

The Role of Intellectual Capital in Fostering Innovation Capability in Higher Education Institutions

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Abstract

In today's dynamic knowledge economy, higher education institutions (HEI) must emphasize recognizing and assessing their innovation capability to gain a competitive edge in the education industry. This strategic approach allows HEIs to set themselves apart from their competitors. To address this imperative, this study proposes a framework for evaluating HEIs' innovation capability among academicians, focusing on key indicators within human capital, structural capital, and relational capital. Using this proposed framework, the research seeks to gauge the relative importance of the indicators of intellectual capital and innovation capability and establish a prioritized ranking that aligns with higher education goals. The proposed framework will guide future researchers to propose a multilevel research framework and extend it to all stakeholders in building a robust innovation capability foundation for HEIs. Providing valuable guidance empowers decision-makers to prioritize critical resources effectively and enables performance measurement, fostering advancements in higher education objectives. In embracing this approach, HEIs can enhance their adaptability and relevance in an ever-evolving educational landscape.

Keywords: Intellectual Capital, Innovation Capability, Higher Education Institutions

Introduction

Intellectual capital is critical to the success and growth of research universities. Intellectual capital (IC) is defined as an organization's non-tangible, or nonphysical, assets and resources (Bontis, 1999). IC also refers as critical element to establishing organizational success in a competitive circumstances (Subramaniam & Youndt, 2005; Indiran et al., 2021). In this era of competitive knowledge-based economy, IC has modified traditional organizational behaviour; it is considered as an added value to physical assets (Bueno et al., 2004). Without the ability to innovate, competition has a negative impact on business growth (Sivalogathan & Wu, 2015). This circumstance encouraged Malaysian government to foster

the growth of IC management in research universities as universities of research serve as innovation and technology transfer centre. In addition, research universities frequently results in the development of new technology, goods, and services. Research institutions also contribute to economic growth and societal progress by turning research discoveries into practical applications through technology transfer offices and industrial partnerships.

Education industry has placed a greater emphasis on fostering science-industry associations and creating high-technology sectors. With regard to this matter, universities are encouraged to form strategic alliances with worldwide research institutions and foreign universities in order to improve R&D efforts, particularly those involving new, developing technologies. The administration proposes three techniques to attain the aims. The first is the adoption of additional industry attachment programs, which will allow professors to share their knowledge and ideas and thereby improve the quality of their research. The second is to improve the governance of research activities by boosting intellectual property management created in institutions. The final one is to strengthen the function of universities as centres of excellence through industrial partnership in R&D activities to support and accelerate the commercialization of breakthroughs and new technology (Salleh & Omar, 2013). As for example, the Malaysian government released the Graduate Employability Blueprint (GEB) for 2012-2017 in 2012. The GEB strives to increase graduate marketability while meeting the requirement for professional and skilled labour to support national growth.

Nevertheless, the pathways for research institutions in developing countries to participate in the global knowledge economy involve intricate elements such as mobility, technology utilization, collaboration, and other factors (Altbach, 2013). Additionally, the current body of research exploring the connection between intellectual capital and the innovation capability of academicians is limited.

HEIs are responsible for the production of knowledge thanks to their most valuable resources, which include professors, researchers, administrative staff, management teams, students, and any other stakeholders. With the support of their IC, higher education institutions are able to concentrate on implementing new ways of learning in order to effectively transfer important knowledge. Intellectual measurements are essential indicators for HEIs use in order to boost the efficiency of their knowledge-based work. Not only does IC play an important part in enhancing the performance of organisations, but it also helps to strengthen the connections between universities and industries, which is to the benefit of both academicians and practitioners.

Regrettably, there is still an absence of published research on the benefits and contributions of IC to academic institutions and on the development of suitable tools for creating, administering, and assessing IC. The concept of intellectual capital (IC) is a relatively new topic that is receiving a lot of attention from academics, governments, and investors. While the importance of IC as a key indicator of organizational growth in a knowledge economy has been the subject of extensive research in industrialized nations, such as the United States and Japan, research on the topic in emerging economies, particularly within universities, is still lacking. The management and measurement of IC dimensions are both essential areas that call for more research and comprehension from the scientific community. As a result, the purpose of this study is to introduces a research framework to explore the relationship between intellectual capital and innovation capability within Higher Education Institutions.

