

# Knowledge management infrastructure capabilities, management information system efficiency and organizational performance: Basis for higher education institution's sustainable competitive advantage framework

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## Abstract

The purpose of this paper is to create a framework for Higher Education Institution's sustainable competitive advantage. The determining factors used were knowledge management infrastructure capabilities, management information system and organizational performance. A total of 265 respondents accomplished the research instrument with a Cronbach Alpha Value of 0.83 making it reliable for the study. In interpreting the data, the statistical tools employed were frequency percentage, ranking, weighted mean, Shapiro-Wilk Test, Spearman rho. Based on the findings, selected institution has high knowledge management infrastructure capability. The selected institution and has a high organizational performance with efficient Management Information System. Findings revealed that statistically significant relationship exists between knowledge management infrastructure capabilities and organization performance. There was also statistically significant relationship that exists between MIS efficiency and organization performance since all the obtained p-values were less than 0.01 which implies that efficient MIS led to better organizational performance. Thus, the development of an Institution's Sustainable Competitive Advantage Framework was recommended by the proponent for utilization of Higher Education Institutions.

**Keywords:** knowledge management, knowledge management infrastructure, capabilities, management information system, organizational, performance

## **Knowledge management infrastructure capabilities, management information system efficiency and organizational performance: Basis for higher education institution's sustainable competitive advantage framework**

### **1. Introduction**

In today's competitive world, knowledge has become the best indicator of survival for many institutions, recognizing employees as the knowledge owners and the most valuable asset of any organization. It is imperative in this situation to effectively handle knowledge by enhancing its capabilities. The capabilities of the Knowledge Management Infrastructure (KMI) are examined in relation to common knowledge, organization, technology, and culture. In the emerging knowledge economy, knowledge is a crucial strategic and competitive resource. It is impossible to overstate the value of knowledge, and educational institutions are no different from other corporate organizations regarding the importance understanding knowledge management for enhancing performance. Organizations can foster knowledge management if they possess these resources and conditions. KMI also includes elements that assist knowledge management (KM) efforts within organizations and give them a competitive edge.

Another factor that could affect the organizational environment is the efficiency of its Management Information System (MIS). Institutions require MIS to compete in the market and to earn more profit, invest in product innovation and grow their businesses. These elements became the cornerstone of the new business environment and changed information systems from being data processing systems to decision support systems (Khan, et al., 2020). There is a great deal of opportunity for enhancing organizational performance given the remarkable expansion of MIS. However, since MIS is a large investment for companies, management is under more pressure to demonstrate a return on investment by measuring the impact of MIS applications on performance. The problem of information security and technological expertise also poses a significant obstacle to the efficient use of MIS. In light of the previously given background, it is crucial to remember that neglecting the challenges of the implementation process may result in issues for the organization's whole MIS development and deployment process. Furthermore, it appears that a significant barrier to the MIS installation process is the absence of successful implementation. To ensure a successful implementation, the success elements must be identified and managed (Malobi, et al., 2019). An organization is also impacted by the adoption of MIS, and the effects are connected to the outcomes of business operations. As a result, while introducing a new MIS, a company must take this into careful consideration.

One more factor that could affect the business environment is organizational performance. The ability of an organization to manage and access a variety of organizational resources in order to accomplish its goals and objectives is known as organizational performance. Organizations are looking to new solutions, market expansion, and flexible growth prospects to promote organizational performance in the rapidly changing global markets characterized by intense rivalry and a dynamically changing environment (Bujang, et al., 2021). According to Masa'deh et al. (2019), the performance measurement system is essential for organizations because it assesses the attainment of organizational goals, helps build strategic plans, and gives information on the quality of operations inside the organization. The four perspectives - financial, customer, internal business, and innovation and learning - form the foundation of the elements.

Despite the increasing adoption of digital technologies and knowledge management strategies in HEIs, many institutions continue to face challenges in leveraging MIS for effective knowledge storage, sharing, and utilization (Hislop et al., 2021). The extent to which KMI capabilities and MIS efficiency influence organizational performance remains an area requiring further empirical investigation, particularly in HEIs where knowledge is a strategic asset (Chatterjee et al., 2020). Understanding this relationship is essential in designing a

sustainable competitive advantage framework that enables HEIs to remain adaptive, innovative, and resilient in a rapidly evolving educational landscape (Serenko & Bontis, 2022).

