ACADEMIC ABSORPTIVE CAPACITY FOR SOCIAL INNOVATION IN HIGHER EDUCATION RESEARCH AND INNOVATION PLANNING

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Abstract. This study explores how Higher Education Institutions (HEIs) contribute to societal progress by enhancing research and innovation through the integration of social innovation. It emphasizes the need for holistic collaboration between HEIs, government agencies, NGOs, and communities. Central to this study are the concepts of social innovation and absorptive capacity, which together influence the ability of academics to plan and implement impactful research. Using a quantitative research design, data were collected via surveys and analyzed using SPSS 25 and PLS-SEM 3.0. The findings reveal that potential absorptive capacity is significantly related to realized absorptive capacity, and both are positively associated with innovation achievement. These results underscore the significance of academic absorptive capacity in driving innovative research that addresses societal challenges. The study offers valuable insights for research and innovation planning in HEIs, supporting efforts to align academic output with inclusive and sustainable national development goals under the Malaysia MADANI framework.
Keywords: *higher education, absorptive capacity, social innovation, innovation*

Introduction

Technology innovation requires social innovation in perfecting the development of innovation and knowledge in a city (Van Der Have and Rubalcaba, 2015; Klein et al., 2010). Fagerberg et al. (2012) explained that the integration of social innovation into innovation studies is defined as the scientific study of the methods or ways in which innovation occurs, as well as the important factors that affect economic, social, and environmental development (Van Der Have and Rubalcaba, 2015). The European Union (EU) places emphasis on the development of social innovation by renewing the Higher Education agenda, namely, Higher Education Institutions (HEIs) should be involved in the development of their cities and regions, whether through development strategy contributors, cooperation with businesses, the public sector, and volunteer or support community dialogue on societal issues. This agenda enables the academic community to gain incentives, appreciation, and career development if it can meet the goals of this higher education agenda (Moulaert et al., 2017).

Social innovation refers to innovative activities and services that are driven with the goal of meeting social needs and are mostly spread through organisations whose primary purpose is social (Mulgan, 2006). Meanwhile, Unceta et al. (2016) defined social innovation as new products, processes, and methods developed creatively and sustainably, offering better solutions to one or several social demands. Besides that, Howaldt et al. (2016) asserted that the concept of social innovation involves the relationship of technology and business innovation aimed at meeting social demands, societal challenges, and systematic change addressed by actors, networks, and governance (including the role of social entrepreneurs, networks, and consumer engagement) for social change and development through a dynamic process. The Malaysian government has recognized the importance of social innovation in addressing social and economic challenges. The National Social Innovation Blueprint was launched in 2019 to guide and support the development of social innovation in the country. The effectiveness of national planning greatly depends on academics' capacity to utilize social innovation to advance research and innovation excellence in HEIs. Therefore, this study aims to investigate the relationship between potential absorptive capacity and realized absorptive capacity in social innovation, as well as the relationship between both capacities and the achievement of innovation excellence.

Research excellence and social innovation at HEIs

Higher Education Institutions (HEIs) in Malaysia can play a crucial role in technological and social innovation by promoting research, collaboration, and entrepreneurship. Through interactions between the Quadruple Helix, Miller et al., (2016) improved understanding of knowledge transfer from institutions into knowledge region ecosystems. The construct is used to assess the multifaceted knowledge transfer process of universities and stakeholders involved in achieving innovative excellence and commercialization. It is based on the conceptual framework of absorptive capacity. An organization's absorptive capability serves as a guideline (Malvesiti et al., 2021) The process of learning to preserve knowledge is essential for transitioning from an industrial society to a knowledge-based society. The ability of academics to incorporate aspects of social innovation in their research efforts is evaluated on an individual basis (Hanafi et al., 2018). To satisfy specific measurement criteria, the social innovation capability assessment items for academics were slightly modified. The absorptive capacity (ACAP) of social innovation is measured through two variables, namely the potential absorptive capacity of social innovation and the realized absorptive capacity of social innovation. In line with the Regional Social Innovation Index (RESINDEX) model assessment (Unceta et al., 2016; Innobasque, 2013).

Potential Absorptive Capacity (PACAP) of social innovation

This concept represents the process of identification and assimilation, which is an aspect of absorptive capacity. As recommended by Mariano and Walter (2015), investigating actual and projected absorption capacity (Zahra and George, 2002). The prospective capacity of individual knowledge to assimilate components of social innovation in research is evaluated using the five primary constructs listed below.

