



The Influence of Intellectual Capital on the Performance of Higher Education Institutions: The Mediation Role of Performance Measurement Systems

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Abstract

Higher education institutions (HEIs) have a key role in developing a country by improving the quality of human resources. Thus, this study aims to empirically examine the determinants of HEIs performance, i.e., intellectual capital and performance measurement systems. This study also investigates the mediating effect of the performance measurement system itself. This quantitative study used a questionnaire survey distributed to private higher education institutions (PHEIs) located in several provinces on Java Island, Indonesia. This study employed a purposive sampling technique with respondents' criteria of structural officials in the financial sector at PHEIs. The questionnaire responses obtained were 186 samples, and Partial Least Square was utilized to test the hypothesis. The results revealed that the performance measurement systems mediated the relationship between intellectual capital and HEIs performance. This research contributes theoretically and practically, especially in implementing intellectual capital mobilized in the performance measurement system to improve the performance of HEIs.

Keywords: intellectual capital; performance; performance measurement systems

INTRODUCTION

In recent years the competition level for higher education institutions (HEIs) in Indonesia is getting higher. Pratolo, Sofyani, and Anwar (2020) explained that one of the indicators of

HEIs performance in Indonesia is accreditation, where HEIs performance is one of the standard assessment factors. It indicates that when the quality of a campus is not yet good, it signifies that its

performance has not been optimal. The condition of HEIs as proxied by the accreditation score also denotes how well the management is carried out and the extent to which the system and personnel aspects have been well managed, especially private higher education institutions (PHEIs), which are larger than the state higher education institutions (SHEIs) in Indonesia (Pratolo, Mukti, & Anwar, 2020).

As an accredited public organization, HEIs have the primary objectives of knowledge production, transmission, and diffusion. Consequently, HEIs have a vital role in the development of a country by improving the quality of its human resources (Vnoučková, Urbancová, & Smolová, 2018). Given the very strategic objectives of HEIs, efforts to continuously enhance the quality of HEIs in Indonesia by maximizing organizational performance are crucial (Pratolo and Mukti et al., 2020; Vnoučková et al., 2018).

Intellectual capital is one of the factors to improve organizational performance (Cricelli, Greco, Grimaldi & Dueñas, 2018; Jusriadi, Rusydi & Muttalib, 2018; Lu, 2012; Shehzad, Fareed, Zulfiqar, Shahzad & Latif, 2014; Tseng, Lan, Lu & Chen, 2013; Wijayani, 2017). To compete in this competitive environment, HEIs must

not only have advantages on tangible assets but also focus more on their intangible assets (Edvinsson & Malone, 1997; Sveiby, 1997). Several previous studies have emphasized the need to pay attention to the intellectual capital concept as a resource that will bring organizations to a competitive and sustainable advantage (Barbosa, Vale, Teixeira Vale & Castelo Branco, 2016).

In the last few decades, the intellectual capital concept has been applied to several sectors, such as regions, nations, and companies, and mostly focuses on individual firms (Vale, Branco & Ribeiro, 2016). Yet, at the micro level, research on intellectual capital in specific settings, such as HEIs, is rarely done (Barbosa et al., 2016). This condition creates a research gap. In addition, one of the studies on the role of intellectual capital in HEIs has been conducted by Secundo, Margherita, Elia and Passiante (2010) and Sofyani and Khairunisa (2021). Secundo et al. (2010) stated that intellectual capital could improve the performance of HEIs in Italy. The research was conducted in developed European countries and used the exploratory method in one case, while developing countries, such as Indonesia, with different HEIs governance, are essential to scrutinize. Besides, to

expand the literature on intellectual capital on the performance of HEIs, a survey method was employed, which allows for broader inferences (external validity). Furthermore, Sofyani and Khairunisa (2021) have tested per dimension with the relationship to the performance of HEIs and revealed that structural and relational capital had a significant effect on the performance of HEIs, while human and social capital did not.