This study aims to examine the interplay between KMI capabilities, MIS efficiency, and organizational performance, identifying critical gaps and strategic opportunities for HEIs. The findings will serve as the foundation for developing a sustainable competitive advantage framework that can guide HEIs in optimizing their knowledge resources, digital infrastructure, and institutional strategies for long-term success.

The intention of the researcher as one of the faculty members of one university is to find out if the university, together with other universities in CALABARZON, are capable of stimulating the creation and sharing of knowledge within their organization since knowledge is the most valuable and strategic resource of an organization. At the same time, the researcher wants to find out if the university's management information system is efficient enough to have a quality information system and service that satisfy and make happy employees who will contribute to its organizational performance. Results of this study could be an added to the body of knowledge contributory to the formulation of competitive advantage framework focused on the three key variables.

This study aimed to determine the knowledge management infrastructure capabilities, management information system efficiency and organizational performance in selected universities in Batangas Province which formed basis for the development of Higher Education Institution's sustainable competitive advantage framework. Specifically, this study aimed to determine the knowledge infrastructure capability of selected private higher educational institutions in terms of technology, structure, culture, and common knowledge; assess the MIS efficiency in terms of information quality, system quality, service quality, usefulness and employee satisfaction; described the organizational performance in view of customer related, internal business, employee learning and growth and perceptual financial; tested the significant relationship of knowledge management capability and MIS efficiency to organizational performance and finally, developed a Higher Education Institutions' Sustainable Competitive Advantage Framework.

## 2. Methods

**Research Design** - This study determined and conceptualized how knowledge management and management information system efficiency impacts the organizational performance. In order to do this, researcher employed a descriptive and quantitative research designs to address the objectives and to be able to formulate a model involving the variables of knowledge management, management information system and organizational performance. The study utilized a quantitative approach through statistical analysis to develop a model among the said variables. Quantitative procedures was used to test the relationship among knowledge management capabilities, management information system and organizational performance. Descriptive research design was employed in this study for an adequate and precise interpretation of the findings.

**Participants of the Study** - Participants of the study were college faculty members from Lyceum of the Philippines University-Batangas, Lyceum of the Philippines University-Manila and Lyceum of the Philippines University-Cavite .Participants must be working for more than six months in the institution. The total population of selected private university is 848, with a margin error of 5% and 95% level of confidence. Raosoft recommended size was 265 respondents.

**Instruments** - The researcher used an adapted questionnaire for data gathering instrument as it has a higher validity. It has three parts which includes the following:

Part 1. Questions measuring knowledge management infrastructure capability was adopted from the study of Fampo (2020) entitled "Knowledge Management Capabilities, Organizational Innovation and Performance of Selected Private Educational Institutions in Batangas." Four components were assessed under the organization's knowledge management infrastructure capability namely technology, structure, culture, and common knowledge.

Five questions were provided to measure technology component of the organization. There were also five questions to measure organizational structure including rules, policies, procedures, hierarchy and boundaries designed to support effective knowledge management flow and activities. Organizational culture was measured using five questions which particularly indicate knowledge sharing culture and five questions for common knowledge.

Part 2 Management information system efficiency was determined using the questionnaire adapted from the CSM survey used by LPU-B. It has four components such as information quality, system quality, service quality, usefulness and employee satisfaction all of each dimension including five questions each.

Part 3 Organizational Performance were measured using the questions from the study of Fampo (2020). A four-item scale to measure organizational performance were utilized with four constructs. These constructs involved questions assessing organizational performance in terms of financial, customer related aspect of organizational performance looks into how the organization invest its resources to build a strong relationship with its customers. There were seven questions to be used in measuring the internal business perspective of the organizational performance. Learning and growth perspective involves activities that deal with how a firm learns, improves, and innovates to meet its objectives. A total of seven questions were provided to measure this aspect of organizational performance while there were four questions for perceptual financial perspective.

The researcher ran a pilot test in order to determine the validity and reliability of the adopted questionnaires which have a Cronbach Alpha result of: Under knowledge management infrastructure capabilities; Information Technology (0.846), Organizational Structure (0.925), Organizational Culture (0.836) and Common knowledge (0.759): While under MIS Efficiency; Information Quality (0.903), System Quality (0.928), Service Quality (0.968), Usefulness (0.976) and User Satisfaction (0.941): Moreover, under Organizational Performance; Customer perspective (0.961), Internal Business Process Perspective (0.935), Learning and Growth (0.862) and Financial Perspective (0.831).