Knowledge capacity

The variable of capacity for knowledge involves the effort to search for ideas and external sources of knowledge related to the needs and wants of society (Yusoh et al., 2023; Benneworth and Cunha, 2015; Moulaert et al., 2013). Therefore, the question arises as to whether academics can effectively consider the advantages and disadvantages of existing products and services. This variable also assesses whether academics consider the needs and problems of society in conducting research, as well as the systematic research required to meet the social demands of society. Ultimately, academics must strive to harness the potential of external knowledge to produce research that effectively addresses societal needs.

Learning capacity

Examines the ability of academics to acquire knowledge from external sources. Therefore, this variable looks at the efforts of academics to learn from various sources, such as attending lectures, seminars, and exhibitions organized by their own university, other universities, NGOs, government agencies, or industry partners. These efforts aim to deepen their understanding of scientific knowledge to develop research oriented towards social innovation.

Capacity for socialization

This variable is introduced in RESINDEX with the aim of looking at creative social ideas. Research and development conducted by academics prioritize the social benefits of society. The involvement of the community in activities that exchange information and knowledge enables them to better understand what they experience and what they want, ultimately meeting their needs and solving their problems. This variable also examines whether academics make an effort to understand the needs of society and link them to the research and development they conduct.

Capacity for development

Development refers to the ability of academics to conduct research effectively. How academics develop research ideas, whether by using new ideas, ideas from previous researchers, or combining or refining ideas from previous research. These sources of ideas influence the direction and goals of the research to be conducted. Based on the development and use of these ideas, can academics produce research that meets and solves societal problems? Furthermore, producing research outputs that benefit society in terms of economic, social, and environmental aspects.

Capacity for association

According to Baraldi et al. (2013), the degree of depth, strength, and importance of links between particular parties is used to evaluate the academic association's potential. This level begins with the smallest relationship, which is contact, and progresses to participation in discussions and communities, ultimately resulting in cooperation involving knowledge exchange and joint activities. Furthermore, it forms deep collaboration involving sharing resources to achieve the same goals, and ultimately, a full relationship with high levels of interdependence (Jonsson et al., 2015).

Realized Absorptive Capacity (RACAP) of social innovation

The realized absorptive capacity, introduced by Zahra and George (2002), involves the processes of transformation, implementation, and exploitation. The context of realized capacity is to incorporate and exchange external knowledge and to use and implement that new knowledge in the production of social innovation. The components are briefly defined as follows:

Knowledge acquisition

The knowledge acquisition capability aims to address the social needs of the community. This variable refers to the academic's ability to acquire knowledge from various sources and collaborations. This capability helps academics to realize effective social innovation. The sources of ideas can come from internal sources, such as universities, regional organizations, such as industry, NGOs, and research agencies. Academics can also acquire ideas from local and regional administrations. Furthermore, academics can acquire social innovation ideas from the local community and society.

Development of social projects

The variables for innovation development are very broad, covering sources of funding for social innovation, the evolution and aspects or forms of social innovation. The implementation of social innovation depends on the funding obtained. Funding can help academics develop research that produces excellent social innovation. There are three types of funding: self-funding, public funding, and private funding. Meanwhile, the evolution of development involves four stages. First, the diagnosis stage, which involves identifying and determining existing problems. Second, the research and development process stage. Fourth, the impact stage, which is the result of the research, and finally, the established or sustainable stage. The final stage aims to ensure that the innovation results obtained can have long-lasting effects and benefits.

Impact of social project

The impact of social innovation is a variable that examines the social and organizational impact of the research results. The research on the impact of social innovation is seen through its dissemination to the community. The results of the innovation can be accepted by the community without being disseminated, disseminated to the target users, or disseminated widely. The impact of social innovation is evaluated based on the community's trust in technology and information as a means of driving societal change. Changes in terms of wealth, sustainable environment, and social welfare of the community.

Governance

The variables of social innovation governance are complex as they involve various forms of governance, including social governance, organizational governance, and sustainability governance. In the context of this study, academics acquire innovation through collaboration with public administrations, companies or firms, universities, technology centers, hospitals or health centers, and NGOs. All of these entities need to work together to ensure that governance runs smoothly in producing a social innovation that meets the community's needs and solves its problems.