However, Barbosa et al. (2016) mentioned that properly utilized and managed intellectual capital will improve organizational performance. Specifically, assessing the performance of HEIs is a complex task, although ranking and accreditation are used to benchmark HEIs (Maingot & Zeghal, 2008). In fact, HEIs are organizations full of intellectual capital, including human, relational, and structural capital. Since each HEIs is different in terms of size, quality, research specialization profiles, management structure, social mission, and vision and mission, an instrument is needed that can be a driver to synchronize the intellectual capital to lead to efforts to improve performance. It is supported by Asiaei, Rezaee, Bontis, Barani, and Sapiei (2021a), referring to the claim of resource orchestration theory that mobilized resources integrated into a

robust system can create better alignment, coordination, and direction for specific organizational achievements. Based on this understanding, better performance of HEIs can be achieved if intellectual capital as a resource for HEIs can be mobilized harmoniously through managerial accounting instruments, i.e., the performance measurement system. However, to this day, related studies that address this research gap are still hard to find.

Hence, this study attempts to extend research from Sofyani and Khairunisa (2021) by providing a novelty, i.e., adding a mediating variable in the form of a performance measurement system as suggested (Asiaei et al., 2021a). Explicitly, this study aims to examines the role of intellectual capital on the performance of HEIs through a performance measurement system as a mediator. This research contributes to the theory, namely treating the performance measurement system as mediation, in which the resources of HEIs, i.e., intellectual capital, are mobilized more effectively, which ultimately results in a sustainable competitive advantage for HEIs by developing a resource orchestration theory. Practically, this research can be used for HEIs to improve performance by utilizing intellectual

capital, translated by the performance measurement system.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Resource Orchestration Theory

Resource orchestration theory was introduced by Sirmon, Hitt, Ireland, and Gilbert (2011). This theory contributes to Resource Based-Value Theory (RBV), i.e., the integration of resource management and asset orchestration to form a more comprehensive framework. Sirmon et al. (2011) explained that resources could affect performance when assets are structured, combined, and utilized appropriately for a particular market. The core of this theory is “resource mobilization,” according to which mobilized resources are integrated into an effective structure to support better alignment, synchronization, and direction for the achievement of a particular organization (Asiaei, Rezaee, Bontis, Barani, & Sapiei, 2021b; Helfat et al., 2009). In this case, HEIs are knowledge-based organizations, so it is assumed that HEIs have high intellectual capital. The intellectual capital of HEIs is a resource that can be mobilized and integrated into a robust performance measurement system to achieve the expected organizational performance.

Relationship between Intellectual Capital and Performance of HEIs

The study of the relationship between intellectual capital and organizational performance is relevant to the resource-based view theory promoted by Barney (1991). This theory argues that organizations can achieve a competitive advantage if they have resources that meet four criteria: valuable, rare, difficult to imitate, and have no equivalent substitutes. From the perspective of this theory, intellectual capital can be identified as a resource that involves human (human capital) and organizational (structural, relational, and social) capital (Barney, 1991). Thus, effectively managed intellectual capital is expected to trigger competitive advantage, as seen from the performance (Sofyani & Khairunisa, 2021).

In the corporate context, specific knowledge assets that organizations can use to improve organizational performance are the potential for human, structural, cultural, and network resources to external parties (Secundo, Ndou, Del Vecchio, & De Pascale, 2020). Several studies in the corporate context have found that intellectual capital could improve company performance. For example, Pratama, Wibowo, and Innayah (2019) stated that intellectual capital could

improve the financial performance of companies in ASEAN. However, studies that empirically examined the role of intellectual capital in the context of HEIs in Indonesia are still few. The findings by Sofyani and Khairunisa (2021) also revealed that intellectual capital had a positive relationship with the performance of HEIs in Indonesia. In detail, Sofyani and Khairunisa (2021) tested the types of dimensions of intellectual capital, and the results obtained by structural and rational means are critical factors determining the performance of HEIs. The structural capital dimension relates to innovation, technology, information systems, and stakeholder aspirations. In comparison, the relational dimension relates to the cooperation and coordination of HEIs with external stakeholders and other organizations outside of HEIs. From the arguments presented, the research hypothesis is as follows:

H₁: Intellectual capital has a positive relationship with university performance.

Relationship between Performance Measurement System and Performance of HEIs

Implementing the performance measurement system can lead individual organizations to achieve

better performance based on acceptance and awareness of work targets, and it aligns with goal-setting theory (Basri, 2013; Sofyani & Nazaruddin, 2019). Implementing a performance measurement system will also make individuals work according to the track as it is clear and structured (Sofyani & Nazaruddin, 2019). Furthermore, Hall (2008) added that a comprehensive performance measurement system is essential in evaluating managerial performance. In addition, the performance measurement mechanism will encourage managers to try to achieve company goals (Asiaei & Bontis, 2019).

