance, give organizations a competitive advantage, promote innovation, reduce costs, and enhance their decision-

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making abilities in general (Irkey & Tüfeki, 2021). This would place KM at the hub of resilience and flexibility in times of crisis within organizations. A synthesis of the various studies indicates that KMSs are significant contributors to the positive performance of an organization. Where an organization can apply KM practices effectively, it enhances the efficiency of organizations by innovating and strengthening their resilience, thus resulting in better performance in various sectors and industries (Alshaar et al., 2023). Studies have reflected the positive impact of KM on IC, which affects the various measures of organizational performance. Salehi et al. (2021) assert that KM, through its emphasis on IC, contributes to reducing organizational failures. This implies that effective KM practices may be able to create and exploit IC in the interest of achieving better organizational outcomes. Wendra and Alhadar (2020) also observed that KM processes continue to significantly contribute to IC innovation performance. The effective KM of the organization leads to a significant development in the IC, which later on influences innovation and other forms of performance outcomes. Chaudhary et al. (2023) assert a link between IC and an entrepreneurial attitude. They stress the importance of KM in developing IC and using it for productive purposes. This statement underlines the role of KM in developing relevant and inclined IC toward the organization's strategic goals.

Recent studies have emphasized the close relationship between knowledge management and intellectual capital, highlighting their combined impact on organizational performance and innovation. Yu et al. (2022) also identify how IC and KM processes may have positive effects on the entrepreneurial orientation and innovative performance of any organization. Hence, the more an organization invests in KM activities and develops all the potential of its IC, the more it will gain innovative advantages. For instance, Hesniati et al.'s (2019) findings demonstrate that IC and KM significantly enhance firm performance. The results further showed that organizations with a stronger orientation toward KM and/or IC development had superior overall performance outcomes. Trisliatanto et al. (2021) say that employees will do a better job and be more skilled if they know how to manage IC through outreach, externalization, internalization, or any mix of these methods. Having an integrated KMS means that IC is used more efficiently, which in turn makes the organization more effective. Al-Tal and Emeagwali (2019) found that KM capacity influences the IC of staff positively. This invites the inference that KM may be the most significant facilitator of IC development for companies in any of these categories.

Following this, a growing body of literature highlights how the effective management of intellectual capital and knowledge can result in innovation, increased competitiveness, and long-term organizational success. The results of Rehman et al. (2021) show that IC and KM significantly affect how innovative an organization will be and, by extension, how competitive it will be. The evidence indicates that organizations with their IC and knowledge assets well managed and regulated are most likely to be innovative in the market, hence increasing their competitiveness. Tamunomiebi and Kalio (2019) highlight the critical role that KM structures play in organizations, particularly in improving the development of IC and, by extension, guaranteeing organizational success. The synthesis above indicates that there is a positive relationship between KMSs and IC in the literature. The organization's well-managed knowledge assets will enhance its IC to innovate, improve performance, and gain competitive advantages in the market outlook. All these elements clearly highlight the critical role of KM in leveraging IC for an organization's success.

In the last few years, IC has been a driver in improving organizational performance, and various studies have established its positive influence in various industries and business environments. Scholars have largely recognized IC as one of the main drivers of organizational performance in recent years (Pambreni et al., 2023). Various previous studies have positively related IC to organizational performance across a wide range of industries and business environments. Organizations have argued that IC positively influences organizational performance by facilitating innovation, strategic planning, and competitiveness (Castillo-Palacio et al., 2022). Furthermore, Istikhoroh (2024) believes that IC is a key driver of organizational innovation, leading to improved performance. Indeed, IC played a vital role in improving organizational

performance. Organizations can develop an innovative culture that drives marketing performance through their IC, potentially improving overall performance (Abu Bakir et al., 2024; Arsawan, 2019; Hanandeh et al., 2021). Moreover, in developing countries such as Indonesia, IC appears to be a significant asset for SMEs to successfully run the business and achieve better performance (Alrafadi, 2020). A proficient IC management system may not only help SMEs in improving performance but also aid their competitive position in the market (Ahmad et al., 2022).