**Table 1**  
*Summary of Test Reliability*

Indicators	Cronbach Alpha	Remarks
Common knowledge	0.759	Acceptable
Customer perspective	0.961	Excellent
Information Quality	0.903	Excellent
Information Technology	0.846	Good
Organizational Culture	0.836	Good
Organizational Structure	0.925	Excellent
Service Quality	0.968	Excellent
System Quality	0.928	Good
Usefulness	0.976	Excellent
User Satisfaction	0.941	Excellent
Internal Business Process Perspective	0.935	Excellent
Learning and Growth	0.862	Good
Financial Perspective	0.831	Good

**Data Gathering Procedure** - The researcher sought assistance from her adviser for the validation of the questionnaire. Validation was done to check whether the questionnaire accurately reflects the constructs or variables being measured. It ensured that all relevant topics were covered and that irrelevant items were removed. Respondents were requested to engage fully and provided accurate answers if the questions are clear and meaningful. After the validation, the researcher proceeded gathering data from thirty respondents and run the pilot test on October 2022. After the validity and reliability were determined, a letter of approval was sent to the research directors of the selected higher educational institution to seek their permissions regarding the study. After approval, the researcher proceeded with the data gathering by administering the survey to the and faculty members face to face through questionnaire print outs and by sending them the link for the google form in their emails and messenger account. A cover letter was included in the instrument which explained the purpose of the

study and informed them to accomplish the instrument in their most convenient time and to be retrieved within a week. A 4-point Likert scale was used to determine the responses of the employees on the constructs of knowledge management infrastructure capability, management information system efficiency and organizational performance. After 2 months, 265 responses were completed. Data were tallied, interpreted and analyzed.

**Ethical Considerations** - An informed consent form was provided to the respondents to fully explain to them the purpose of the study. Participation in the study was made voluntary; thus, respondents were allowed to decide whether or not they will answer the survey questionnaire. The researcher assured respondents of the confidentiality of the information shared by the respondents. Responses were also presented in aggregate and no individual answers were shown. All information gathered was strictly used only for the purpose mentioned.

**Data Analysis** - Weighted mean and rank were used to determine the knowledge management infrastructure capability in terms of information technology, organizational structure, organizational culture and common knowledge, determine the MIS efficiency in terms of information quality, system quality, service quality, usefulness and employee satisfaction; describe the organizational performance in view of; customer's perspective, internal business perspective, learning and growth and financial perspective. The result of Shapiro-Wilk Test showed that p-values of all variables were less than 0.05 which means that the data set was not normally distributed. Therefore, Spearman rho was used to test the significant relationship as part of the non-parametric tests. All analyzes were performed using SPSS version 28. Responses on the variables were presented in terms of weighted mean results.

### 3. Results and Discussions

**Table 2**

*Summary Table on Knowledge Management Infrastructure Capabilities*

Key Result Areas	Composite Mean	VI	Rank
Information Technology	3.43	Agree	2
Organizational Structure	3.24	Agree	4
Organizational Culture	3.48	Agree	1
Common knowledge	3.29	Agree	3
Grand Composite Mean	3.36	Agree	

Legend:3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree

Table 2 indicates the summary table on knowledge management infrastructure capabilities with grand composite mean of 3.36 and verbally interpreted as agree. It implies that the systems are present and working, but they are not perceived as very strong or fully optimized. Organizational culture (3.43) verbally interpreted as agree ranks first. This indicates that respondents agree that the university's culture supports knowledge management practices. It is perceived by respondents as the strongest enabler of knowledge sharing and collaboration within the university. This high rating suggests that the university has cultivated an environment where trust, openness, collaboration, and shared values are present factors that are essential to successful knowledge management. A strong organizational culture fosters collaboration, trust, and shared values, which are critical in creating an environment where knowledge sharing thrives (Ugwu & Ejikeme, 2023). This is consistent with Al-Kurdi et al., (2020) who emphasized that organizational culture is a foundational enabler of knowledge management, especially in academic institutions where openness and teamwork are vital. Organizational structure received the lowest mean (3.24), indicating that structural elements such as hierarchy, departmental boundaries, and formal processes may be limiting knowledge flow across the institution. This reflects the challenges of siloed systems in academic institutions, where knowledge may be restricted to specific departments rather than shared across units (Almeida & Carvalho, 2021). A rigid structure can hinder collaboration and reduce opportunities for interdepartmental learning (Foss, et al., 2022).