In HEIs, the implementation of the performance measurement system has been investigated by Sofyani and Nazaruddin (2019) and Tjahjadi, Soewarno, Astri, and Hariyati (2019), which resulted that the existence of an effective performance measurement system as part of the structural capital of HEIs could increase the motivation of lecturers to improve performance and further enhance the performance of HEIs. Besides, Kaplan, Norton, and Rugelsjoen (2010) asserted that the performance measurement system is closely related to the strategy to create a comprehensive mutual understanding of the organization's

vision, mission, goals, and objectives. From the arguments presented, the research hypothesis is as follows:

H₂: The implementation of the performance measurement system has a positive relationship with the performance of HEIs.

Mediation of Performance Measurement System

According to resource orchestration theory, if mobilized resources are integrated into a robust system, it will create better alignment, coordination, and direction for the achievement of certain organizations (Asiaei et al., 2021b). In the context of this research, intellectual capital as a mobilized resource is integrated into the system, i.e., the performance measurement system, which is expected to be used in improving the performance of HEIs. It is also reinforced by Asiaei and Jusoh (2017), who stated that if intellectual capital is not identified, managed, and assessed properly through an impressive performance measurement system, it will not be effective enough. In addition, Widener (2006) added that the performance measurement mechanism is vital to realizing and managing strategic assets to increase organizational performance.

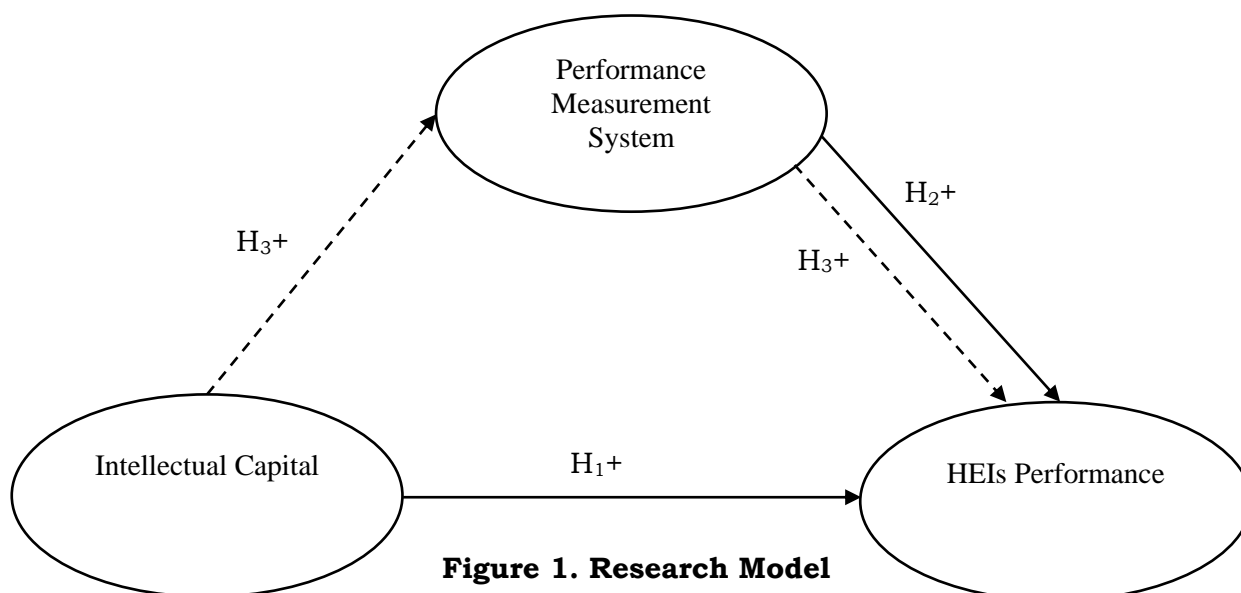
Moreover, HEIs are knowledge-based organizations; thus, it is assumed that HEIs have greater knowledge resources to prioritize a more developed performance measurement system, including a variety of non-financial and financial performance measures (diversity of performance measurement) (Asiaei et al., 2021b). Implementing a performance measurement system will improve the performance of HEIs since they will be more focused and help concentrate on the strategic dimension. In line with the discussion above, the hypothesis formulated is:

H₃: The relationship between intellectual capital and HEIs performance is mediated by implementing the performance measurement system.