Literature suggests that IC is considered a strategic asset in higher educational institutions, significantly affecting organizational performance (Sumual et al., 2021). IC may be the strategic resource that universities or other educational institutions can leverage to raise the bar for quality teaching and research outputs and, correspondingly, boost the performance of the institution (Prasetya et al., 2023). Moreover, IC contributes to the performance of some other departments in the educational organization, such as lecturer performance and administrative functions. According to Ganawati et al. (2021), academic institutions use their IC to find and use things that have value on their own. This helps them improve their operations greatly and do a better job. The impact of IC on organizational performance does not stop in private organizations but transcends into the public sector as well (Laras et al., 2021). The right way to handle IC can help any government agency or public institution provide better services, run more efficiently, and ultimately do better in terms of performance (Rufus et al., 2022). In this context, IC plays a crucial role in financial management and auditing within public sector entities, promoting transparency, accountability, and performance excellence (Khalique et al., 2020). Therefore, practices for managing IC could be very helpful for public sector organizations that want to make the best use of their resources to improve performance in a way that lasts (Santowijaya et al., 2023).

More critically, IC involves the resilience and adaptability of organizations to adversities, such as those realized within the COVID-19 pandemic. A firm that can develop and utilize its own IC is clearly in a better position to manage uncertainties and stabilize performance by fostering innovation in an increasingly dynamic environment. It develops the organizational competencies and instills a learning and continuous improvement culture in the firm, thereby culminating in better performance outcomes. Findings from a number of studies have therefore built up a corpus of evidence on how IC crucially affects organizational performance in different industries and contexts. By recognizing IC, businesses will be able to use intangible resources to come up with new ideas that make them more competitive and help them grow in the long term. In this view, managing and developing IC is essential for an organization in every aspect of the enhancement of performance, achievement of strategic goals, and sustaining competitive markets for its products or services.

Several empirical studies have confirmed that intellectual capital serves as a key mechanism through which knowledge management systems contribute to organizational performance. For example, Guptah (2021) shows that IC can be a variable that helps explain how knowledge-based HRM practices improve the performance of an organization. This underlines the role IC plays in translating HRM initiatives into organizational success. In addition, Wendra and Alhadar (2020) and Chotivanich and Phorncharoen (2023) back up and confirm that IC plays a role in connecting KM processes to organizational performance. Collectively, these different studies show that using the right KM strategy makes IC possible, which helps organizations reach their highest and most long-lasting performance levels. HC, as a core component of IC, plays a significant role in shaping the relationship between KM and organizational performance. IC, which comprises human, structural, and relational elements, acts as a mediator by translating knowledge-related activities into tangible performance outcomes. Irawan et al. (2019) found that intellectual, human, structural, and relational capital all played a role in how knowledge-sharing activities affected the performance of organizations. In contrast, Al-Tal and Emeagwali (2019) proposed that KM and IC were crucial factors that provided an organization with a competitive advantage and contributed to its success. All these studies highlight how knowledge factors, IC, and firm performance interlink in a complex manner.

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Based on previous research, several scholars have further emphasized the strategic role of intellectual capital in linking knowledge management efforts to improved organizational outcomes. Salehi et al. (2021) illustrate how IC enables enhancing firm innovation and performance. Hence, the study places IC as the most important asset in attaining innovation and competitive advantage, basing the argument on its findings. Moreover, Li and Lin (2023) explore how IC mediates flexibility-orienting HRM systems in relation to organizational resilience. Even more specifically, this previous literature underlines the mediating role of IC in building enhanced organizational capabilities. Collectively, these studies clearly demonstrate the mediating role of IC between KMSs and organizational performance. These studies all point out the strategic importance of IC in driving organizational success by elucidating how it mediates such initiatives encompassing human, structural, and relational components with organizational outcomes.

A number of studies have been done on this estimated relationship, which tends to shed some light on why HC stands to be one of the major mediation variables for better organizational outcomes. According to Rezaei et al. (2021), for example, good HC, like employees' skills and knowledge, acts as a go-between for KM and organizational performance and makes it stronger. Similarly, Darmawan et al. (2023) establish that while HC mediates through innovation, it also has a direct influence on how KM affects organizational performance. Lewaherilla et al. (2023) and Alqershi et al. (2020) looked at how HC affects the links between different aspects of customer relationship management and small businesses' performance. They discovered that it does, but in some ways, it does so differently. Moreover, Muafi and Kusumawati (2020) emphasize the importance of aligning HC for improved organizational outcomes.