Table 3 indicates summary table on MIS efficiency with grand composite mean of 3.39 and verbally interpreted as efficient. It suggests a balanced but modest level of effectiveness. It reflects that while the MIS is reliable and usable, further refinements such as enhanced functionality, faster performance, and deeper user

engagement could improve efficiency across all areas. Information Quality ranked the highest with a composite mean of 3.43, indicating that users find the information provided by the MIS to be clear, readable, relevant, and timely. Information quality is often seen as a key antecedent of user satisfaction. Measures of information quality include personalization, completeness, ease to understand, security, timeliness, availability, relevance, and format of contents delivered through the information systems. Thus, the quality of content or information may be an important reason for online users to perceive the usefulness of information systems and to have higher levels of satisfaction with using those information systems (Ge et al., 2023). System quality ranks lowest with a composite mean of 3.32, highlighting that users may have concerns about the system's technical aspects, such as response time, consistency, and interface design. This area often reflects the system's infrastructure and technical stability. A lower rating here suggests potential gaps in performance reliability or user interface usability that could negatively affect the overall experience. System quality is a significant determinant of user satisfaction with information systems in various studies (Kolasa et al., 2020). Thus, the more that system users believe the information systems will be reliable, available, and easy to use, the more they will use it.

**Table 3***Summary Table on MIS Efficiency*

Key Result Areas	Composite Mean	VI	Rank
Information Quality	3.43	Efficient	1
System Quality	3.32	Efficient	5
Service Quality	3.42	Efficient	2
Usefulness	3.39	Efficient	3
User Satisfaction	3.36	Efficient	4
Grand Composite Mean	3.39	Efficient	

Legend:3.50-4.00=Highly Efficient;2.50-3.49=Efficient;1.50-2.49=Less Efficient;1.00-1.49=Not Efficient

**Table 4***Summary Table on Organizational Performance*

Key Result Areas	Composite Mean	VI	Rank
Customer perspective	3.37	Agree	1
Internal Business Process Perspective	3.32	Agree	2
Learning and Growth	3.14	Agree	3
Financial Perspective	3.13	Agree	4
Grand Composite Mean	3.24	Agree	

Legend:3.50-4.00=Strongly Agree;2.50-3.49=Agree;1.50-2.49=Disagree;1.00-1.49=Strongly Disagree

Table 4 indicates summary table on organizational performance with grand composite mean of 3.24 and verbally interpreted as agree. This result implies that overall organizational performance is viewed positively by stakeholders but not strongly. This suggests that while the university's strategic initiatives across customer service, internal processes, learning and growth, and financial management are generally effective, they may not yet be perceived as fully meeting stakeholders' highest expectations. Customer Perspective (3.37) verbally interpreted as agree got the highest ranking. It suggests that stakeholders perceive the university as more successful in delivering quality service to students, alumni, and external partners. This aligns with recent studies emphasizing that higher education institutions increasingly prioritize external stakeholder satisfaction to remain competitive and maintain reputation (Hazelkorn, 2021). Investment in student services, alumni engagement, and external partnerships is often highly visible, which helps explain why respondents rated this area most favorably. Financial Perspective (3.13) verbally interpreted as agree, received the lowest composite means, suggesting this is relatively weaker area from respondents' viewpoints. Similarly, concerns about fair compensation and benefits reflect financial pressures often faced by institutions, especially when balancing budgets for research, community outreach, and employee welfare (Tight, 2020).

**Table 5**  
*Relationship Between knowledge management infrastructure capabilities and organizational performance*

Variables	rho-value	p-value	Interpretation
<b>Information Technology</b>			
Customer perspective	0.557	0.000	Highly Significant
Internal Business Process Perspective	0.569	0.000	Highly Significant
Learning and Growth	0.451	0.000	Highly Significant
Financial Perspective	0.424	0.000	Highly Significant
<b>Organizational Structure</b>			
Customer perspective	0.425	0.000	Highly Significant
Internal Business Process Perspective	0.405	0.000	Highly Significant
Learning and Growth	0.391	0.000	Highly Significant
Financial Perspective	0.372	0.000	Highly Significant
<b>Organizational Culture</b>			
Customer perspective	0.607	0.000	Highly Significant
Internal Business Process Perspective	0.507	0.000	Highly Significant
Learning and Growth	0.461	0.000	Highly Significant
Financial Perspective	0.392	0.000	Highly Significant
<b>Common Knowledge</b>			
Customer perspective	0.519	0.000	Highly Significant
Internal Business Process Perspective	0.564	0.000	Highly Significant
Learning and Growth	0.583	0.000	Highly Significant
Financial Perspective	0.495	0.000	Highly Significant

\*\*. Correlation is significant at the 0.01 level

Table 5 depicts the relationship between knowledge management infrastructure capabilities and organizational performance. As seen in the table, the computed rho-value ranging from 0.372 to 0.607 indicating moderate to strong positive correlation. It shows that there was a statistically significant relationship exists between knowledge management infrastructure capabilities and organization performance since all the obtained p-values were less than 0.01. This implies that good knowledge management infrastructure capabilities lead to better organizational performance. The fact that all p-values were less than 0.01 confirms that these correlations are statistically significant, suggesting that the observed relationships are unlikely due to chance (Field, 2020). This strengthens the argument that investing in robust KM infrastructure is not just theoretically valuable but empirically linked to improved performance.

