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DOES KNOWLEDGE PROTECTION INFLUENCE HIGHER EDUCATION INSTITUTIONS' PERFORMANCE?

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Abstract

Knowledge management (KM) remains highly relevant in this knowledge-based economy. In an attempt to explain why KM is still relevant, this study examines organisational KM capabilities, including internal processes, as proposed in the theory of Knowledge Management Capabilities. Specifically, the goal of this study is to investigate the relationship between knowledge protection processes and performance among private higher education institutions (PHEIs). Data collected from 261 respondents at 19 PHEIs in Malaysia is analyzed using IBM SPSS Statistics 20. The results reveal that knowledge protection processes have a positive and significant impact on PHEIs' performance. This study also adds the useful insight that academics in PHEIs must be able to contribute to protecting organisational knowledge.

Keywords: knowledge management; knowledge protection; private higher education institutions performance; university's performance; sustainable competitive advantage

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INTRODUCTION

In today's knowledge-based economy, Knowledge Management (KM) has emerged as a subject of academic study. Since its origin in the 1950s as a statistical approach known as the Program Evaluation and Review Technique (PERT), KM has evolved into a more complex and human-capital-intensive subject. KM is no longer focused on how to develop a knowledge-based system, but is now centred on collaboration and content management, synchronised with the evolution of social media, crowd sourcing and cognitive computing (O'Leary, 2016).

When Nonaka & Takeuchi (1995) hit the town with their ground-breaking, classic book in the field of knowledge management, it illustrates how firms can systematically cultivate innovation by managing knowledge creation processes, which then give insightful thoughts to global practices in

managing organizational knowledge that became the driver for innovation. In addition, Grant (1996), in his article "Toward a Knowledge-Based Theory of the Firm" argues that knowledge is the most strategically significant resource within firms, proposing that it serves as the foundation for sustained competitive advantage.

The application of Knowledge Management (KM) in today's business environment is essential. KM is recognized as a key factor in driving sustainable competitive advantage by improving decision-making and problem-solving capabilities. This is enabled through the efficient use of intellectual capital, as well as the organization's ability to respond to market dynamics and technological advancements (Venkitachalam et al., 2023). Effective leadership is essential for the successful implementation of KM strategies because leaders shape a knowledge-sharing organizational culture and foster an environment where knowledge is valued and applied, thereby increasing employee engagement and participation in KM initiatives (Winkler & Wagner, 2017).

The critical role of KM has significantly influenced the survival and growth of small and medium-sized enterprises (SMEs) in Malaysia, with notable advancements in KM practices observed across various industries. Knowledge acquisition, dissemination, and application are linked to enhance export performance among SMEs in Malaysia. According to Ganapathy et al. (2020), Malaysian businesses also have to adapt to emerging trends and address these challenges to maintain competitiveness in a knowledge-driven landscape, despite challenges such as inadequate management support and the need for continuous evaluation of KM practices persist. In the context of higher education industry, the higher education institutions (HEIs) have emphasized the integration of KM strategies to enhance organizational performance, competitiveness, and innovation. Hassan et al. (2022) found that effective KM techniques within Malaysian public universities can significantly improve quality and efficiency. However, they also highlighted the necessity of strong leadership and a supportive organizational culture to facilitate successful KM implementation.

Despite its relevance, some critiques suggest that KM research has stagnated, with a significant portion of studies failing to contribute new insights or address pressing issues similar to sustainability (Jevnaker & Olaisen, 2022). There is a concrete reason why there is a dispute concerning KM's lifespan. In 2015, Davenport, whom was considered a pioneer in this field, opined that KM is 'fading, gasping for breath'. One of the reasons of its failure, he asserted that 'It was too hard to change behaviour. Some employees weren't that interested in acquiring knowledge, others weren't interested in sharing what they knew'. This observation raises the question, of whether individuals are reluctant to share knowledge, or whether protecting individual knowledge is equivalent to protecting organisational knowledge. This signifies a need for more innovative and problem-driven research to ensure KM continues to evolve and meet contemporary challenges.

