

Driving Higher Education Performance Through Human and Relational Capital: The Mediating Role of Knowledge Absorptive Capacity

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Abstract

The purpose of this research is to improve the competitiveness and relevance of higher education institutions in Indonesia, examining the role of human capital, relational capital and knowledge absorptive capacity. With a strategic and integrated approach, the institution is expected to achieve its long-term vision as a center of innovation and sustainable development. This study aims to examine the extent to which human capital and relational capital affect educational performance through the mediating role of knowledge absorptive capacity. This research uses quantitative methods. Data is obtained from 300 people who are lecturers. Data processed using SEM-PLS 4.0. The findings indicate that human capital ($\beta = 0.412$, $p < .001$) and relational capital ($\beta = 0.444$, $p < .001$) significantly enhance knowledge absorptive capacity, which in turn exerts a strong positive influence on higher education outcomes ($\beta = 0.664$, $p < .001$). Moreover, knowledge absorptive capacity mediates the effects of both human and relational capital on institutional performance. These results highlight the strategic importance of leveraging intellectual resources and absorptive mechanisms to improve teaching effectiveness, research productivity, and academic reputation. The study contributes to ongoing debates on intellectual capital and absorptive capacity by offering evidence from Indonesian higher education, a context underexplored in existing literature.

Keywords: Human capital, relational capital, knowledge absorptive capacity, higher education performance

1. Introduction

In the era of globalization and rapid technological advancement, higher education performance is under increasing pressure to meet growing expectations for relevance, quality, and global competitiveness (Tamimi & Munawaroh, 2024). As a key driver of the knowledge-based

economy, the performance of universities plays a crucial role in contributing to national and global development through advancements in science, technology, and innovation. The acceleration of digital transformation has necessitated significant improvements in the quality, adaptability, and responsiveness of higher education performance to address the demands of sustainable economic, social, and cultural development (Wiyanto, 2020). However, despite these imperatives, the performance of many universities remains suboptimal due to various institutional limitations and challenges. One major factor contributing to disparities in higher education performance is the inefficient use of internal strategic resources particularly human capital and relational capital. Gaps in lecturer qualifications, staff competencies, and institutional capabilities reflect an underutilization of available resources needed to achieve educational goals and institutional missions (Pasban & Nojehdeh, 2016). Moreover, limited capacity to identify, assimilate, and apply relevant external knowledge commonly referred to as knowledge absorptive capacity (KAC) has further hindered performance improvements.

KAC is increasingly recognized as a vital mechanism through which institutions convert internal and external inputs into measurable performance outcomes (Liao et al., 2023). In this regard, strengthening KAC becomes essential to optimizing both human capital and external partnerships in a way that directly enhances higher education performance (Wu & Fang, 2020). Although human and relational capital have been widely acknowledged as critical for organizational success, there is still limited empirical research exploring how these resources interact with KAC in the context of higher education performance.

This study addresses this gap by proposing a conceptual framework in which KAC mediates the relationship between human capital, relational capital, and higher education performance. The central hypothesis posits that the effectiveness of both internal and external resources in driving performance depends significantly on the institution's absorptive capacity. Specifically, institutions with strong KAC are more likely to improve the quality of education, strategic decision-making, and innovation outcomes.

The study employs a structural model to empirically examine these interrelationships. Theoretically, it contributes to the expanding discourse on absorptive capacity by contextualizing it within the higher education performance domain. Practically, the findings provide actionable insights for educational leaders and policymakers aiming to enhance institutional outcomes by strategically integrating internal competencies with external collaborations. Ultimately, by clarifying the mediating role of absorptive capacity, this study offers a valuable foundation for improving higher education performance particularly in terms of service quality, academic reputation, and contributions to national development in a knowledge-based economy.

1.1 Higher Education Performance

Higher education performance generally refers to how higher education institutions measure, evaluate, and improve their performance across various dimensions. It can be assessed through quality indicators such as teaching effectiveness, curriculum relevance, and the impact of research and learning outcomes on students. To ensure sustainable academic standards,

universities must implement quality assurance systems through both internal and external evaluations. Furthermore, adapting to global changes such as digitalization and labor market demands is essential to enhancing competitiveness and educational quality. With this approach, higher education can continue to innovate and meet the expectations of its stakeholders (Varouchas et al., 2018).