Departing from the formulated hypotheses, the researchers constructed a research model as presented in Figure 1.

METHOD

This quantitative study used a questionnaire survey distributed to private HEIs in several provinces on Java Island, Indonesia. This study also employed a purposive sampling technique, where respondents were selected with the criteria of structural officials involved in financial management in HEIs.



The respondents were represented by HEIs management at different levels, including the chancellor, vice-chancellor, faculty dean and the heads of study programmes. We chose these criteria because they are considered familiar with the financial management process in tertiary institutions. Thus, it was intended so that the research respondents had sufficient knowledge to answer the questions in the questionnaire.

The data collection process was carried out for six months, from January to August 2021. The questionnaires received from respondents were those filled out completely and could be analyzed. In this study, the sample size was calculated using Hair, Black, Babin, Anderson, and Tatham (1998), where the sample was determined using the

“10 times rule.” The minimum sample must be 100 (10 x 10). Since the sample size collected for this study was 186, this requirement was met.

In addition, the data used were primary data obtained directly from respondents, using a Likert scale of 1-5, where 1 indicates "strongly disagree" to 5 "strongly agree". The instrument employed was adapted from Sofyani and Khairunisa (2021) for intellectual capital, referring to Singgih and Rahmayanti (2008) for financial performance, based on the Appendix of BAN PT (APT assessment matrix) for operational performance and alluding to Istianingsih and Utami (2009) for a performance measurement system. Besides, the questionnaire was consulted and validated by involving four expert lecturers in the field of accounting research with a survey approach. The

questionnaire had also been piloted involving 17 respondents with characteristics similar to the real study sample.

Before testing the hypothesis, Partial Least Square (PLS) was used. One of the substantive reasons for using PLS is that PLS can increase the complexity of the model (Nitzl, 2016). The PLS approach is also suitable for this study as it requires a relatively small sample size (Chin, Marcolin, & Newsted, 2003). Based on Hair Jr, Sarstedt, Hopkins, and Kuppelwieser (2014), using PLS requires stages consisting of (1) model specifications, (2) evaluation of outer models (validity and reliability), and (3) evaluation of inner models.

RESULTS AND DISCUSSION

This study obtained a sample of 186, with the most respondents coming from universities with a percentage of 41%, located in the Special Region of Yogyakarta with a percentage of 18%, and accreditation B having a percentage of 47% (Table 1). Before testing the hypothesis, validity and reliability tests were carried out by testing the outer model. The validity test consists of convergent validity and discriminant validity. Referring to Hair Jr et al. (2014), the values of outer loading and average variance extract (AVE) were used to evaluate convergent validity (Table 2).

Table 1. Descriptive Statistics

No	Information	Description	Total	Percentage (%)
1	Types of HEIs	Number of samples	186	
		Polytechnic	9	4
		College	69	37
		University	77	41
		Institute	9	5
		Academy	22	12
		Number of samples	186	
2	Province	West Java	30	16
		Banten	30	16
		Jakarta Metropolitan Area	30	16
		Central Java	32	17
		East Java	34	18
		Special Region of Yogyakarta	30	16
		Number of samples	186	
3	Accreditation	A	15	8
		B	87	47
		C	48	26
		Not yet accredited	36	19

Table 2. Outer Loading

Latent Variables	Code	Indicators	Outer Loading
Financial Performance	FP1	My HEIs procures goods/services with price selection to get the cheapest goods/services but still follows the quality standards of goods/services that have been set.	0.801
	FP2	My HEIs uses resources in the form of goods to maximize the outcomes that have been set.	0.761
	FP3	My HEIs uses resources in the form of services to maximize the outcomes that have been set.	0.733
Operational Performance	OP1	The teaching and learning process in the classroom achieves the objectives according to the RPS (semester lesson plan).	0.657
	OP5	The level of quality of facilities and infrastructure available at your HEIs	0.670
Intellectual Capital	IC1	The leadership of my HEIs can monitor the achievement of organizational performance well.	0.778
	IC2	My HEIs has a reliable information system to support college services.	0.775
	IC3	My HEIs has relatively better idea creativity compared to other campuses in service.	0.786
	IC4	The input of parents/guardians of students is always a consideration in improving my HEIs services.	0.639
	IC5	My HEIs is active in establishing relationships with other HEIs in various regions.	0.637
Performance Measurement System	PMS1	Based on performance information, my HEIs is taking follow-up actions to improve organizational performance.	0.809
	PMS2	At my HEIs, the performance measurement system at the work unit is carried out quickly and on time.	0.855
	PMS3	Based on personnel information, my HEIs follows up on improving the performance of lecturers and education staff.	0.733
	PMS4	At my HEIs, the quality of the personnel performance measurement system is evaluated every period.	0.826
	PMS5	The personnel performance measurement system at my HEIs is conducted quickly and on time.	0.853