In this study, we approach knowledge protection as a process within the framework of KM capabilities. In 2001, Gold, Malhotra and Segars (2001) introduced the concept of KM capabilities and defined knowledge protection as efforts within an organisation to secure knowledge and to protect it from inappropriate use; and to prevent it from being given to, or stolen by competitors. Though the significance of knowledge management in organizations has long been recognized, scholars have paid

little attention to knowledge protection because they believe that intellectual property rights will offer the required protection (Yaakub, 2019). Furthermore, only a handful of studies have attempted to connect knowledge management (KM) to academia, and even fewer have connected KM to performance in private higher education institutions (PHEIs) (Leen, 2006). This brought us to knowledge protection, another important subject in the context of higher education, which deals with the protection of intellectual property within educational institutions. Despite its importance, knowledge protection has received less attention than knowledge sharing (Alghail et al., 2021).

This study evaluates the performance of PHEIs in Malaysia, focusing on four key dimensions: academic effectiveness, rating criteria, research capacity, and financial performance. This holistic framework, including both financial and non-financial measures, aims to assess PHEIs' competitiveness, emphasizing their role in producing knowledge workers for a global workforce. As KM is relevant to PHEIs (Wiig, 1997), this study attempts to explore the possible influence of knowledge protection processes on the performance of private higher education institutions (PHEIs) in Malaysia. The role of knowledge protection is essential for the PHEIs to function more effectively, not just mere approach that assists PHEIs in teaching and learning activities (Bangotra et al., 2016; Demchig, 2015).

According to Gonçalves and Tomaél (2018), innovation within the education sector depends on strong knowledge-protection measures, supported by clear policies and guidelines that address confidentiality, intellectual rights, and fair financial participation. Consequently, many researchers remain unaware of how crucial knowledge protection is to advancing innovation. Extending this concern to the digital learning environment, recent discussions highlight that many academicians still lack sufficient understanding of data-protection procedures and the ethical use of technology, which are essential for sustaining responsible teaching practices and safeguarding students' rights. The significance of knowledge protection in educational settings to improve security and collaborative learning is emphasized by Qazi, Raza, and Khan (2020), who show that information security awareness has a positive impact on threat appraisal and knowledge sharing behavior among higher education students. Additionally, according to Bongiovanni, Renaud, and Cairns (2020), knowledge protection for college students entails safeguarding their intellectual capital, which includes their contributions and tacit knowledge. Therefore, effective data and information security practices are essential to safeguard this knowledge, ensuring students' roles as both knowledge producers and consumers are protected.

The motivations to undertake this study are twofold. First, there seems to be turbulence in the private higher education industry in Malaysia because of rising competition to support Fourth Industrial Revolution (4IR). Although establishing PHEIs in Malaysia was encouraged in the early 2000s because of their role in 'supplementing and complementing' tertiary education, the overall productivity and performance of PHEIs has declined in recent years (MPC, 2016). According to Harun (2015), sustainability has become the main problem among PHEIs . This statement was supported by the Malaysian Minister of Higher Education when he announced that 33 PHEIs were closed in 2017 due to their failure to manage their finances efficiently (Mohd Pilus, 2017). This issue was exacerbated by the

Covid-19 outbreak, which led to the closure of 37 PHEIs between 2020 and 2023 due to financial unsustainability (Tajudeen, 2023). Second, there seems to be a lack of consensus in the research related to knowledge protection. Manhart & Thalmann (2015) assert that any attempts to disclose tacit knowledge is an infringement of personal rights. However, this view is often seen as inadequate because knowledge protection involves more than capturing tacit knowledge. In fact, organisational knowledge must be protected in cases of employee departures due to retirement, layoffs or turnover. Knowledge protection processes could impede the loss of organisational knowledge (Mills et al., 2011). Working under the resource-based view (RBV) of the firm, this paper posits that knowledge protection processes have a positive and significant influence on PHEIs' performance.

LITERATURE REVIEWS

PHEIs' performance

The Malaysian higher education sector has been improved by encouraging universities to assess their performance in a competitive environment. The performance of private higher education institutions (HEIs) is shaped by multiple factors that collectively enhance institutional effectiveness and efficiency. Purbey et al. (2007) highlighted that performance measurement helps PHEIs to evaluate their progress towards defined goals, recognise their strengths and weaknesses, and establish future plans with goals to improve performance. In terms of human resource analytics, a performance measurement framework utilizing key performance indicators (KPIs) has been developed, emphasizing instruction, research, and community extension, with sub-KPIs such as teaching competence, research involvement, and community participation serving as critical evaluation metrics (Robles, 2025).