Higher education performance is shaped by the complex and dynamic interplay of four fundamental dimensions: human resources, which encompass the competencies, motivation, and engagement levels of both lecturers and students; environmental factors, including the adequacy of physical infrastructure, accessibility of digital technologies, and the strength of academic culture that promotes collaboration, inquiry, and innovation; material resources, such as the availability and quality of educational content, learning platforms, and research tools that support knowledge construction; and pedagogical methods, which refer to the design and implementation of effective teaching approaches, assessment strategies, and feedback mechanisms. This comprehensive perspective highlights that institutional performance in higher education cannot be attributed solely to the strength of the curriculum or academic content. Rather, it emerges from the synergistic integration of these four interrelated components, all of which must function cohesively to foster an engaging, inclusive, and sustainable learning environment capable of responding to the demands of a rapidly evolving global context (Vasilev et al., 2024).

Higher education performance reflects the effectiveness and efficiency of institutions in carrying out their core functions: education, research, and community service. It is not only measured by academic outputs such as the number of graduates or scientific publications but also by how well institutions create added value for all stakeholders, both internal and external. Higher education performance can be improved through the systematic and strategic use of student academic data. By analyzing academic indicators such as attendance, grades, participation, and student engagement in learning activities, institutions can identify consistent performance patterns as well as anomalies that may signal academic risk. This data-driven approach allows for early detection of students facing learning difficulties or at risk of not completing their studies on time, enabling timely, targeted, and personalized interventions. Additionally, such analysis provides insights into learning trends and the effectiveness of teaching strategies employed by faculty members. Consequently, universities can proactively adjust instructional methods, develop more relevant content, and improve curriculum design based on empirical evidence and students' actual needs. This approach contributes not only to the enhancement of learning quality but also directly impacts graduation rates, student retention, and overall academic satisfaction. In other words, the effective use of academic data serves as a vital foundation for transforming higher education institutions toward more adaptive, inclusive, and performance-based systems (Meghji et al., 2023).

1.2 Human Capital

The theory of human capital focuses on how investment in education, training, and individual development can significantly contribute to macroeconomic growth and micro-level organizational productivity. In this context, human capital is not merely understood as the

accumulation of knowledge and technical skills, but also includes innovation capabilities, critical thinking, and adaptive capacity in response to changes in the work environment. Human capital serves as a strategic asset that determines the performance quality of individuals and institutions. Through their competencies, individuals can make meaningful contributions to achieving organizational goals, enhancing operational efficiency, and strengthening institutional competitiveness in an increasingly dynamic global environment (Yohanes & Hidayati, 2019).

Human capital comprises the collective knowledge, skills, experiences, creativity, and competencies possessed by individuals within an organization, which directly contribute to improved efficiency, innovation, and overall productivity. It encompasses not only formal education and technical expertise but also soft skills, problem-solving abilities, and adaptability to change. As such, human capital is increasingly recognized as a critical strategic asset that plays a central role in building and sustaining an organization's long-term competitive advantage. In contrast to physical or financial capital, human capital is dynamic and cumulative, growing through continuous learning, experience, and capacity development. Its importance becomes particularly evident in knowledge-intensive sectors, such as higher education, where the intellectual capabilities of faculty, researchers, and staff serve as the primary drivers of institutional success. Therefore, investing systematically in the development of employees' knowledge, competencies, and motivation through training, professional development, mentoring, and supportive work environments is not merely a human resources initiative but a foundational strategy for improving organizational resilience, adaptability, and performance outcomes (Pasban & Nojede, 2016).