In a similar vein, a growing number of studies have explored the critical role of human capital in shaping organizational outcomes, particularly in the context of knowledge management and performance. Hamzah et al. (2022) found a strong link between enterprise risk management and organizational performance, which was tempered by HC. This showed that HC was a key factor in determining how well an organization did. Desta et al. (2022) also indicated that HC management practices play a mediating and moderating role in improving the job performance of employees and organizational effectiveness. This kind of research has shown that HC can both help and hinder the achievement of desired results in a number of areas of an organization's performance. More so, Graha et al. (2019) and Irawan et al. (2019) have supported the idea that HC mediates the relationship between KM and organizational performance. This puts much emphasis on the interlinked nature of HRM, KM capabilities, and organizational performance. Cahyani and Agusria (2023) also talk about how competitive advantage acts as a link between HC and organizational performance. This shows how the different factors that determine an organization's success work together in a complex way.

These studies put together the idea that HC is one of the most important things that affects how well a business does with KMSs. HC, on the other hand, strongly moderates the effect of KM practices on organizational outcomes through a variety of competencies and abilities that are linked to organizational performance. Understanding the sophisticated dynamics of HC is relevant to KM for any organization that wishes to optimize its performance and realize sustainable success. This study aims to explore how knowledge management systems influence university performance, with a particular focus on how intellectual capital helps explain this relationship and how human capital strengthens or alters its effects. Given the aforementioned objectives, the study formulates the following hypotheses:

H1: KMSs positively influence Organizational Performance.

H2: KMSs positively influence Intellectual Capital.

H3: Intellectual Capital positively influences Organizational Performance.

H4: Intellectual Capital mediates the relationship between KMSs and Organizational Performance.

H5: Human Capital moderates the relationship between KMSs and Organizational Performance.

2. RESEARCH METHOD

This study followed a quantitative research approach to investigate how knowledge management systems influence the performance of private universities in Jordan, with particular focus on the mediating role of intellectual capital and the moderating role of human capital. The study was conducted between July and September 2024, a period selected to ensure the availability of university employees during the academic off-season, thereby improving response rates and reducing survey fatigue. The study focused on all 18 private universities accredited by the Jordanian Ministry of Higher Education and Scientific Research (MHESR), which collectively represent a diverse and representative sample of higher education institutions in the country. Due to the lack of publicly available data on the total number of academic and administrative staff in these institutions, the sample size was determined using recommended sampling standards for unknown populations. A structured questionnaire was sent via email to 384 employees selected from academic and administrative departments based on their involvement in knowledge-related activities. 276 responses were received, and 273 were deemed valid and complete for analysis. The survey was anonymous and voluntary, with informed consent obtained from all participants. A detailed breakdown of respondent characteristics is provided in Table 1, including variables that may influence survey outcomes, such as role, years of experience, department, and academic qualifications.

Table 1. Respondent characteristics

Variable	Category	Frequency (n = 273)	Percentage (%)
Gender	Male	151	55.3%
	Female	122	44.7%
Job Role	Academic Staff	165	60.4%
	Administrative Staff	108	39.6%
Experience	Less than 5 years	72	26.4%
	5-10 years	108	39.6%
	More than 10 years	93	34.1%
Educational Qualification	Bachelor's	68	24.9%
	Master's	109	39.9%
	Doctorate	96	35.2%

The questionnaire was designed to measure four key constructs: knowledge management systems, organizational performance, intellectual capital, and human capital. To ensure validity and comparability, previously tested and published measurement scales were adapted from established studies. These scales were selected based on their high reliability scores in prior research and their strong theoretical alignment with the variables under investigation:

Table 2. Sources of measurement scales

Construct	N of Items	Source
Knowledge Management Systems	14 items	Lee and Wong (2015)
Organizational Performance	12 items	Santos and Brito (2012)
Intellectual Capital	8 items	de Frutos-Belizón et al. (2019)
Human Capital	10 items	Dahiya and Raghuvanshi (2022)

The full questionnaire is provided in Appendix A of this article. Items were slightly reworded to fit the higher education context in Jordan. All responses were recorded on a five-point Likert scale. The use of existing, validated instruments was essential to ensure the study's methodological rigor and to facilitate future replication. A pilot test was conducted with 20 respondents from two private universities to ensure the clarity and appropriateness of the questions before full distribution. Based on feedback, minor adjustments were made for language simplicity and contextual relevance. The final dataset was analyzed using Structural Equation Modeling – Partial Least Squares (SEM-PLS) with the SmartPLS software.