Literature Review**Intellectual Capital**

The term "IC" was introduced by John Kenneth Galbraith in 1969. Since then, other researchers have defined the idea of IC in various ways. For example, IC is the sum of employees' experience, knowledge, information, and intellectual property (Stewart, 1997). In other words, it is the collective ability of members that includes knowledge perception and learning. In addition, intellectual capital is an important tool to developing internal value (Kelly, 2004; Ren, 2009; Roos et al., 1997; Semenov, 2016; Ali et al., 2023; Indiran et al., 2017). According to Wilkinson, Begthol, and Morra (2009); Campos et al (2022), intellectual capital is a crucial source of competitive advantage for universities. They underline that it is a knowledge-based asset that exists in various states within the institution and can be determined using indicators (Wilkinson et al., 2009). As a result, there is a growing interest in applying the IC-based approach to managing universities, which are defined as organizations that invest in teaching, research, and human resources, and whose primary goals are knowledge generation and dissemination (Leitner and Warden, 2004; Sanchez et al., 2009).

Fazlagic (2005) highlights the significance of measuring universities' intellectual capital for several compelling reasons. Firstly, it is crucial to enhance the transparency of government entities, especially when allocating public funds in a knowledge-based society. Citizens should have continuous and comprehensive access to information in such scenarios. Secondly, comparing the rankings of universities in the press to other benchmarking methods that aim to "measure" rather than "rank" educational institutions would provide readers with a more nuanced understanding of university performance, enabling them to make informed decisions about which university aligns better with their preferences. Moreover, universities should focus on developing and implementing innovative learning approaches. Access to information about their intellectual capital could expedite the sharing of best practices among universities, fostering a culture of continuous improvement. Lastly, a common language of communication is vital to establishing a connection between academia and industry. This shared ground would enable fruitful collaborations between academics and business professionals, benefiting both parties mutually.

The creation and utilization of intellectual capital result from the interactions between organizations and their environments. Notably, intellectual capital serves as both a competitive advantage and a means of building internal value. Universities play a pivotal role in intangible activities, and their function in managing intellectual capital is crucial. Various scholars (Kelly, 2004; Ren, 2009; Roos et al., 1997; Semenov, 2016; Ortega, 2013; Sánchez, 2008; Silvestri and Veltri, 2011; Stewart, 1997; Vidrascu, 2016; Fazlagic, 2005; Leitner, 2004) emphasize that universities are hubs of knowledge, with every action within them contributing to knowledge development and transmission.

While knowledge itself is challenging to measure or observe, the resources and activities associated with it, such as professors, researchers, PhD students, administrative staff, governance modalities, databases, and intellectual property, are more amenable to evaluation. Additionally, the interactions between universities and non-academic partners, like companies, nonprofit organizations, and public authorities, are relevant factors in the context of intellectual capital assessment (Iacoviello et al., 2019).

While some research has explored universities' intellectual capital assessment (Araujo, 2000; Bezhani, 2010; Campos, 2003; Caibano and Sanchez, 2008; Córcoles et al., 2011; Silvestri and Veltri 2011), few studies have investigated the relationship between universities'

intellectual capital and their performance (Brătianu, 2009; Bueno et al., 2016; Kianto, 2007; Secundo et al., 2018). Thus, the quantitative examination of the intellectual capital value creation process in universities remains relatively understudied.

This study seeks to explore intellectual capital's impact on academicians' innovation capability in Malaysian research universities. While there are various classifications for intellectual capital aspects, a considerable number of researchers categorize it into three components: human capital, structural capital, and relational capital (Bontis, 1998; Carson et al., 2004; Chan, 2009; de Castro et al., 2011; Delgado-Verde & Cruz-González, 2010; Huang et al., 2007; O'Donnell & O'Regan, 2001; Pedrini, 2007; Saint-Ogne, 1996). Consequently, this study adopts human capital (HC), structural capital (SC), and relational capital (RC) as the key components of intellectual capital for analysis.

Human Capital

Human capital refers to the collective knowledge, experiences, and skills possessed by the members of an organization (Castro et al., 2011). It emphasizes the significance of individual competencies and problem-solving abilities in contributing to the organization (Suciu & Năsulea, 2019). Cohen and Kaimenakis (2006) assert that human capital serves as a wellspring of innovation as people share and exchange knowledge, contributing their creative ideas. Fitz-enz (2012) defines it as a blend of an individual's attributes, including intellect, commitment, imagination, and creativity, offered to the organization. It encompasses the knowledge, skills, and abilities that employees utilize to achieve organizational goals.