Human capital is not merely the accumulation of knowledge, it also reflects the extent to which individuals are able to leverage their competencies to innovate and contribute within a business ecosystem. Organizations that effectively understand and develop their human capital are better positioned to adapt to change, foster innovation, and improve performance making it a strategic factor in ensuring sustainability and growth (Nerdrum & Erikson, 2001). Human capital, encompassing employees' knowledge, skills, and creativity, is regarded as the most valuable asset of an organization (Truong & Nguyen, 2024).

1.3 Relational Capital

Relational capital refers to the intangible value derived from the quality and depth of relationships established between an organization and its various stakeholders, including individuals, other organizations, and external entities. These relationships, which encompass formal and informal interactions, are essential contributors to knowledge exchange, collaboration, and long-term organizational success. As an integral component of intellectual capital, relational capital captures the collective trust, loyalty, mutual respect, and goodwill that are developed and sustained over time through consistent engagement, communication, and cooperation. It includes not only external relationships with business partners such as suppliers, customers, governmental institutions, and academic collaborators but also internal networks that facilitate coordination and shared understanding within the organization. This asset plays a pivotal role in creating strategic opportunities, reducing transaction costs, enhancing innovation,

and improving responsiveness to environmental changes. Importantly, relational capital is not static; it evolves based on the organization's ability to maintain credibility, deliver value, and foster meaningful partnerships. In the context of higher education institutions, strong relational capital with stakeholders such as alumni, industry partners, and international institutions can significantly enhance institutional reputation, resource mobilization, and performance outcomes (Thi Mai Anh et al., 2019).

Relational capital also plays a vital role in enhancing organizational effectiveness, particularly in contexts where external collaboration and interorganizational partnerships are critical to achieving strategic objectives. It reflects not only the existence of interpersonal and institutional relationships but also the quality and sustainability of these connections, which are built through consistent, transparent, and meaningful communication over time. The ability of individuals or institutions to foster and maintain strong relational ties grounded in trust, reciprocity, and mutual understanding serves as a key enabler of organizational agility, innovation, and performance. These trust-based relationships create an environment in which open information exchange is encouraged, decision-making is more cohesive, and coordination is streamlined across organizational boundaries. Furthermore, relational capital supports the co-creation of knowledge, facilitates the alignment of shared values and goals, and helps overcome cultural, operational, or structural barriers in cross-functional or cross-institutional collaborations. In both academic and professional domains, the strength of relational capital can determine the success of collaborative projects, joint ventures, research partnerships, and stakeholder engagement efforts. As highlighted by Aaltonen and Turkulainen (2018), the development of high-quality interpersonal networks significantly contributes to organizational resilience and long-term effectiveness by enabling synergies that individual actors could not achieve in isolation.

Relational capital encompasses the relationships and networks that an organization maintains with external stakeholders such as customers, suppliers, and business partners. Strong relational capital can enhance marketing performance through the mediation of dynamic capabilities—an organization's ability to adapt to and respond effectively to market changes. By leveraging robust relational capital, organizations can access valuable market insights, better understand customer needs, and improve adaptability, ultimately contributing to improved marketing outcomes (Wibisono et al., 2024).

1.4 Knowledge Absorptive Capacity

The concept of knowledge absorptive capacity (KAC) is defined as an organization's ability to recognize the value of external information, assimilate it, and apply it for commercial purposes. This capability reflects the extent to which an organization can identify, acquire, comprehend, and integrate new knowledge from the external environment to enhance innovation and competitiveness (Sancho-Zamora et al., 2021). KAC is not merely a static capability, but rather a dynamic and process-oriented mechanism involving four key stages: acquisition, assimilation, transformation, and exploitation of knowledge (Easterby-Smith et al., 2008). These stages are influenced by both internal factors such as organizational culture, managerial structure, and human resources and external factors, including strategic partnerships, regulatory frameworks,

and market conditions. Furthermore, internal power dynamics and organizational boundaries play a critical role in shaping how external knowledge is adopted and integrated into innovation processes and strategic decisions.

A widely accepted conceptualization of absorptive capacity differentiates between two core components: potential absorptive capacity (PAC), which refers to an organization’s ability to acquire and assimilate external knowledge, and realized absorptive capacity (RAC), which involves the transformation and exploitation of that knowledge into productive and innovative outcomes (Pereira et al., 2018).