In his study, Singh, (2018) concluded that sustainable competition and long-term success could be achieved if emphasis to proper management of knowledge management is implemented together with the organizations core culture. Organizations need to nourish a culture that will motivate employees to share knowledge as a result of realizing their personal and organizational objectives. Similarly, a recent study found that organizational structure has a significant positive impact on organizational performance and shapes employee behavior by influencing work specialization and coordination mechanisms (Al-Hussaini et al., 2021). On the other hand, Abu et al., (2018) concluded that knowledge management is the main path to business growth. Thus, it is good to invest in knowledge management resources to attain organizational performance improvement, since knowledge management resources and practices are related directly and indirectly to it when they are implemented effectively. Furthermore, sustaining Knowledge management is essential to improve organization performance (Shahzad et al., 2020).

The findings presented in Table 6 reveal a strong and statistically significant positive relationship between Management Information System (MIS) efficiency and organizational performance across all dimensions of the Balanced Scorecard: customer perspective, internal business processes, learning and growth, and financial performance. The computed correlation coefficients, ranging from 0.340 to 0.750, indicate that as MIS efficiency increases—particularly in terms of information quality, system quality, service quality, usefulness, and user satisfaction—so does the performance of the organization. Efficient MIS enhances customer service, supports internal operational efficiency, fosters a learning-oriented culture, and contributes to better financial outcomes. These results are strongly supported by literature, affirming that well-designed and effectively implemented MIS is not only a technological asset but a strategic tool that drives competitiveness, innovation, and sustainability.

**Table 6**  
*Relationship Between MIS Efficiency and Organizational Performance*

Variables	rho-value	p-value	Interpretation
<b>Information Quality</b>			
Customer perspective	0.599**	0.000	Highly Significant
Internal Business Process Perspective	0.557**	0.000	Highly Significant
Learning and Growth	0.537**	0.000	Highly Significant
Financial Perspective	0.340**	0.000	Highly Significant
<b>System Quality</b>			
Customer perspective	0.656**	0.000	Highly Significant
Internal Business Process Perspective	0.611**	0.000	Highly Significant
Learning and Growth	0.575**	0.000	Highly Significant
Financial Perspective	0.521**	0.000	Highly Significant
<b>Service Quality</b>			
Customer perspective	0.497**	0.000	Highly Significant
Internal Business Process Perspective	0.548**	0.000	Highly Significant
Learning and Growth	0.513**	0.000	Highly Significant
Financial Perspective	0.446**	0.000	Highly Significant
<b>Usefulness</b>			
Customer perspective	0.683**	0.000	Highly Significant
Internal Business Process Perspective	0.750**	0.000	Highly Significant
Learning and Growth	0.634**	0.000	Highly Significant
Financial Perspective	0.563**	0.000	Highly Significant
<b>User Satisfaction</b>			
Customer perspective	0.552**	0.000	Highly Significant
Internal Business Process Perspective	0.669**	0.000	Highly Significant
Learning and Growth	0.604**	0.000	Highly Significant
Financial Perspective	0.507**	0.000	Highly Significant

\*\* . Correlation is significant at the 0.01 level

Specifically, each MIS component plays a distinct yet interconnected role in improving organizational performance. Information and system quality were shown to be strongly correlated with enhanced customer satisfaction and streamlined operations. Similarly, service quality and system usefulness promoted employee development and financial optimization, while user satisfaction was linked to improved productivity and retention, ultimately boosting profitability. The study underscores the importance of continuous investment in MIS infrastructure, emphasizing that a well-functioning MIS ecosystem significantly contributes to holistic organizational growth and long-term success.