3. RESULTS

This study examines the complete measurement model that is subject to preliminary testing. The study examined the critical assessments of discriminant validity, convergent validity, and reliability to verify the outcomes of confirmatory factor analysis (CFA). In this analysis, Cronbach's alpha test functions as a convention-

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al means for evaluating the scale reliability. The test results indicated values that surpassed the acceptable level (> 0.70), implying that the study instrument demonstrates reliability and stability (Nunnally, 1978). The evaluation of the measurement model reveals that the Confirmatory Factor Analysis (CFA), grounded on the outer model, possesses adequate indicator loadings. Moreover, convergent validity, composite reliability, and discriminant validity affirm the measuring model's validity.

The factor loadings of the indicator items adhered to the recommended cut-off threshold of 0.60, as established by Hair et al. (2011), resulting in the deletion of only one indicator item due to its loading being below 0.6 (see Table 3). Hair et al. (2011) indicate that the AVE for the variable exceeds 0.5. The AVE for all variables spans from 0.609 to 0.712, signifying that they all surpass the acceptable threshold of 0.60. Assessing reliability is essential, and this may be accurately evaluated using Cronbach's Alpha (α) and composite reliability (CR). Hair et al. (2019) indicate that Cronbach's Alpha scores CR are deemed satisfactory when they are 0.70 or higher. The findings demonstrated robust internal consistency, with values between 0.893 and 0.959. The CR values exhibited satisfactory ranges between 0.916 and 0.961, all beyond the acceptable threshold of 0.70.

To ascertain discriminant validity, the study assesses the associations among the model indicators; the latent variable must surpass the inter-item correlation values, and the diagonal AVEs should also be superior (Fornell & Larcker, 1981). The AVE of the constructs determines discriminant validity, which assesses the distinctiveness of two constructs from one another. All factor loadings of the constructs exceeded 0.6. Furthermore, each indicator exhibited a superior score on its corresponding construct relative to others, suggesting the validity and discriminant characteristics of the measuring model (see Table 4). The constructs' composite reliability (CR) spans from 0.916 to 0.961, affirming the concern of unidimensionality (Farrell & Rudd, 2009). Additionally, the HTMT method utilized a technique for assessing discriminant validity, stipulating that the correlation ratio must be below one (Henseler et al., 2015), as illustrated in Table 5.