In the context of higher education, these factors manifest in the ability of lecturers and researchers to access and leverage global knowledge, form strategic partnerships with other institutions, and utilize infrastructure that facilitates efficient knowledge exchange. When such factors are optimally managed, knowledge absorptive capacity not only improves an institution’s ability to adapt to external changes but also strengthens evidence-based decision-making, curriculum innovation, and institutional performance as a whole.

1.5 Hypothesis Development

A hypothesis is a formal statement of a set of assumptions that have not yet been proven, but are temporarily used to explain certain facts or phenomena. The following are the hypotheses proposed in this study:

- H1: Human capital has a positive and significant influence on knowledge absorptive capacity.
- H2: Relational capital has a positive and significant influence on knowledge absorptive capacity.
- H3: Knowledge absorptive capacity has a positive and significant influence on higher education performance
- H4: Knowledge absorptive capacity mediates the influence of human capital on higher education performance.
- H5: Knowledge absorptive capacity mediates the influence of relational capital on higher education performance.

The propose model for this research shown in Figure 1.



Figure 1: Research Model

2. Method

This study employed a quantitative research design using a survey method, wherein data were systematically collected through the distribution of structured questionnaires to a total of 300 respondents. The target population for this research consisted of university lecturers, as they represent key academic actors whose insights are essential in assessing institutional performance and the interplay of human capital, relational capital, and absorptive capacity within higher education settings. The selection of respondents was conducted using a non-probability sampling technique, specifically purposive sampling, to ensure the inclusion of participants with relevant academic roles and experience. The sample size of 300 was determined based on the Slovin formula, which is commonly applied in social science research to calculate an appropriate sample size from a known population, with a 95% confidence level and a tolerable margin of error.

To analyze the collected data, the study utilized the Structural Equation Modeling–Partial Least Squares (SEM-PLS) technique. This method was chosen due to its robustness in handling complex models involving multiple latent variables and its suitability for predictive analysis in studies with relatively large samples and non-normal data distributions (Majdina et al., 2024). SEM-PLS also allows for simultaneous examination of both the measurement model (validity and reliability of indicators) and the structural model (relationships between constructs), making it particularly effective for hypothesis testing in exploratory research frameworks.

The questionnaire instrument employed in this study consisted of multiple items aligned with the research variables, each measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). This scale was designed to capture respondents' levels of agreement and perceptions regarding various dimensions of human capital, relational capital, knowledge absorptive capacity, and higher education performance. Prior to full-scale distribution, the questionnaire underwent a pilot test to ensure clarity, reliability, and validity of the measurement items.

3. Results

In this study, lecturers were used as the research sample. A total of 300 respondents completed the questionnaire, consisting of 152 female and 148 male participants, with the majority aged between 35 and 45 years old.

3.1 Measurement Model

The measurement model in this study was evaluated using four main criteria: indicator reliability (loading factors), internal consistency reliability (Cronbach's Alpha and Composite Reliability/CR), convergent validity (Average Variance Extracted/AVE), and discriminant validity. The results of the measurement model evaluation are presented in Table 1.

Table 1. Outer Model Analysis

Variable	Items	Loading	AVE	Cronbach's Alpha	Composite Reliability
Human Capital	HC1	0,812	0,660	0,829	0,886
	HC2	0,813			
	HC3	0,819			
	HC4	0,806			
Relational Capital	RC1	0,868	0,724	0,809	0,887
	RC2	0,844			
	RC3	0,840			
Knowledge Absorptive Capacity	KAC1	0,849	0,705	0,861	0,905
	KAC2	0,836			
	KAC3	0,834			
	KAC4	0,841			
Higher Education Performance	HEP1	0,852	0,694	0,854	0,901
	HEP2	0,838			
	HEP3	0,827			
	HEP4	0,815			