Innovation performance

The achievement of research and innovation is adapted from the MyRA measurement. Based on the MyRA scoring, innovation achievement is measured based on book and journal publications, patents, products, and technology licensing. Suhaimi et al. (2022) stated that most academics achieve innovation through journal article publications. The variables in this study add a social innovation element to innovation achievement. Firstly, assessment is conducted through the production of publications in various forms, including books, proceedings, book chapters, and magazine articles. Secondly, publications indexed in journals such as Scopus, WOS, and with an impact factor. Thirdly, the production of research methods and the creation of results. Fourthly, new platforms and regulations were created. Sixth, patents obtained from research results. Seventh, commercialized products and technologies. Eighth, achievement in terms of technology licensing, and finally, the contribution in terms of community development through consultation. These innovations are used to measure the success of research conducted. The study highlights the importance of both realized and potential absorptive capacity in driving innovation and competitiveness (*Figure 1*). As a result, the previously described hypothesis is put out regarding the academics' ability to make contact. Thus, the following hypotheses are proposed: (H1): Potential absorptive capacity of social innovation has a positive and significant relationship with the realized absorptive capacity of social innovation. (H2): Potential absorptive capacity of social innovation has a positive and significant relationship with innovation achievement. (H3): Realized absorptive capacity of social innovation has a positive and significant relationship with the achievement of innovation.

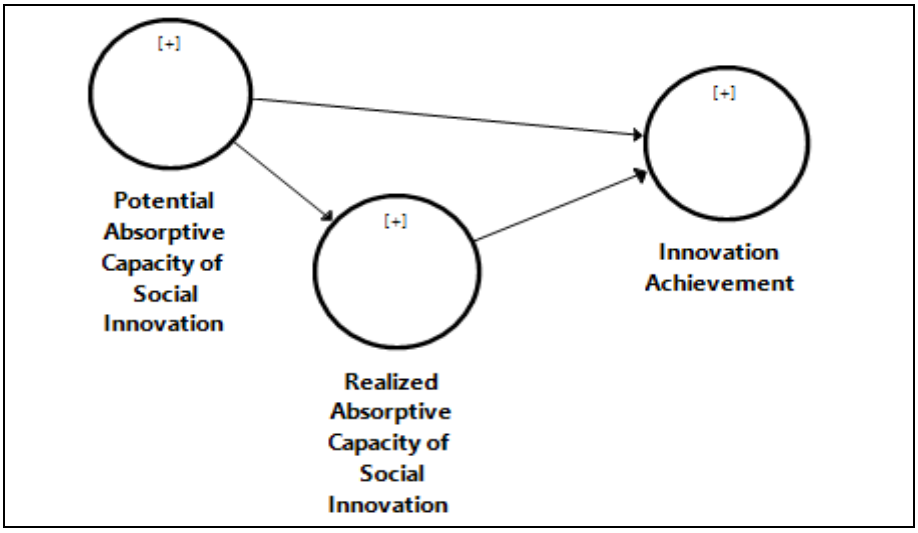

Figure 1. *Research model.*

Materials and Methods

The study's questionnaire was modified and developed from earlier research. Prior to the survey, a pilot test was conducted to evaluate the quality of the measurement items. Most respondents answered the questionnaire online through a Google Form. The questionnaire was developed using RESINDEX as a basis and processed based on individual evaluations based on previous studies. The data collection was statistically

analysed using IBM SPSS version 22 and SmartPLS software version 3. The five Likert-type questions were subjected to a descriptive statistical analysis. The final sample is selected from 8 various public universities in Malaysia and consists of 237 instructors. There were 30 respondents from Universiti Malaya (UM), 31 from Universiti Malaysia Kelantan (UMK), 35 from Universiti Kebangsaan Malaysia (UKM), 35 from Universiti Putra Malaysia (UPM), 20 from Universiti Teknologi Malaysia (UTM), and 35 from Universiti Putra Malaysia (UPM) from the participating universities. While 31 responders (13%), 36 (15%), and 19 (8%) respectively represent University Malaysia Terengganu (UMT), Universiti Sultan Zainal Abidin (UniSZA), and Universiti Malaysia Pahang (UMP).

Results and Discussion

Respondent profile

A total of 237 respondents were examined in this study. *Table 1* provides a summary of the respondents' backgrounds, including their gender, race, marital status, educational background, age, and job title. A total of 102 respondents, or 43%, were men, while 135 respondents, or 57%, were women. There are many other races represented among the respondents, but Malays make up the majority with 219 responses, or 92.4 percent of the total. 9 professors who identify as Chinese responded to the survey (43.8%). Indians make up the remaining 2.1 percent, Bumiputera 1.4 percent, and Punjabis 0.4 percent, respectively. Most of the responders, 201 persons, or 84.8 percent, are academics who are married. Meanwhile, five respondents (2.1%) are divorced or widowed, and 31 respondents (13%) are single.