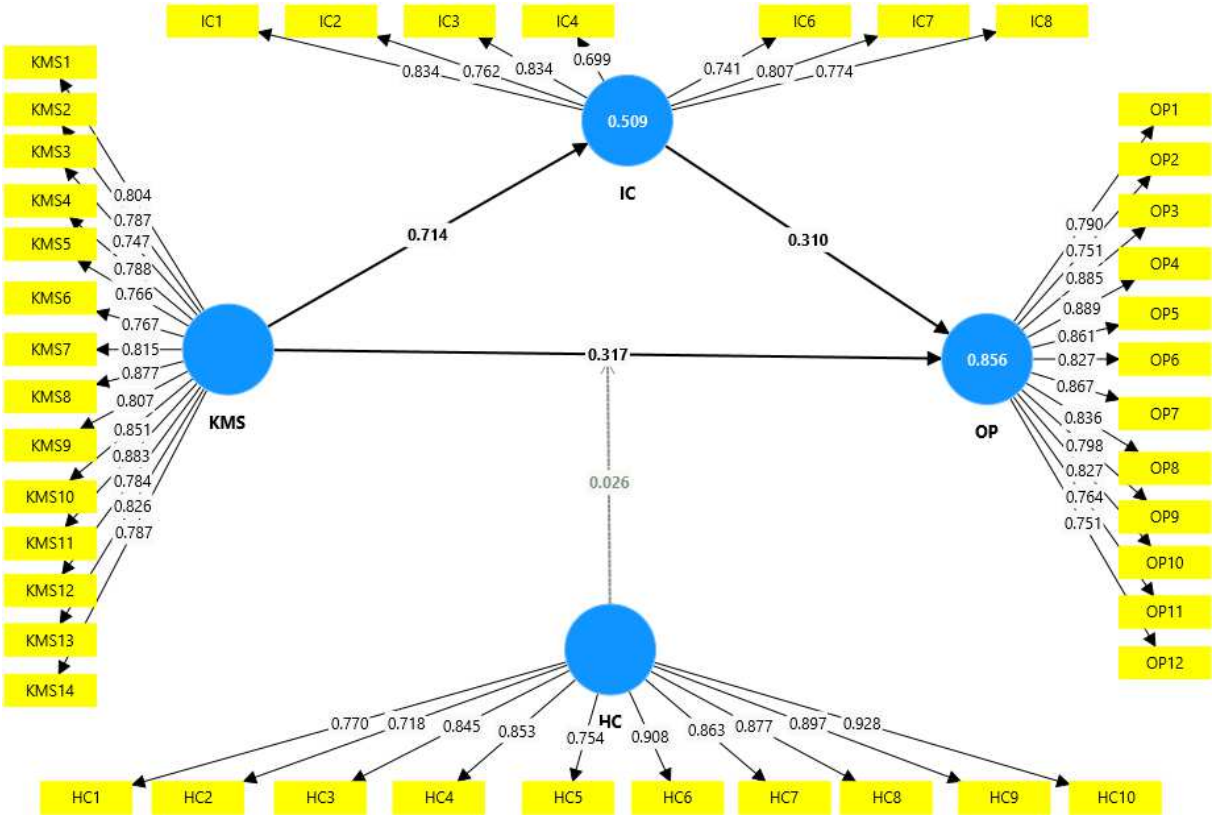

Figure 1. Measurement model

Table 3. Measurement model assessment

Constructs and items	Loadings	Cronbach's alpha	CR	AVE
KMS	–	0.959	0.963	0.652
KMS1	0.804			
KMS2	0.787			
KMS3	0.747			
KMS4	0.788			
KMS5	0.766			
KMS6	0.767			
KMS7	0.815			
KMS8	0.877			
KMS9	0.807			
KMS10	0.851			
KMS11	0.883			
KMS12	0.784			
KMS13	0.826			
KMS14	0.787			
OP	–	0.956	0.961	0.676
OP1	0.790			
OP2	0.751			
OP3	0.885			
OP4	0.889			
OP5	0.861			
OP6	0.827			
OP7	0.867			
OP8	0.836			
OP9	0.798			
OP10	0.827			
OP11	0.764			
OP12	0.751			
IC	–	0.893	0.916	0.609
IC1	0.834			
IC2	0.762			
IC3	0.834			
IC4	0.699			
IC5	Deleted < 0.6			
IC6	0.741			
IC7	0.807			
IC8	0.774			
HC	–	0.954	0.961	0.712
HC1	0.770			
HC2	0.718			
HC3	0.845			
HC4	0.853			
HC5	0.754			
HC6	0.908			
HC7	0.863			
HC8	0.877			
HC9	0.897			
HC10	0.928			

Note: KMS = knowledge management systems; OP = organizational performance; IC = intellectual capital; HC = human capital.

Table 4. Discriminant validity results

Variable	HC	IC	KMS	OP
HC	0.844	–	–	–
IC	0.824	0.780	–	–
KMS	0.827	0.714	0.807	–
OP	0.888	0.842	0.839	0.822

Table 5. HTMT criteria

Variable	HC	IC	KMS	OP
HC	–	–	–	–
IC	0.879	–	–	–
KMS	0.859	0.750	–	–
OP	0.829	0.891	0.873	–

3.1. Hypothesis testing

The bootstrap method was utilized for hypothesis testing, employing 5,000 subsamples. Figure 2 illustrates the structural model. Based on the t-statistics, five hypotheses were validated from the comprehensive model. The analysis of path coefficients (β) was performed to evaluate the impact of exogenous constructions on both the mediating and endogenous constructs (Figure 2). The evidence presented in Table 6 substantiates that all three direct effect hypotheses have been empirically supported. The findings from *H1* demonstrate a significant positive connection between KMS and organizational performance, with $\beta = 0.317$, $t = 6.780$, and $p = 0.000$. The findings from *H2* reveal a robust connection between KMS and IC, with $\beta = 0.714$, $t = 21.384$, and $p = 0.000$. The findings from *H3* indicate a robust positive association between IC and organizational performance ($\beta = 0.310$, $t = 6.841$, $p = 0.000$).