All indicators for each variable exhibit loading values above 0.70, indicating that the indicators contribute significantly to measuring their respective latent constructs (Hair et al., 2019). The Cronbach's Alpha and Composite Reliability (CR) values for all variables exceed the threshold of 0.70, demonstrating good internal consistency reliability. For example, the Human Capital variable has a Cronbach's Alpha of 0.829 and a CR of 0.886. Similarly, the Higher Education Performance variable shows strong reliability, with a Cronbach's Alpha of 0.854 and a CR of 0.901. All variables also meet the criteria for convergent validity, as shown by Average Variance Extracted (AVE) values above 0.50. For instance, the AVE for Relational Capital is 0.724, while the AVE for Knowledge Absorptive Capacity is 0.705, indicating that more than 50% of the variance in the indicators is explained by the respective constructs. Measurement model analysis confirmed reliability and validity (AVE > 0.50; CR > 0.70). Structural model results show significant relationships: human capital → KAC ($\beta = 0.412, p < .001$), relational capital → KAC ($\beta = 0.444, p < .001$), and KAC → performance ($\beta = 0.664, p < .001$). Mediation analysis revealed that KAC significantly transmits the effects of human capital ($\beta = 0.274, p < .001$) and relational capital ($\beta = 0.295, p < .001$) onto higher education performance.

Therefore, the measurement model in this study is considered to have met the criteria for validity and reliability, and is deemed appropriate to proceed to the structural model analysis stage

3.2 Structural Model and Hypotheses Testing

Hypothesis testing or path coefficient analysis (see Figure 2), was conducted to examine the direction and strength of relationships between variables, and whether these relationships are positive or negative. In this stage, the potential for multicollinearity among variables was also evaluated, as it could affect the model’s validity. Multicollinearity was assessed using the Inner Variance Inflation Factor (VIF), with an ideal standard of less than 5. The analysis results showed that all VIF values in this study ranged from 1.00 to 2.088, indicating no significant multicollinearity problems within the model (Hair et al., 2019).

Table 2. Path coefficient

Hypotheses	Original Sample	T statistics	P values
H1: HC -> KAC	0,412	7,483	0,000
H2: RC -> KAC	0,444	8,404	0,000
H3: KAC -> HEP	0,664	13,993	0,000
H4: HC -> KAC -> HE	0,274	6,751	0,000
H5: RC -> KAC -> HEP	0,295	6,741	0,000

Based on Table 2, the hypothesis testing in this study employed the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, which is considered suitable for exploratory and predictive research purposes, especially when the data do not meet normality assumptions and the sample size is relatively small. The significance of the relationships among variables was evaluated using statistical indicators such as p-values, t-statistics, and path coefficients (original sample). The results revealed that Human Capital has a positive and significant influence on Knowledge Absorptive Capacity, with a path coefficient of 0.412 and a t-statistic of 7.483 (p = 0.000), thereby supporting Hypothesis 1. Furthermore, Relational Capital also demonstrated a positive and significant effect on Knowledge Absorptive Capacity, with a coefficient of 0.444 and a t-statistic of 8.404 (p = 0.000), indicating support for Hypothesis 2. Knowledge Absorptive Capacity was found to have a significant positive effect on Higher Education Performance, with a coefficient of 0.664 and a t-statistic of 13.993 (p = 0.000). This finding suggests that the greater the absorptive capacity, the better the higher education performance, thus confirming Hypothesis 3. In addition to direct effects, the mediating effects were also tested. Human Capital, through Knowledge Absorptive Capacity, had a significant indirect effect on Higher Education Performance, with a coefficient of 0.274 and a t-statistic of 6.751 (p = 0.000), supporting Hypothesis 4. Similarly, Relational Capital exerted a significant indirect influence on Higher Education Performance through Knowledge Absorptive Capacity, with a coefficient of 0.295 and a t-statistic of 6.741 (p = 0.000), confirming Hypothesis 5.