Table 1. *Respondents' demographic.*

Categories		Frekuensi	Peratus
Gender	Male	102	43
	Female	135	57
Ethnicity	Malay	219	92.4
	India	5	2.1
	Chinese	9	3.8
	Bumiputera	3	1.3
	Punjabi	1	0.4
Marital Status	Married	201	84.8
	Never Married	31	13.1
	Divorced, Separated, or Widowed	5	2.1
Age	<30 Years	9	3.8
	31-40 Years	112	47.3
	41-50 Years	85	35.9
	51-60 Years	31	13.1
	Total	237	100.0

According to *Table 2*, there are 48 Associate Professors (20.5%) and 16 individuals with the status of Professor (6.7%), respectively. Academics holding senior lecturer jobs received the most responses, accounting for 107 respondents or 55.7% of all respondents. 40 respondents or 18.9% are teachers in the meantime. 182 respondents, or 82.7%, have a PhD or DBA, the majority of respondents. Of the 42 people who hold a master's academic degree, 29 are lecturers, making up the majority of the post. Only one

respondent simultaneously holds the titles of Professor and Associate Professor, possessing a master's degree.

***Table 2**. Position and academic qualification of respondents.*

Category		Position				Total
		Professor	Associate Professor	Senior Lecturer	Lecturer	
Academic Qualification	PhD/DBA	15	47	122	15	200
	Master	1	1	6	29	37
	Degree	0	0	1	0	1
Total		16	48	129	44	237

Measurement model

As recommended by Hair et al. (2019) and Ramayah et al. (2018), the measurement model was evaluated by looking at the loadings, average variance extracted (AVE), and composite reliability (CR) More specifically, the extent to which the three criteria, that all indicator loadings should exceed 0.5, that the AVE for each construct should be larger than 0.5, and that the CR should exceed 0.7. This has been evaluated and proven to meet the criteria. All the indicator loadings are above 0, as shown in *Table 3* and *Table 4*, and the CR values vary from 0.82 to 0.99, while the AVE values range from 0.50 to 0.63. All three requirements for the measurements' convergent validity are hence.

***Table 3**. Measurement model potential absorptive capacity.*

Construct	Item	Loading	AVE	Composite Reliability
Knowledge Capacity	B1.1	0.607	0.568	0.865
	B1.2	0.842		
	B1.3	0.860		
	B1.4	0.841		
	B1.5	0.563		
Learning Capacity	B2.1	0.753	0.555	0.896
	B2.2	0.753		
	B2.3	0.808		
	B2.4	0.835		
	B2.5	0.792		
	B2.6	0.671		
	B2.7	0.568		
Capacity for socialization	B3.1	0.725	0.516	0.840
	B3.2	0.821		
	B3.3	0.612		
	B3.4	0.807		
	B3.5	0.594		
	B4.3	0.853		
Capacity for Development	B4.4	0.667	0.627	0.833
	B4.5	0.843		
Capacity for Association	B5.1	0.684	0.632	0.895
	B5.2	0.789		
	B5.4	0.826		
	B5.5	0.859		
	B5.6	0.804		

***Table 4**. Measurement model realized absorptive capacity.*

Construct	Item	Loading	AVE	Composite Realibility
Knowledge Acquisition	C1.1	0.680	0.539	0.822
	C1.2	0.811		
	C1.3	0.798		
	C1.4	0.633		
Development_IS	C2.1	0.508	0.507	0.852
	C2.4	0.800		
	C2.5	0.786		
	C2.6	0.841		
	C2.7	0.869		

Impact_IS	C3.3	0.537	0.543	0.821
	C3.4	0.657		
	C3.5	0.890		
	C3.6	0.813		
Governance	C4.1	0.797	0.570	0.902
	C4.2	0.801		
	C4.3	0.660		
	C4.4	0.802		
	C4.5	0.820		
	C4.6	0.706		
	C4.7	0.682		