Furthermore, financial accountability also plays a pivotal role, as the implementation of internal control systems and accounting information systems significantly improves institutional performance, while organizational commitment to financial accountability fosters operational effectiveness (Suhendro & Halim, 2024). Additionally, infrastructure and communication technology (ICT) governance and capability contribute to organizational performance, with performance management systems acting as mediators, enabling private universities to gain a sustainable competitive advantage (Utami & Pratolo, 2024). Strategic flexibility further enhances university performance, underscoring the importance of adaptability in achieving long-term success (Maulani, 2024). Moreover, sustainability practices have a profound impact, as holistic implementation can predict performance improvements, though challenges such as resource constraints and inconsistent commitment to these initiatives may hinder progress (Hernandez-Diaz et al., 2023).

In addition, Hamid (2015) argues that financial instruments and metrics such as return on investment (ROI) and cash flow, are critical in measuring business performance. However, this financial approach is not appropriate for measuring performance at PHEIs because of the differences in the roles of for-profit and not-for-profit universities arising from differences in their objectives when they were established (Deiaco et al., 2012). In addition, Moshari (2013) explained that using measures

of financial performance alone may be inadequate since they only address an organisation's financial returns, while value might be derived from intangibles such as intellectual capital.

Given this backdrop, this study introduces non-financial approaches to measure a university's performance, incorporating many dimensions such as the effectiveness and efficiency of a university education (Albekov et al., 2017; Sahney & Thakkar, 2016), input-process-output approaches (Chinta et al., 2016), and research activities (Alcaine, 2016; Kidwell et al., 2000; Tee, 2016). Abdullah (2012) identified several critical agenda projects that may assist Malaysia in achievement its National Higher Education Strategic Plan 2007-2020, such as the number of academics with double appointments, the number of expert-based councils established and the number of joint publications. Thirumanickam and Ahmad (2012) supported the notion of non-financial performance metrics to avoid having an organisation's measurement system derail its vision, mission and strategic direction. Furthermore, Demchig (2015), Bhusry & Ranjan (2011), Esposito et al. (2013), Tee (2016) and Warwick (2014) studied strategies pursued by higher education institutions (HEIs), whereas Goi and Goi (2009) explained the importance of rebranding in HEIs and Spender (2005) focused on the roles of academics in HEIs .

Based on these earlier studies, we apply a Balanced Scorecard (BSC) model which has been tested to measure performance of universities in India (Umashankar & Dutta, 2007) and in Lebanon (Aljardali et al., 2012), to measure the perceived performance of PHEIs. As PHEIs are knowledge organisations (Wiig, 1997), implementing a BSC model rather than assessing current quality to measure performance is useful to ensure that organisational knowledge is preserved (Esposito et al., 2013). The four constructs of the BSC model are internal business process, customer, learning and growth and financial strength.

Knowledge protection process

The essence of the RBV theory of the firm is that organisational resources are rare and difficult to imitate (Wernerfelt, 1984). Knowledge has been considered as an intangible asset that can contribute to an organisation's sustainable competitive advantage (Lee et al., 2007). Knowledge protection is viewed in two ways. First, individual knowledge protection refers to an individual employee's reluctance to share his/her tacit knowledge with the organisation. This form of knowledge protection inhibits the process of knowledge sharing (Khamseh & Jolly, 2008). In contrast, a second form of knowledge protection aims to prevent organisational knowledge from being stolen by competitors (Estrada et al., 2014). This study focuses on the latter view of knowledge protection to show its influences on PHEIs' performance at the organisational level.

The knowledge protection process is crucial for organizations to safeguard their intellectual assets and enhance overall performance. This process involves various strategies and models that facilitate knowledge management and protection, ultimately fostering innovation and organizational effectiveness. Research suggests that while knowledge protection positively influences employee performance, its impact may not always be significant (Ondi, 2023). However, effective knowledge

management practices can enhance organizational outcomes by integrating knowledge infrastructure capabilities with processing capabilities (Abdo & Edgar, 2021). Additionally, Rivas et al. (2023) asserted that technological innovation models that promote a flexible approach to knowledge protection by incorporating technological surveillance and resource allocation able to ensure that innovation is safeguarded through effective protection mechanisms. Despite these benefits, organizations face challenges in preserving intellectual capital, particularly due to workforce turnover and retirements, making structured knowledge management processes essential for identifying critical knowledge and fostering a culture of knowledge sharing (Razuck et al., 2023). While knowledge protection plays a vital role in innovation and performance enhancement, excessive emphasis on protection may lead to knowledge hiding, potentially hindering collaboration and creativity within organizations (Abdo & Edgar, 2021).