Source: Authors (2022)

From Table 2, the results obtained by indicators that did not meet the requirements of less than 0.5 were FP4, FP5, OP2, OP3, and OP4, so they were eliminated. Table 2 also shows that the outer loading value for all items was greater than the required score, 0.5 (Hair Jr et al.,

2014). Furthermore, in PLS, discriminant validity is usually assessed using the Fornell-Lacker criteria. In statistical terms, if the square root of the AVE for a construct has a greater correlation for itself than for other constructs in the model, it can be concluded that discriminant

validity has been met (Fornell & Larcker, 1981) (Table 3).

As shown in Table 4, the AVE value corresponded to the rule of thumb value, greater than 0.5 (Fornell & Larcker, 1981), so it can be concluded that the convergent and discriminant validity were also met (Gefen & Straub, 2005). In addition, the value of Cronbach's Alpha for each construct was more than 0.6, and the Composite reliability value for all constructs showed results in accordance with the rule of thumb, as presented in Table 4 (Chin et al., 2003; Fornell & Larcker, 1981). Thus, it can be concluded that all constructs

met the criteria of validity and reliability, and hypothesis testing could be conducted.

The summary of the hypothesis testing results is presented in Table 5. From these results, intellectual capital and performance measurement systems had a direct relationship with the performance of HEIs. Meanwhile, intellectual capital to performance has a partial mediating relationship through performance systems because intellectual capital and performance measurement systems directly relate to performance without going through or involving mediating variables.

Table 3. Discriminant Validity Test Results Using Fornell-Lacker

	Performance	Intellectual Capital	Performance Measurement System
Performance	0.726		
Intellectual Capital	0.584	0.726	
Performance Measurement System	0.677	0.675	0.817

Source: Authors (2022)

Table 4. Cronbach's Alpha, Composite Reliability, and AVE

	Cronbach's Alpha	Composite Reliability	AVE
Performance	0.774	0.847	0.528
Intellectual Capital	0.775	0.847	0.528
Performance Measurement System	0.875	0.909	0.667

Source: Authors (2022)

Table 5. Hypothesis Test Results

Hypotheses		Original sample (O)	t-statistic	p-value	Conclusion
IC → P	H ₁	0.232	3.566	0.000	Supported
PMS → P	H ₂	0.521	7.700	0.000	Supported
IC → PMS → P	H ₃	0.351	6.158	0.000	Partial Mediation

IC: Intellectual Capital; P: Performance; PMS: Performance Measurement System

Discussion

The results of testing the first and second hypotheses uncovered that intellectual capital and performance measurement systems had a direct positive relationship to the performance of HEIs. It is consistent with the research results of Sofyani and Khairunisa (2021). According to them, effectively managed intellectual capital will improve the performance of HEIs. Furthermore, Sofyani and Khairunisa (2021) found a relationship between intellectual capital and organizational performance in each dimension. The results revealed that structural and relational capital was related to the performance of HEIs in Indonesia. It indicates that increasing innovation, technology, information systems, stakeholder aspirations, and collaboration with other HEIs can improve the performance of HEIs in Indonesia.

These findings also in line with Pratolo et al. (2020) that the innovation of a performance-based budgeting system has been able to improve HEIs performance accompanied by a reward system and participation in planning and management, triggering information disclosure and clarity of goals, so that management at all levels in HEIs can control the realization of their

performance targets. Furthermore, the results of this study also confirm the resource-based view theory, organizations can gain a competitive advantage if they have resources that are valuable, rare, difficult to imitate, and do not have equivalent substitutes. According to this theory, intellectual capital is a resource that includes both human (human capital) and organizational (structural, relational, and social) capital (Barney, 1991; Asiaei et al., 2021b). The performance shows that adequate management intellectual capital is expected to provide a competitive advantage (Sofyani & Khairunisa, 2021). Then this result strengthens previous studies, such as Cricelli et al. (2018), Jusriadi et al. (2018), Lu (2012), Shehzad et al. (2014), Tseng et al. (2013), and Wijayani (2017). However, the majority were carried out in the context of profit organizations, i.e., companies.