Predictive relevance of the model

The relevance of a model needs to be predicted by researchers other than evaluating the accuracy of a forecasting model (Stone, 1974). This predictive model was evaluated using the cross-validated redundancy measurement technique represented by the Q2 value (Stone, 1974). Specifically, when PLS-SEM shows relevant prediction, it accurately predicts the indicators for the constructs involved (Hair et al., 2014). If the value of Q2 exceeds 0, it indicates that this value is sufficient to predict relevance in a structural model (Hair et al., 2010). According to Hair et al. (2014), the Q2 value can be obtained through the blindfolding technique available in the SmartPLS Software. The blindfolding technique is used to predict parameters by removing a portion of the data and treating the remaining data as incomplete. The obtained parameters are processed to meet the data that was previously considered raw and incomplete. Next, the blindfolding technique can produce a cross-validation value, which is the Q2 value, as shown in the table below. R2 values of 0.75, 0.50, and 0.25 are regarded as substantial, moderate, and weak, respectively. (Hair et al., 2019; Ramayah et al., 2020). The results' in-sample explanatory power R2 were 0.227 (potential absorptive capacity of social innovation), 0.576 (realized absorptive capacity of social innovation) and 0.205 (innovation achievement). In summary, the R2 values were considered all acceptable for a model like this (*Table 5*).

***Table 5**. Predictive relevance of the model.*

Construct	R2	Q2
Potential Absorptive Capacity of Social Innovation	0.227	0.077
Realized Absorptive Capacity of Social Innovation	0.576	0.179
Innovation Achievement	0.205	0.121

The results of the structured model test for this study are as in *Table 6*. Based on the table below, the results indicate a positive and significant relationship between the construct of potential absorption capacity of social innovation and the construct of realized absorption capacity at a p-value of 0.01 ($\beta = 0.691$, $p < 0.01$). The results of this analysis are sufficient to support H3.

***Table 6**. Hypothesis testing.*

Hypothesis	Relationships	Path Coefficient (β)	t-value	p-value	Results
H1	PACAP IS -> RACAP IS	0.691	12.735	0.000*	Supported
H2	PACAP IS -> Innovation Performance	0.186	2.364	0.009**	Supported
H3	RACAP IS -> Innovation Performance	0.298	4.070	0.000*	Supported

*Note: *p < 0.01, **p < 0.05, ***p >0.05.*

A significant positive relationship between construct of the potential absorptive capacity of social innovation to innovation achievement ($\beta=0.186$, $p < 0.05$). These

coefficient path results are sufficient to support H2. Next, Table 6 shows a significant positive relationship between the realized absorptive capacity of social innovation and innovation achievement ($\beta = 0.298$, $p < 0.01$). Thus, H3 is supported and accepted. By demonstrating a realized absorptive capacity, academia can build stronger partnerships with external stakeholders and improve its capacity to develop innovative solutions to social problems. Through such collaborations, academia can expand its knowledge and expertise, translating this knowledge into practical solutions that have a positive impact on society. The positive relationship between realized absorptive capacity and innovation achievement in academia highlights the importance of fostering an environment that encourages the exchange of knowledge and ideas, as well as the ability to apply this knowledge to develop innovative solutions to social problems.

The study findings indicate that the potential absorptive capacity of academics can enhance innovation excellence achievement. This is because academics can understand the need to conduct research based on social innovation. The potential absorptive capacity of academics shows a significant relationship with the realized absorptive capacity. Consistent with Zhang et al. (2019) study, the realized absorptive capacity aims to transform knowledge acquisition and learning at the potential absorptive capacity level. Academics can realize the potential to produce research that meets the needs and requirements of society. Consistent with the study's findings, which show a significant relationship between potential absorptive capacity and realized absorptive capacity. To improve this measurement model, there are several items that need to be eliminated. Most of the constructs are related to the effects of social innovation.

Conclusion

Overall, these studies demonstrate that academia has the potential to play a significant role in social innovation by building its absorptive capacity through research, education, partnerships, and initiatives. By investing in social innovation, academia can drive the advancement of research and innovation, thereby contributing to the addressing of social challenges for the benefit of society. Planning for the establishment of meaningful research that benefits industry and society, with a focus on sustainable development, has been underway since the Second National Science, Technology, and Innovation Policy (2002-2010). The National Social Innovation Action Plan was developed in 2019 with the goal of implementing a social innovation-based development strategy. Following the Social Innovation Initiative (MyIS), Malaysia's MADANI was launched, focusing on the six pillars of a healthy community. Finally, there is already the capability and planning for community growth. To enhance the interaction between academia and ecosystem support, further research is needed. To aid academics and stakeholders in developing responses to societal and national concerns within the context of social innovation, a comprehensive study of the entire social innovation ecosystem can also be conducted.

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Conflict of interest

The researcher confirms that there is no conflict of interest involving any party in this research study.

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