According to Gold, Malhotra and Segars (2001), knowledge protection is not entirely possible if that knowledge is used to generate and preserve a competitive advantage. However, this gains little attention because many consider the use of copyright and patents as adequate for protecting organisational knowledge. Furthermore, copyright laws that are intended to protect knowledge are limited how they address the knowledge environment (Mills et al., 2011). Therefore, knowledge protection should be considered as more than the normal process of obtaining intellectual property rights guarded by patents or trademarks. The complex nature of KM extends not only to laws and regulations, but also to instilling the notion of protecting what is valuable to the organisation among its employees.

As Gold, Malhotra and Segars (2001) and Mills et al. (2011) explained, since the knowledge protection process is critical in contributing to the effectiveness of an organisation's overall processes and controls, PHEIs must develop capabilities with respect to the technological, structural and functional aspects of knowledge protection. This includes an adequate technology infrastructure and incentives for employees to manage and protect organisational knowledge. By focusing on the means necessary to protect organisational knowledge, this study develops the following hypothesis:

H1: The knowledge protection process has a positive and significant impact on PHEIs Performance.

The research hypothesis is followed by research framework for this study, as indicated by Figure 1 below.

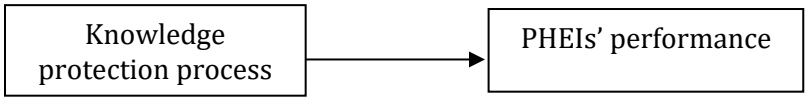

Figure 1 Research framework.

METHODOLOGY

Research Design

The purpose of this study is explanatory and adopts a positivist, quantitative approach, as the emphasis is on examining the causal relationship between knowledge protection processes and the PHEIs' performance. Consistent with the positivist paradigm, the study relies on objective measurement and statistical analysis to test hypothesised relationships derived from existing theory. A cross-sectional survey design is employed, with data collected from key managerial respondents, and the proposed relationships are analysed using inferential statistical techniques to ensure rigor and generalizability of findings.

Sampling

This study employs a non-probability convenience sampling design, as the absence of a definitive sampling frame and the nationwide scope of PHEIs necessitated a time-efficient approach (Sekaran & Bougie, 2013; Lee et al., 2011; Leong et al., 2013). While convenience sampling is often criticized for its limited generalizability, Lucas (2003) argues that non-probability methods do not inherently result in low external validity, especially when the research objective is to test theoretical relationships rather than achieve pure statistical representation. By prioritizing theory expansion and procedural rigor, this study justifies the use of convenience sampling as a valid means to contribute to the broader understanding of the population and the development of the applied theories.

Participants are chosen based on their accessibility and proximity to the researcher. The questionnaires were targeted at academics in management positions who are aware of, and able to describe the PHEI's policies (Alaarj et al., 2017; Gold et al., 2001; Mills et al., 2011). To determine the minimum required sample size, an A Priori Power Analysis was conducted using G*Power 3.1.9.2 (Faul et al., 2007). With an effect size (f^2) of 0.15, an α error probability of 0.05, a power level of 0.95, and 12 predictors, the analysis recommended a sample of at least 184 academicians. To ensure this threshold was met and to mitigate the risk of low response rates typical in nationwide surveys, 3,125 questionnaires were distributed across 125 PHEIs. This oversampling approach was a deliberate measure to secure the statistical power necessary for robust theoretical testing. Of the 3,125 questionnaires distributed, 291 responses were received. After a screening processes, 261 usable questionnaires were further analysed, for a response rate of 9.3%.

Instrumentation

To evaluate this hypothesis, a structured questionnaire was developed to analyse measures of knowledge protection processes and PHEIs' performance. The measures consisted of multi-item

constructs as summarised in Table 1. All items were assessed using seven-point Likert scales, anchored with '7 = Strongly agree' and '1 = Strongly disagree'.

Table 1 Sources of measurement items

Variables	Number of items	References
Knowledge protection process	10	[3]
PHEIs' performance	22	[37-39]

FINDINGS

Demographic information

Table 2 shows that a typical respondent was a Malay Muslim female, between 25 to 44 years old, who has been in the higher education industry for more than three years. This demographic information also shows that academics in Malaysian PHEIs are diverse in terms of ethnicity and religion. While Malay Muslims form the majority, a significant portion of respondents are from Chinese, Indian, and other ethnic backgrounds, reflecting Malaysia's multicultural society. Similarly, religious representation includes Buddhism, Hinduism, and Christianity, highlighting the presence of individuals from different faiths within private higher education institutions. Additionally, the data indicates that most respondents have considerable work experience, with nearly 70% having worked in the industry for more than six years, suggesting a relatively stable and experienced workforce in the sector. Demographic information about the respondents is shown in Table 2.