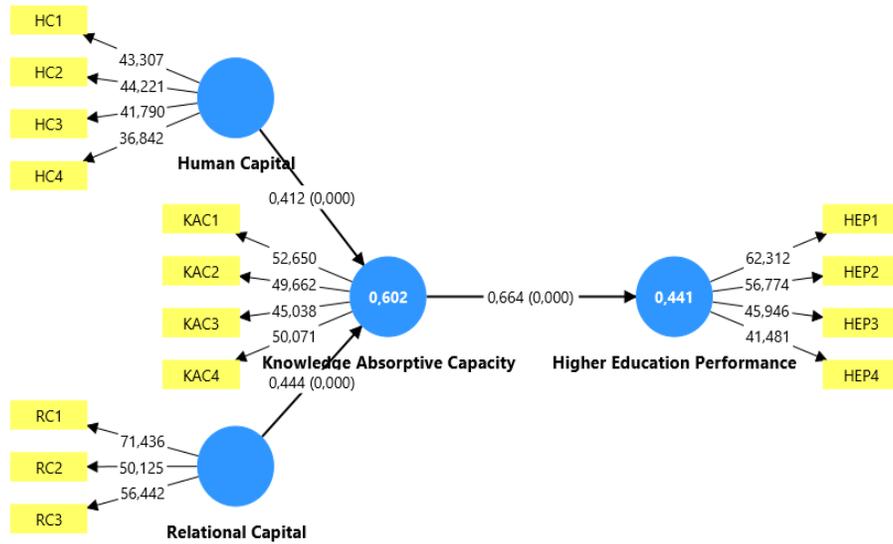


Figure 2. Path Analysis Result

4. Discussion

The statistical results indicating a positive and significant effect of Human Capital on Knowledge Absorptive Capacity are further reinforced by consistent descriptive findings, in which all dimensions of lecturers' human capital are rated positively. This clearly demonstrates that effective investment in and management of lecturers' education, training, experience, and well-being collectively and synergistically enhance the university's ability to effectively identify, absorb, assimilate, and utilize new knowledge. These findings are in line with the study by Khoiriyah, Poernomo, and Iswono (2018), which showed that knowledge absorptive capacity is positively influenced by the quality of human resources, particularly employees who receive good education and training.

Overall, the strength of various dimensions of relational capital both through active collaboration with external parties and a commitment to sustainable strategic partnerships serves as a key pillar supporting the university's knowledge absorptive capacity. Strong external relationships facilitate the flow of information, resources, and opportunities necessary for the university to effectively identify, acquire, assimilate, and transform new knowledge into innovation and superior institutional performance. These findings are consistent with the study by Liao et al. (2023), which emphasizes the importance of relational capital through networks and collaboration in enhancing an organization's knowledge absorptive capacity.

The results of the mediation test clearly demonstrate that knowledge absorptive capacity mediates the relationship between human capital and higher education performance. This indicates that the positive impact of human capital on higher education performance is largely or entirely explained through the intermediary role of knowledge absorptive capacity. Lecturers with strong human capital enhance the university's ability to absorb knowledge, and it is this

improvement in knowledge absorptive capacity that causally drives better performance in various aspects of higher education, such as teaching quality, research productivity, innovation, and operational efficiency. These findings are consistent with the study by Wu and Fang (2020), which stated that knowledge absorptive capacity mediates the effect of human capital on organizational performance, including in educational institutions.

The results of the mediation test clearly indicate that knowledge absorptive capacity mediates the relationship between relational capital and higher education performance. This means that the positive effect of relational capital on university performance occurs primarily through the enhancement of the university's ability to absorb and manage knowledge. Accordingly, strong relational networks across customer, supplier, and partner dimensions enhance the university's knowledge absorptive capacity, which in turn causally drives improvements in various aspects of university performance, such as teaching quality, research productivity, innovation, and operational efficiency. These findings are consistent with the study by Liao et al. (2023), which stated that relational capital strengthens absorptive capacity, thereby improving organizational performance.

5. Conclusion

This study confirms that both human capital and relational capital positively influence knowledge absorptive capacity, which in turn significantly impacts higher education performance. Knowledge absorptive capacity also mediates the relationship between both forms of capital and institutional performance, emphasizing its strategic role in driving academic excellence and innovation.

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