The loss of employees poses a threat to an organization's human capital, as it does not inherently belong to the organization. Torres (2006) defines human capital as the knowledge and abilities individuals acquire while attending university. University administration personnel, including teachers, researchers, and administrators, gain tacit and explicit knowledge value through official and informal training and retraining (Corcoles, Penalver, and Ponce, 2011).

While in HEI, professors and researchers, in particular, contribute to the university's intellectual capital through their teaching capacities and research competencies, such as innovative teaching, teaching quality, research excellence, involvement in national and international projects, and the percentage of doctoral qualifications. By integrating their intellectual capital into the university's production structure, administrative and service employees play a crucial role in transforming tacit knowledge into explicit knowledge. Additionally, students serve as a conduit for knowledge transfer, facilitating the flow of knowledge from professors to the business sector and back to the institution.

Motivating senior academic employees becomes crucial to address this vulnerability and keep pace with the rapidly changing environment. Some academic communities tend to reward their members based on past achievements. Cricelli et al (2018) researched the relationship between intellectual capital and university performance. They developed a model that considers IC aspects (human, structural, and relational) as inputs capable of generating outputs such as research, innovation, and teaching, all aimed at benefiting society. The findings of the study emphasized that human capital significantly impacts innovation performance.

As a result, this study focuses on investigating the pivotal role of HEI in supporting academicians to enhance their innovation capability through improved services. The specific area of interest is the influence of human capital on knowledge transfer from research universities to academicians. Here, human capital refers to the competencies and skills

possessed by individual researchers. Considering the increasing demand for skilled research personnel in today's global economy, universities' human capital becomes particularly vulnerable (Fazlagic, 2005). Hence, this research incorporated the concept of human capital dimension as proposed by Sharabathi et al (2010), encompassing elements such as learning and education, experience and expertise, and innovation and creativity within HEIs.

Structural Capital

Structural capital, as defined by Bothayi and Karimi (2009) and supported by Betis et al (2000), encompasses all intangible knowledge repositories within an organization, including databases, organizational charts, procedures, and rules, which hold higher value than tangible assets. For universities, Structural Capital involves not only the knowledge generated through internal organizational processes but also the effective management of relationships among researchers, technology components, and organizational culture, as indicated by (Feng et al., 2012; Corcoles et al., 2011; Lu, 2012). The inherent value of universities' structural capital is demonstrated through various factors, such as intellectual property recognition, technical advancements, patents, licenses, publications, databases, bibliographic resources, and effective management processes, as revealed by (Corcoles et al., 2011).

Additionally, Structural Capital in universities is closely tied to the accreditation and certification processes, as highlighted by Koch et al (2000). Recent studies have underscored the significance of structural capital in universities, emphasizing its role as a crucial non-human knowledge repository that profoundly influences their performance and success (Bothayi and Karimi, 2009; Betis et al., 2000; Feng et al., 2012; Corcoles et al., 2011; Lu, 2012; Koch et al., 2000). Consequently, understanding and effectively managing structural capital is imperative for universities to thrive in today's knowledge-based economy.

Therefore, this study propose the structural capital of HEI in aiding academicians by offering better service to improve their ability to innovate. The majority of past literature demonstrated a positive relationship between human capital and innovative capabilities. Cricelli et al (2018) investigated the association between intellectual capital and university performance. Intellectual capital is measured using human, structural, and relational capital. Further, the performance of universities was measured in terms of research and innovation, as well as education. Government financial resources, the number of scientific journals published, the number of bachelor, PhD, master, and specialization programmes, and research groups used as structural capital components. According to the study's correlation coefficients, SC are favourably associated to university performance. Furthermore, in the United Kingdom, as in the rest of Europe, the number of academic spinoffs (ASO) has progressively expanded in response to pressures to commercialize the research base or provide knowledge-based services for larger corporations that subcontract R&D operations such as experimental testing (Mariani et al., 2018). As a result, this research adapted from Sharabathi et al (2010) conceptualization of structural capital into its study. This encompassing framework comprises various components, such as system and process, research and development (R&D), and intellectual property rights (IPR) within the context of HEIs.