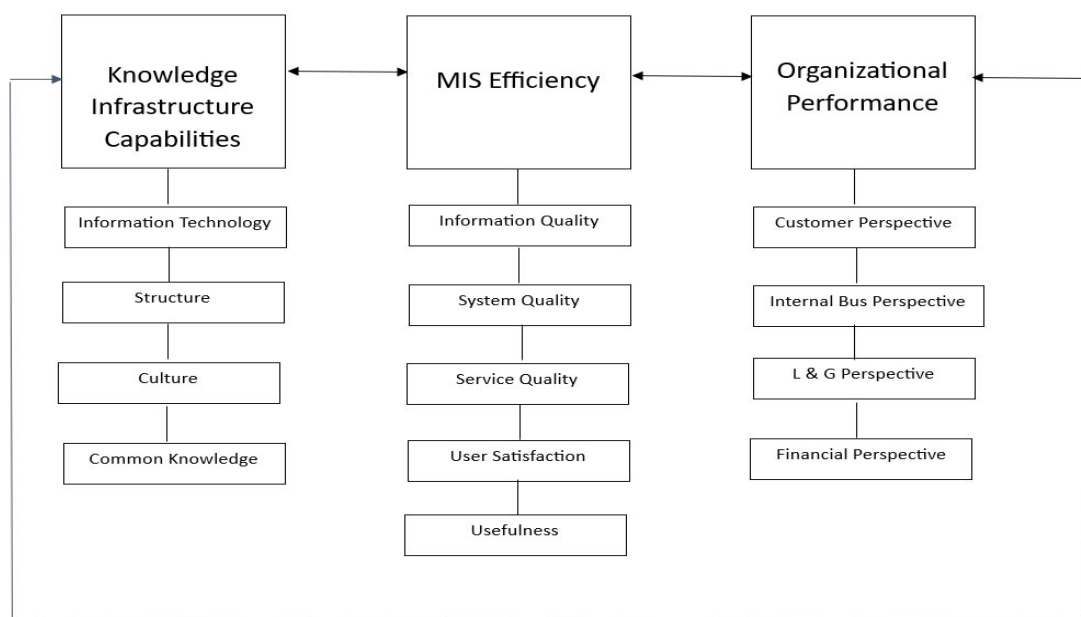


Figure 1. Higher Education Institution's Sustainable Competitive Advantage Framework

Based on the results of this study, knowledge management infrastructure capabilities, MIS Efficiency and organizational performance have a high significant relationship to each other. Most organizations have vast amounts of organizational knowledge, but this knowledge is only valuable for the business if used to make better and faster decisions. With the teaching personnel being the most important element in Higher Education Institutions, they are expected to be knowledgeable of their tasks, processes of the institution and a good communicator to the students and other stakeholders of the institution. If all that teaching required was the transmission of knowledge and competencies, teaching personnel could be replaced by a video specially in this technology age. But students need more, students as the customer and the main source of income of institutions need a guide, an adviser, and a role model. Teaching personnel having these duties should be supported by the institution with a rich culture, supportive managers, reliable information and good technology to be used in doing their task. Having efficient MIS, teaching personnel will be able to do their tasks efficiently and effectively through the integration of process and information technology which could motivate them to perform better. Satisfied teaching personnel is a potential loyal employee. Teaching personnel will be satisfied by fair salary and benefit, learning & growth opportunities and a good management. All these could result to a better employee performance that could lead to a better organizational performance.

#### 4. Conclusions and recommendations

Majority of respondents demonstrates general agreement on knowledge management infrastructure capability across all dimensions of technology, structure, culture, and common knowledge. The respondents agreed that the implemented management information system is generally efficient. The selected private higher education institutions have been demonstrating good organizational performance across customer-related, internal business, employee learning and growth, and perceptual financial aspects. There was statistically significant relationship between knowledge management infrastructure capabilities, management information system and organization performance. A higher education institution sustainable competitive advantage framework was developed provide a practical and theoretically sound tool that empowers the institution to strategically navigate the competitive environment.

The institution may revisit the organizational structure in terms of the discovery and creation of new knowledge and design process. The institution may encourage the employees to report to MIS department about any delay and problem encountered with the system. MIS may also facilitate training to employees about simple troubleshooting as a refresher. The institution may conduct a survey to employees in regard with the possible benefits they need and the possibility of providing them to the employees. The institution may also review if the salary of the employees is enough compared to the tasks assigned to them since salary and benefits got the lowest rating. Based on these results HEIs may utilize the framework developed by the researcher to enhance their competitive advantage. For future studies, researchers may involve other stakeholders (administrative personnel, students and managers) to determine their perception on the knowledge management infrastructure capabilities, MIS efficiency and organizational performance of their institution.

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