Moreover, the results of this study regarding the positive relationship between the implementation of a performance measurement system and performance reinforce the previous research findings, showing that the implementation of a more comprehensive performance measurement system can result in better company performance (Asiaei &

Jusoh, 2017; Micheli & Mura, 2017). A performance measurement mechanism will also encourage managers to try to achieve company goals (Asiaei & Bontis, 2019). Furthermore, the findings of Sofyani and Nazaruddin (2019) stated that the performance measurement system is part of the structural capital of HEIs, so the mechanism for implementing a performance measurement system on HEIs can increase lecturers' motivation to improve their performance and further improve the performance of HEIs.

The Mediating Role of Performance Measurement System

Although the importance of intellectual capital practices and their broad implications for organizational performance has long been recognized, there is still little evidence of the role of certain managerial control systems, particularly performance measurement systems, in improving performance (Asiaei et al., 2021b). For this reason, this study provides evidence regarding applying a performance measurement system in translating intellectual capital to improve performance in non-profit organizations, i.e., HEIs, which is still rarely done.

The third hypothesis results for the mediating testing revealed that

intellectual capital had a positive relationship to the performance of HEIs through implementing a performance measurement system. This result verifies the theory of Sirmon et al. (2011), i.e., resource orchestration theory, suggesting that if mobilized resources are integrated into a robust system, it will be able to create better alignment, coordination, and direction for the achievement of certain organizations.

Further, this research provides theoretical and practical benefits. Theoretically, this study offers an empirical reference to explore the relationship between intellectual capital and the performance of HEIs by introducing a performance measurement system as a mediating variable. More specifically, this study treated the performance measurement system as mediation, in which the resources of HEIs, i.e., intellectual capital, were mobilized more effectively, ultimately resulting in a sustainable competitive advantage for HEIs. It indicates that researchers were inspired by resource orchestration theory to introduce a performance measurement system as a process mechanism and managerial style, providing direction for optimizing the utilization of intangible assets from HEIs. Meanwhile, practically, this research also has

implications for practitioners because of the importance of using a comprehensive management control mechanism, particularly a performance measurement system. Implementation of a performance measurement system will also enable HEIs to translate the broad implications of their intellectual capital for performance improvement. In practice, appropriate performance measurement systems can effectively regulate, synchronize, and align intellectual capital, leading to superior performance overall.

CONCLUSION, IMPLICATION AND LIMITATION

This study aimed to empirically examine the effect of intellectual capital on the performance of HEIs through a performance measurement system as an mediating variable in private HEIs in Java. A total of 186 HEIs comprising different types – university, institute (college), specialised school and academy – were involved. The respondents were represented by HEIs management at different levels, including the chancellor, vice-chancellor, faculty dean and the heads of study programmes. The study found that intellectual capital and performance measurement system positively influenced HEIs performance. It was

also exposed that performance measurement system partially mediated the relationship between intellectual capital and HEIs performance. Furthermore, this study contributes to expanding the literature and practice. This study extends the exploratory study of intellectual capital and performance of HEIs by introducing a performance measurement system as an mediating variable inspired by the resource orchestration theory. Meanwhile, practically, this research helps the leaders of HEIs to translate the broad implications of intellectual capital for improving the performance of HEIs using a performance measurement system.

This study has limitations, which are important to note for readers. First, this study could not generalize the results since it was only conducted on private HEIs in Java. Therefore, further research on associated topics needs to be carried out in other areas to continue to develop discussions related to intellectual capital and performance measurement systems in HEIs. Second, this study did not look at the relationship of intellectual capital in each dimension. Thus, for further research, it will be better to update the model by looking at the intellectual relationship in each

dimension. In addition, another limitation of this study is that it did not perform cross-validation as the required secondary data were unavailable. To follow up on this limitation, further studies may be conducted with a qualitative approach to provide more in-depth and detailed exploration results regarding the practice and role of intellectual capital and performance measurement systems in improving the performance of HEIs.

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