The results of *H4* indicated a significant indirect association between KMS and organizational performance, mediated by IC ($\beta = 0.221$, $t = 6.798$, and $p = 0.000$). The results substantiate the mediation theory, indicating that IC functions as a partial mediator in the association between KMS and organizational performance. KMS directly influences organizational performance and indirectly affects it by enhancing staff intellectual capital. The findings from *H5* indicate a significant interaction effect between KMS and HC in predicting organizational performance, with $\beta = 0.104$, $t = 2.201$, and $p = 0.006$. Thus, the findings validate the hypothesis that the interaction between KMS and HC is contingent upon HC, indicating that the effect of KMS on HC varies according to the level of HC.

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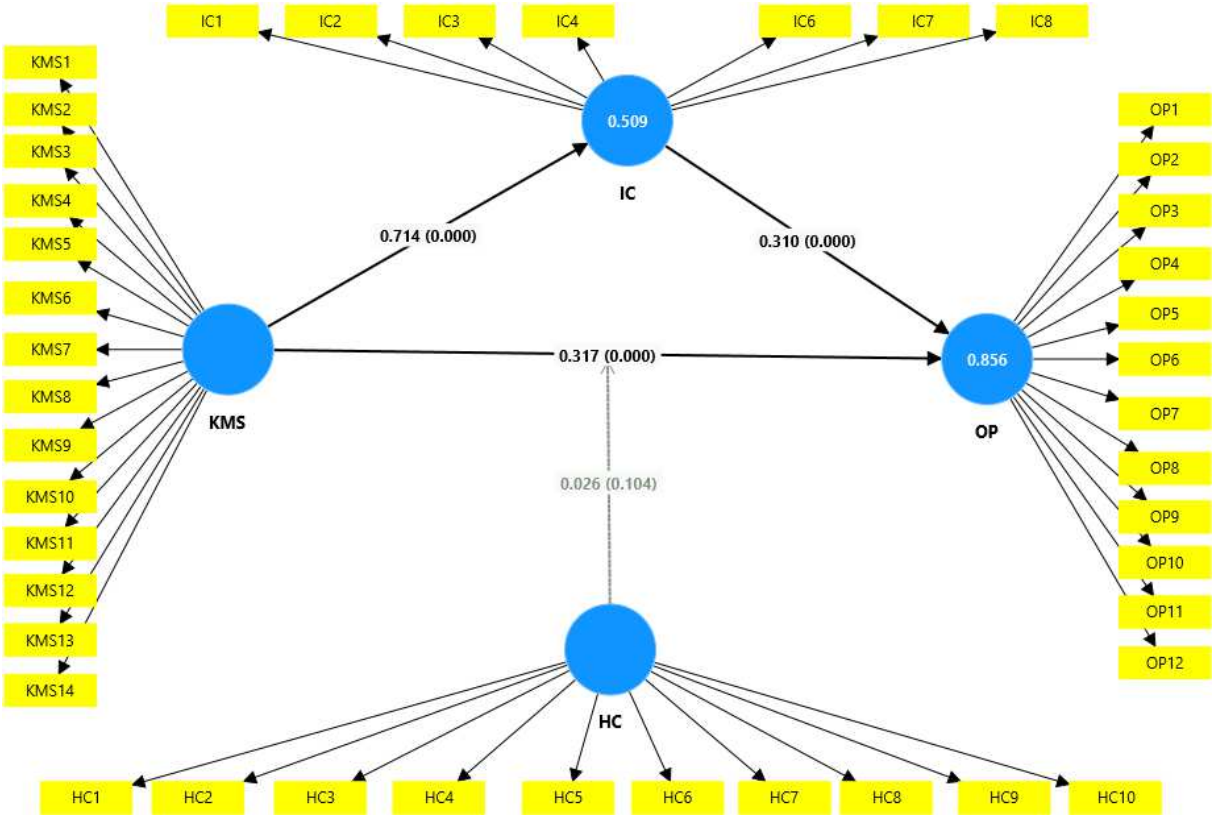