Relational Capital

Relational capital refers to an organization's relationship and connection with its external stakeholders (Perez et al., 2011; Ramirez et al., 2014; Sanchez et al., 2006; Torres, 2006; Warden, 2003). It includes partnerships with other universities, private and public

groups, and the university's image both inside and beyond the university (Torres, 2006; Reza, 2010).

This research aimed to explore into the significance of relational capital in HEI as a crucial element in supporting academicians to enhance their innovative capabilities through improved services. According to Secundo et al (2018), the interaction between academics and external stakeholders, including other universities, research institutions, investors, corporations, and government entities, is vital in creating value within the academic environment. Neo-institutional sociology (NIS) theory suggests that universities utilize performance-planning and performance-measurement tools to project a distinct image and gain stakeholders' approval (Carmona et al., 2013). Additionally, these tools help reduce internal management ambiguity, fostering rational and efficient behaviours (Greenwood et al., 2002; Parker, 2007).

In the context of Jordanian universities, Najim et al (2012) found that intellectual capital significantly influences university performance in achieving their goals. Leadership, human capital, and relational capital emerged as crucial factors in accomplishing university objectives, surpassing the impact of structural capital. This finding indicates that universities may not be fully optimizing their systems, programs, and information technology to their advantage. Meanwhile, Golshahi et al (2015) developed and evaluated intellectual capital indicators in higher education institutions, primarily from the perspective of faculty members. The study included various indicators to assess relational capital, such as faculty members' participation in conferences, scientific meetings, workshops, and offering dissertation advice. The results demonstrated a positive relationship between relational capital, infrastructural development, and international engagement.

As HEIs undergo transformations in their accountability principles and adapt to the modern university setup (Mariani et al., 2018), they increasingly strengthen their relationships with social partners, particularly businesses. This move comes in response to economic demands that have sometimes been perceived as conflicting with the traditional public nature of knowledge production. In summary, this study highlights the crucial role of relational capital in HEIs, emphasizing the importance of collaborations with external stakeholders for value creation and achieving institutional goals. Consequently, this study integrated Sharabathi et al.'s (2010) conceptualization of relational capital into its research, encompassing three key components: strategic alliances, licensing and agreements, and external relations, along with customer knowledge, all within the context of Higher Education Institutions (HEIs).

Innovation Capability

Innovation capability, as a dependent variable in academic research, has become an increasingly significant area of investigation in the modern era of knowledge-driven economies and highly competitive academic landscapes. The ability of HEI and researchers to innovate is crucial for fostering advancements in various disciplines, driving economic growth, and addressing societal challenges. This paper aims to explore and understand the factors that influence innovation capability within the context of academic research.

Innovation capability refers to an organization's capacity to generate novel ideas, develop groundbreaking solutions, and effectively implement these innovations to achieve a competitive advantage and create value (Akram & Hilman, 2017). In the academic context, innovation capability encompasses the capacity of researchers, departments, and universities to push the boundaries of knowledge, produce groundbreaking research, and translate

academic findings into practical applications that positively impact various industries and society as a whole (Hamón et al., 2017).

Cankul (2019) provides a comprehensive definition of innovation as the implementation of novel, significantly improved, or distinct products, processes, new marketing methods, or the realization of fresh organizational approaches within an enterprise's workplace organization, internal applications, or external interactions. Furthermore, innovation entails the acceptance of new ideas, attitudes, or behaviors by the organization. Simultaneously, innovation serves as a powerful tool to shield an organization from the challenges posed by a constantly evolving environment and ensures the development of plans and programs for new products, organizational structures, and systems (Turgut and Beenirbas, 2013).