Table 2 Respondents' demographic information

No.	Variable	Categories	Frequency	(%)
1.	Gender	Male	87	29.9
		Female	204	70.1
2.	Age	Below 25	27	9.4
		25 – 34	93	32.3
		35 – 44	96	33.3
		45 – 54	63	21.9
		55 and above	9	3.1
3.	Race	Malay	201	69.8
		Chinese	45	15.6

		Indian	9	3.1
		Others	33	11.5
4.	Religion	Islam	207	71.9
		Buddha	27	9.4
		Hindu	9	3.1
		Christian	42	14.6
		Others	3	1.0
5.	Years of working	3 – 5 years	64	24.5
		6 – 10 years	101	38.7
		11 – 20 years	78	29.9
		More than 20 years	18	6.9

Reliability and correlational analysis

The reliability of the measurement scales is examined using correlations and coefficients (Cronbach's Alpha) values. Hair, et al. (2014) suggested that the Cronbach's Alpha values must be greater than 0.70 to achieve internal consistency. As shown in the Table 3, the variables have Cronbach's Alphas of 0.952 and 0.974, indicating that the measurement items have a high reliability.

Table 3 Reliability test using Cronbach's Alpha

No.	Variables	Number of items	Cronbach's Alpha
1	Knowledge protection process	10	0.952
2	PHEIs' performance	22	0.974

Correlational analysis

Further analysis was conducted to measure the correlation between knowledge protection and PIHE performance. According to Field (2009), Pearson's correlation coefficient measures the size and direction of the linear associations between two variables. Table 4, exhibits the knowledge protection process has a strong positive correlation with PIHE' performance ($p < 0.05$), with a correlation coefficient of 0.701, denoting a strong and positive relationship between knowledge protection process and PHEIs' performance.

Table 4 Correlation coefficient analysis

		Knowledge protection process	PHEIs' performance
Knowledge protection process	Pearson Correlation	1	.701**
	Sig. (2-tailed)		.000
	N	261	261
PHEIs' performance	Pearson Correlation	.701**	1
	Sig. (2-tailed)	.000	
	N	261	261

**. Correlation is significant at the 0.01 level (2-tailed).

Regression analysis

Table 5 presents the result of linear regression analysis between the two variables, with PHEIs' performance as the dependent variable. The correlation coefficient R was 0.701, indicating a strong positive relationship between the knowledge protection process and PHEIs' performance conveying the meaning as knowledge protection practices increase or improve, PHEIs' performance tends to also improve. This regression result indicates a moderate to strong correlation between the knowledge protection process and the performance of PHEIs. The R^2 value, or the coefficient of determination, is 0.491, which indicates that 49.1% of the variation in PHEIs' performance can be explained by the knowledge protection process. This means that nearly half of the differences observed in PHEIs' performance outcomes are associated with variations in how well knowledge is protected. The remaining 50.9% of the performance variation is likely influenced by other factors not included in this model, such as leadership effectiveness, financial management, or other knowledge management processes. This level of R^2 (49.1%) is fairly strong for studies in social sciences, suggesting that knowledge protection is a significant contributor to performance, though further research could explore additional variables for a more comprehensive model

Table 5 Regression analysis result.

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.701[a]	.491	.489	.59965

a. Independent variable : Knowledge protection process

For hypothesis testing, we consider the P value of the coefficient that describes the impact of the independent variable on the dependent variable. The results, presented in Table 6, show that the

knowledge protection process is significantly correlated with PHEIs' performance (P = 0.701, t = 15.814, p < 0.05), supporting H1. This is consistent with Mills et al. (2011) who found that a knowledge protection process has a significant impact on organisational performance. The result is also consistent with the premise that knowledge protection contributes positively to organisational performance as concluded by Gold et al. (2001), and supports the work on knowledge protection and organisational performance introduced by Lee et al. (2007). Evidently, PHEIs can derive benefits from having a formal process to protect organisational knowledge.