Figure 2. Structural model

Table 6. Structural model assessment

Hypothesis	Paths	Beta	t-value	P-value	Results
H1	KMS → OP	0.317	6.780	0.000	Supported
H2	KMS → IC	0.714	21.384	0.000	Supported
H3	IC → OP	0.310	6.841	0.000	Supported
H4	KMS → IC → OP (Mediation)	0.221	6.798	0.000	Supported
H5	KMS x HC → OP (Moderation)	0.104	2.201	0.006	Supported

4. DISCUSSION

The primary objective of this study was to investigate the impact of KMSs on the performance of universities. In particular, it investigates the mediating role of IC and the moderating role of HC in the above relationship. This study aims to comprehend the interplay of these factors on the overall performance of academic institutions. The first hypothesis was that KMSs have a positive influence on organizational performance. The positive relationship between KMSs and organizational performance supports this. Iqbal et al. (2019) conducted a research study that further corroborates and suggests that the successful deployment of KMSs, characterized by higher levels of knowledge creation, sharing, and utilization, is likely to enhance an organization's efficiency and effectiveness. On the other hand, Al-Tit et al. (2022) gave importance to KMSs for organizational performance improvements by managing the knowledge strategically. Therefore, every academic organization must implement a comprehensive approach to KM if it is to prosper.

During hypothesis testing, the second hypothesis revealed a positive influence of KMSs on IC. The hypothesis has been strongly supported through the test outputs, as it reveals a very strong positive relationship between the KMS and the IC. It also coincides with the results of the present study, which used the works of Yu et al. (2022) and Chaudhary et al. (2023). Indeed,

effective KMSs assist significantly in developing and enhancing IC at higher education institutions: HC, structural capital, and relational capital. These systems provide a comprehensive and responsive platform that can engender innovative ways of thinking or handling tasks and eventually offer service-quality performances by creating intellectual resources and academic and administrative efficiencies at HEIs. The third hypothesis was that IC has a positive effect on organizational performance. The results confirm this hypothesis, since a significant positive relationship exists between IC and organizational performance. This result is consistent with the studies by Pambreni et al. (2023) and Istikhoroh (2024), which emphasize that IC is a significant enabler in realizing the full benefits of KMSs to enhance innovation and organizational performance. This makes IC the most influential factor for improving performance outcomes in universities through building a culture of continuous learning and leveraging strategic knowledge.

The fourth hypothesis involved the role of IC in mediating the relationship between KMSs and organizational performance. These results validate the partial mediation role of IC, as its development facilitates the transfer of a portion of the direct positive impact of KMSs on organizational performance. This finding agrees with the works of Wendra and Alhadar (2020), who consider that IC has provided an important mediator in enhancing the relationship between the different KMSs and the development of organizational outcomes. This puts universities in a strategic position where they can invest in the growth and fostering of their IC, thereby reaping the full benefits of setting up KMSs. The fifth hypothesis was that HC would act as a moderator of the relationship between the KMS and organizational performance. Indeed, the existence of a statistically significant interaction effect between KMSs and HC in explaining organizational performance supports this hypothesis. This implies that the effectiveness of a KMS in enhancing organizational performance is dependent on the quality and competence of HC in universities. It means that high-quality HC will multiply the success of the KMS by better managing and using knowledge. This finding confirms the research of Rezaei et al. (2021) and Darmawan et al. (2023), which found that competent and skilled employees are meaningful in driving the success of an organization through effective KM.