In addition to these definitions, the Massachusetts Institute of Technology (MIT) has demonstrated remarkable success in fostering collaborations with the industry, creating a two-way flow of knowledge that enriches and guides university-based research, and facilitating the transfer of both codified and tacit technology from the university to the business sector. Furthermore, according to Salleh and Omar (2013), knowledge exchange innovation (SIKE) proves highly effective in generating novel and innovative concepts that facilitate information exchange. Consequently, universities are encouraged to establish strategic alliances with global research institutions and foreign universities to enhance their research and development endeavors, particularly in the realm of emerging and advancing technologies. To achieve these objectives, the administration proposes three key techniques. Firstly, the adoption of additional industry attachment programs is recommended, allowing professors to share their knowledge and ideas, thereby enriching the quality of their research. By fostering collaboration with industries, academia can benefit from practical insights and real-world applications, leading to more impactful and relevant research outcomes. Secondly, an emphasis on improving the governance of research activities is suggested by enhancing intellectual property management within institutions. This step ensures that valuable intellectual assets resulting from research efforts are appropriately protected, promoted, and commercialized, fostering a culture of innovation and encouraging the development of marketable solutions. Lastly, the role of universities as centers of excellence can be strengthened through industrial partnerships in research and development activities, supporting and expediting the process of commercializing breakthroughs and new technologies. Collaborating with industries not only accelerates the translation of academic findings into practical applications but also enhances the potential for economic growth and societal impact.

By implementing these three techniques, universities can not only promote knowledge exchange and innovation but also advance their research capabilities. Moreover, they can actively contribute to the development and commercialization of transformative technologies, thus solidifying their position as crucial drivers of innovation in today's global landscape. In line with this vision, the Malaysian government strongly advocates for active collaboration between universities and industries, recognizing its potential positive impact on the national economy. The government has recently undertaken a transformational initiative for Malaysian universities as part of this commitment. The primary goal of this endeavor is to shift these institutions from mere conduits for research and education to active contributors to income generation and profitable development (Yaakub et al., 2011). Through these concerted efforts, universities in Malaysia are poised to play a pivotal role in fostering innovation, fostering fruitful partnerships with industries, and bolstering economic growth. By bridging the gap between academia and the corporate world, these transformed

institutions can unlock new avenues for research and technology commercialization, driving societal progress and economic prosperity.

Conceptual Framework

Thus, this study integrated Sharabathi et al.'s (2010) proposed concept of human capital dimension, which encompasses vital elements such as learning and education, experience and expertise, and innovation and creativity, within the context of Higher Education Institutions (HEIs). The research presents a conceptual framework (Figure 1) that explores the relationship between intellectual capital and innovation capabilities in the realm of higher education. The independent variable under examination is intellectual capital, which encompasses intangible assets within an organization, including human capital, structural capital, and relational capital. Furthermore, the research also adopted Sharabathi et al.'s (2010) conceptualization of structural capital into its investigation. This comprehensive framework comprises various components, such as system and process, research and development (R&D), and intellectual property rights (IPR), all within the context of HEIs. In addition to that, the study incorporated the concept of relational capital, as proposed by Sharabathi et al (2010), into its research. This conceptualization encompasses three pivotal components: strategic alliances, licensing and agreements, external relations, and customer knowledge, all of which play a significant role within the context of Higher Education Institutions. On the other hand, the dependent variable in this research is innovation capability, which illustrates an organization's capacity to generate and effectively apply novel ideas and technology. As such, this section of the study focuses on investigating how distinct components of intellectual capital independently impact the organization's innovation capability. Overall, this research delves into the interplay between intellectual capital and innovation capability in the specific context of higher education, shedding light on the crucial

factors that influence HEIs’ ability to foster creativity, generate knowledge, and drive innovation.