Table 6 Regression coefficient analysis

Coefficients[a]							
Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.	
		B	Std. Error	Beta			
1	(Constant)	1.332	.157		8.505	.000	Hypothesis accepted
	Knowledge protection process	.693	.044	.701	15.814	.000	

a. Dependent Variable: PIHEs' performance

DISCUSSION

Competition among higher education institutions in Malaysia is intensified by the number of established PHEIs. This requires PHEIs to not only compete in terms of academic programmes offered, but also in developing their internal capabilities. Knowledge is the most important asset for PHEIs. However, acquiring knowledge is not the only thing that matters in an academic institution; knowledge must also be protected from competitors.

It is clear that knowledge protection is important in the academic world as shown by the strong relationship between knowledge protection and PHEIs' performance. This finding supports the concerns of academics that valuable organisational knowledge must be protected from internal and external theft. Furthermore, it is crucial that PHEIs use formal policies and procedures, including a reward system, to encourage employees to protect the organisation's valuable knowledge.

We can refer to previous studies for other ways knowledge can be protected. For example, O'Donoghue and Croasdell (2009) proposed seven methods top management can use to protect knowledge: monitor practices, stay current, leverage global knowledge, strengthen human resource, employ modular development practices, establish global partners and utilise collaboration tools and software. Distinctly , de Faria and Sofka (2010) suggested that formal methods (e.g., patents, copyrights, trademarks) and strategic methods (e.g., secrecy, lead time, complex design) can be used as knowledge protection strategies. Clearly, PHEIs should establish policies and procedures for knowledge protection and should consider investing in their technology infrastructure to assist in

protecting knowledge.

Knowledge protection in PHEIs is essential for safeguarding intellectual assets and fostering innovation. Various strategies can be employed to ensure that knowledge is effectively protected from unauthorized use or loss. Universities may preserve knowledge by defending various types of information, encouraging academic freedom, and making sure people are physically protected by creating an environment that values and defends intellectual inquiry against external threats and internal conflicts (Gready et al., 2023). Moreover, effective intellectual property (IP) rights management is essential for universities to secure their innovations and research outputs. Establishing comprehensive guidelines for patenting and confidentiality agreements ensures that researchers are aware of their rights and responsibilities (Kadir & Salim, 2016). A well-structured IP management framework enhances awareness and streamlines the protection of knowledge assets. Additionally, developing institutional frameworks with clear guidelines on knowledge protection, such as financial participation for inventors and confidentiality protocol, is crucial (Gonçalves & Tomaél, 2018). Universities should also maintain repositories to preserve intellectual outputs, enabling knowledge sharing while ensuring protection (Shaffiei et al., 2013). Beyond structural measures, fostering a culture that prioritizes knowledge protection is vital. This includes implementing training programs to raise awareness among researchers and designing organizational structures that balance knowledge sharing with protective measures (Alghail et al., 2021).

With advances in technology and increased awareness of business networking, it is possible for a PHEIs to collaborate with their competitors. This is crucial for research and development (Hurmelinna-Laukkanen, 2011) and innovation (Estrada et al., 2014) . However, PHEIs should identify what type of knowledge can be shared and what should not. PHEIs must also recognise and protect the internal capabilities and distinctive unique resources so that competitive advantages can be sustained.

CONCLUSION AND FUTURE WORKS

In this study, the reseachers presented evidence to support the hypothesis that knowledge protection process supports performance for PHEIs. Researchers also contributed to the existing literature on knowledge protection, focusing on its link with organisational performance. The researchers believed that PHEIs are not unlike corporate organisations with respect to the need to sustain their competitive advantages. However, the generalizability of these findings should be interpreted with caution given that this is a cross-sectional study. Longitudinal and experimental studies may provide further support to the results. Furthermore, the convenience sampling method was applied in the data collection process, which contributes to problem of generalizability. Lastly, it is recommended that future research study the influence of other knowledge processes (e.g. knowledge acquisition, conversion or application) on PIHE performance. KM remains high in contemporary organizations, particularly as they navigate rapid changes and competitive pressures. The integration of KM practices is essential for leveraging knowledge as a strategic asset, enhancing decision-making, and fostering innovation. This relevance is underscored by various studies that highlight the evolving dynamics of KM in response to

external and internal organizational factors.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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AUTHOR CONTRIBUTIONS STATEMENT

Yaakub, M.H. (Methodology; Data curation; Formal analysis; Visualisation; Writing-original draft) M.Y., Rosmi Yuhasni. (Methodology; Data curation; Formal analysis; Visualisation; Writing-original draft, editing)

AVAILABILITY OF DATA AND MATERIALS

The data supporting this study's findings are available on request from the corresponding author.

ETHICS STATEMENT

Not applicable.

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