CONCLUSION

The objective of this research was to examine the influence of knowledge management systems on university performance and, further, the mediating influence of intellectual capital and moderating influence of human capital on this relationship. The research indicated that knowledge management systems contribute significantly to improving organizational performance by making knowledge creation, dissemination, and application processes smoother within a university. More importantly, intellectual capital mediated the relationship between knowledge management systems and performance. This finding confirms that universities are able to maximize the gains derived from knowledge endeavors through actively nurturing and capitalizing on intellectual capabilities. Furthermore, having highly qualified and capable individuals enhances such a relationship, with human capital being demonstrated to positively moderate the influence of knowledge systems on performance. Hence, success with any knowledge management strategy is not only a function of technological infrastructure but also strategic capability development within institutions. In light of these recommendations, there is a need for universities to move towards an integrated strategy, which integrates knowledge management with human resource nurturing and innovation capabilities. High priority must be given to staff professional development, teamwork, and ongoing learning so that staff are able to manage and utilize knowledge adequately for staff development, teaching, and administrative excellence. This paper is open for further research exploring other contextual influences toward making knowledge management systems more effective within academia and outside.

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APPENDIX A.

Table A1. The study questionnaire

	Assessment scale	Disagree Strongly	Disagree Slightly	Indifferent	Agree Slightly	Agree Strongly
	Please read each statement carefully and indicate your response by placing a circle or a tick	1	2	3	4	5
	Knowledge Management Systems					
1	Our university effectively captures knowledge from internal sources	1	2	3	4	5
2	Our university effectively captures knowledge from external sources	1	2	3	4	5
3	There is a system in place for storing knowledge that can be accessed by others	1	2	3	4	5
4	Knowledge is regularly updated and made available across departments	1	2	3	4	5
5	We use technology to facilitate knowledge sharing	1	2	3	4	5
6	Best practices are documented and shared within the university	1	2	3	4	5
7	Employees are encouraged to share knowledge with one another	1	2	3	4	5
8	Lessons learned from past experiences are used to guide future actions	1	2	3	4	5
9	We have established processes for knowledge creation	1	2	3	4	5
10	Knowledge is regularly used to improve teaching and administrative processes	1	2	3	4	5
11	Information and knowledge are easy to retrieve when needed	1	2	3	4	5
12	There is a strong culture of collaboration and knowledge sharing	1	2	3	4	5
13	Knowledge management is supported by senior leadership	1	2	3	4	5
14	Our systems help integrate knowledge from various sources	1	2	3	4	5
	Organizational Performance					
1	Our university has shown improved academic results over the past few years	1	2	3	4	5
2	We have seen an increase in student satisfaction	1	2	3	4	5
3	The university has enhanced its research output	1	2	3	4	5
4	Our institution attracts a growing number of applicants each year	1	2	3	4	5
5	There is strong financial stability and resource management	1	2	3	4	5
6	Operational efficiency has improved noticeably	1	2	3	4	5
7	We maintain high levels of staff satisfaction and retention	1	2	3	4	5
8	The university is known for its innovation in teaching and learning	1	2	3	4	5
9	There is effective use of resources to support academic goals	1	2	3	4	5
10	Our reputation among peer institutions is strong	1	2	3	4	5
11	We meet or exceed accreditation standards regularly	1	2	3	4	5
12	Stakeholder engagement and partnerships have improved	1	2	3	4	5
	Intellectual Capital					
1	Our university values and develops internal knowledge and capabilities	1	2	3	4	5
2	There is a strong emphasis on innovation and knowledge creation	1	2	3	4	5
3	Knowledge is embedded in systems and processes	1	2	3	4	5
4	We build and maintain strong external relationships (e.g., industry, academia)	1	2	3	4	5
5	Our staff regularly updates their knowledge and skills	1	2	3	4	5
6	There is efficient documentation and use of institutional knowledge	1	2	3	4	5
7	We have strong collaborative networks that enhance knowledge sharing	1	2	3	4	5
8	Organizational knowledge contributes to strategic planning	1	2	3	4	5
	Human Capital					
1	Our employees possess the necessary skills to perform their tasks effectively	1	2	3	4	5
2	There is continuous training and development for staff	1	2	3	4	5
3	The university attracts high-quality talent	1	2	3	4	5
4	We invest in leadership development and capacity building	1	2	3	4	5
5	Employee performance is regularly evaluated and improved	1	2	3	4	5
6	There is a high level of employee commitment and engagement	1	2	3	4	5
7	Our university supports career advancement and growth	1	2	3	4	5
8	Staff adaptability to change is strong	1	2	3	4	5
9	We foster a culture of learning and development	1	2	3	4	5
10	Employees share their expertise to support others' growth	1	2	3	4	5