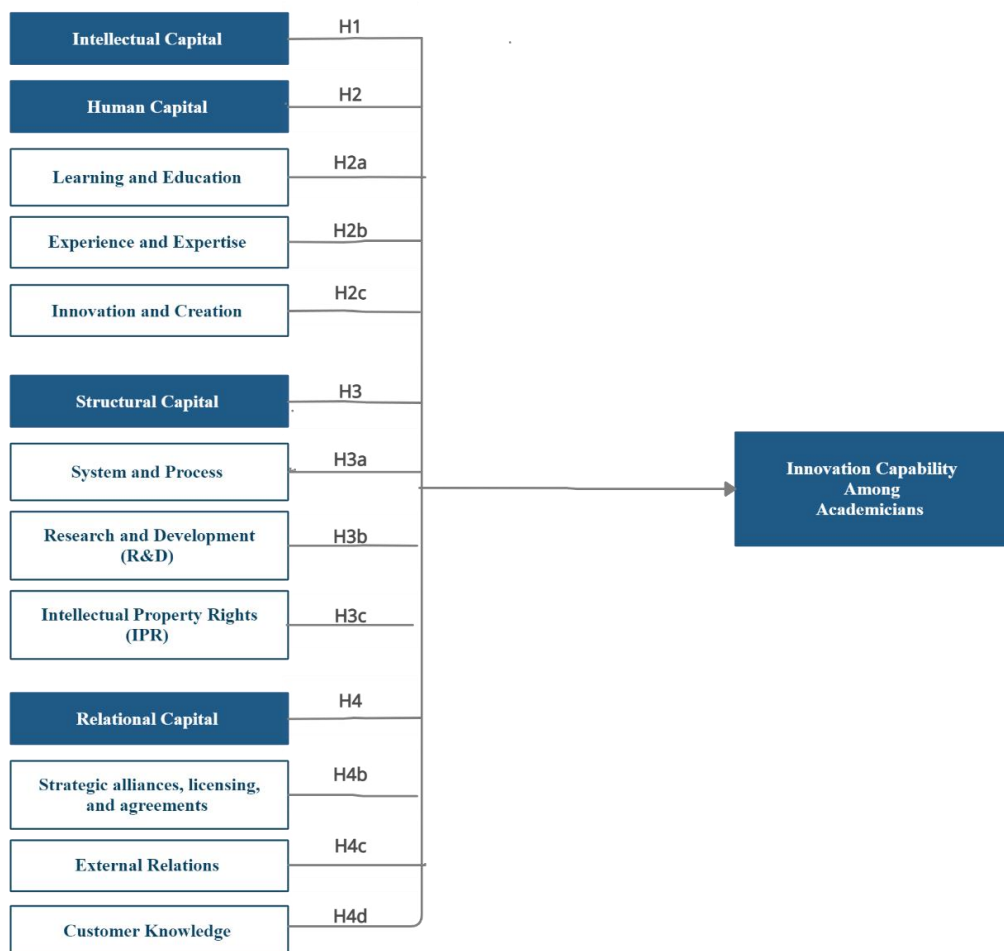
Figure 1: Conceptual Framework

Future Recommendation and Conclusion

Numerous previous studies have extensively examined intellectual capital, particularly concerning its impact on organizational performance. However, a pertinent question arises: "Is there enough substantial evidence or research that establishes a direct connection between intellectual capital and innovation capability?" Furthermore, have such investigations been specifically conducted in the context of Higher Education Institutions (HEIs)? This inquiry highlights the potential need for further research, and it opens the door to several recommendations for future studies in this domain.

The first recommendation entails broadening the scope of intellectual capital analysis by including other crucial elements, such as technology capital, process capital, and customer capital. By incorporating these additional dimensions, researchers can gain a more comprehensive understanding of how diverse aspects of intellectual capital contribute to innovation capability within HEIs.

The second recommendation involves exploring intermediate variables that could potentially act as mediators or moderators in the relationship between intellectual capital



and innovation capability in HEIs. Identifying and comprehending these intermediary factors can shed light on the underlying mechanisms through which intellectual capital influences

innovation outcomes, offering valuable insights for optimizing the innovation process in academic settings.

The third recommendation centers on adopting a multidimensional approach to the dependent variable, namely innovation capability. This entails recognizing that innovation capability encompasses various dimensions, such as product innovation, process innovation, and organizational innovation or incremental innovation and radical innovation. By capturing this multi-faceted perspective, researchers can paint a more nuanced and accurate picture of the innovation landscape within HEIs.

By embracing these recommendations and directing future research efforts in these directions, we can foster a more robust understanding of the intricate relationship between intellectual capital and innovation capability within the realm of HEI. This, in turn, has the potential to enrich academic practices, promote knowledge creation, and ultimately contribute to societal progress and development.

The purpose of this study is to make valuable contributions by continually evolving approaches to effectively managing IC knowledge, which incorporate a variety of capabilities. The research will concentrate on how HEIs can formalise, capture, and leverage their intangible assets to influence academicians' levels of innovation capability.

In the nutshell, this study propose a conceptual framework on a component of IC that has been subject among scholars in the international context since the early 1990s, encompassing human capital, structural capital, and relational capital. However, many scholars have overlooked IC in the setting of research universities. Thus, the purpose of this article was to investigate the role of Intellectual Capital components connected to research universities, including human capital, structural capital, and relational capital towards innovation capability among academicians.

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