

## Intellectual Property and Academia Commercialization in Malaysia

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### Abstract

The commercialization of research results in universities has become the main agenda for higher education institutions (HEIs) around the world. This is because the commercialization of research results is seen as a basic way for every university to promote its economic growth and increase the innovation of the industrial sector in a country. In addition, an innovative product produced from academic research also has the potential to be commercialized. This is because it can benefit the local community. However, there are still countries where the rate of commercialization of innovation research in universities is still low. Innovation research results are not denied their rights from the point of view of national law because activities involving ideas and innovations that lead to new creations are intellectual property. Therefore, this study aims to see how the commercialization of research results in universities involving the academic world in Malaysia. This study has used the Systematic Literature Review (SLR) method, which is a method that focuses on the needs of the study. There are three levels to analyze articles that are relevant to the study, namely identification, screening and eligibility. The results of the study show, for the eight articles that have discussed the elements of commercialization of research results in universities, three important elements in the commercialization of innovation research results such as factors that affect commercialization, business models and opportunities and the impact on the local economy and community. This study also suggests that the commercialization of innovation research results of universities in Malaysia can be increased in the future.

**Keywords:** Commercialization, Intellectual Property, Academic Research Results, Innovation

### Introduction

Abu Hasan et al. (2020) stated that knowledge assets are intellectual resources accumulated in the organization in the form of ideas, experience, information, memory, skills, understanding, learning, views and abilities. Most of the intellectual property produced at universities is the result of government-funded research. The ownership of intellectual

property for research funded by the government originally rests with the government as a benefactor (Nasiibah, Zinatul Ashiqin, 2015; Chian Tam et al., 2019; Muda et al., 2021). Universities, as owners, need to register academic research patents for the purpose of obtaining legal protection and publishing them (Sarkam 2015).

Now, the commercialization of research results in public universities is the main agenda for public institutions of higher education in Malaysia. Various efforts have been made in the research and commercialization of innovative technology developed by public universities in Malaysia. Public universities are also seen to be more aggressive in promoting and managing research activities to meet the needs of the population and contribute to the country's economic growth. Among the government's efforts is the launch of the Malaysian Open Science Platform (MOSP), which aims to bridge the gap between research, innovation, and commercialization, thus increasing the country's innovation capacity.

The commercialization of research results is a fundamental way for a university to promote its economic growth and increase the innovation of the industrial sector in a country. However, in developing countries, the commercialization rate of university patents is generally seen as still low (Gu, 2023). Nevertheless, the existence of fierce competition in the global market has put pressure on universities to continue to move forward and survive. This is because, according to Syazwani, Sofian & Hafiza (2022), Malaysia needs to constantly generate and create new sources of growth to remain competitive in this global era. Many universities are trying to increase research and innovation because their influence on the development and values of the university is seen to be very large. However, Olawore et al. (2023) stated that success in achieving this goal is seen as difficult because there are several difficulties related to commercialization assessing the commercialization potential of technology in universities.

### **Literature Review**

In general, knowledge is non-rivalrous and indivisible. Therefore, the use of knowledge is not limited to anyone, but it can be excluded through intellectual property rights and patents (Lisenco, 2021; Kapczynski & Krikorian, 2010). Intellectual Property Rights are rights that arise from the sharing of ideas that produce products or processes that are useful for humans (Anggraeni, Imannudin & Rezki, 2022). Intellectual property includes trademarks, patents, and copyrights that serve as the foundation of brand identity and innovation and protect your ideas from becoming someone else's.

For companies operating in the dynamic Malaysian e-commerce industry, protecting IP rights is paramount. It aims to ensure the protection of proprietary technology, branding assets, and creative works. The World Intellectual Property Organization (WIPO) is also an agency under the United Nations (UN) that was established in 1967 to encourage creative intellectual activity and to facilitate intellectual property around the world. WIPO has also defined Intellectual Property Rights as "Intellectual property rights refer to creations of the mind: inventions; literary and artistic works; and symbols, names and images used in commerce".

Intellectual property rights in force in Malaysia today are the same as in other Commonwealth countries. In general, intellectual property (IP) rights in Malaysia are in accordance with accepted international standards. Malaysia administers intellectual property (IP) rights through an agency operating under the Ministry of Domestic Trade and Consumer Affairs, the Malaysian Intellectual Property Corporation (MyIPO) (Isa & Yasin, 2023). Malaysia is also a

member of the World Intellectual Property Organization (WIPO). Malaysia has signed the Paris Convention that governs intellectual property rights. It is also an agreement on trade-related aspects of intellectual property rights (TRIPS) signed under the auspices of the World Trade Organization (WTO). Intellectual Property Rights (IPR) are legal protection rights for owners of new products or process invention ideas (Cullen, Calitz & Chetty, 2020; Gaikwad, 2020).

Intellectual Property Rights can be seen as a form of compensation or encouragement to produce creative works. Compensation related to all the hard work that the owner has done needs to get a proper reward for the results of his efforts (Anggraeni, Imannudin & Rezki, 2022). According to Anggraeni, Imannudin and Rezki (2022), the legal protection of intellectual property rights is closely related to two administrative systems, namely the constitutive system and the declaration system. A constitutive system is a system that stipulates that in order to obtain legal protection, the work must be registered.

### **Academic Intellectual Property Rights Management**

The literature above clearly explains the definition of Intellectual Property Rights, which is the right of legal protection for the owner of the idea of creating a new product or process. However, there are questions about the relationship between intellectual property and academia. According to Mohammad & Newaz (2018), in the past two decades, many small and medium-sized companies have shifted their focus to technological inventions that lead to entrepreneurship and, at the same time, commercializing their new technologies. Companies also began to invest large sums in research for innovation, and when any innovation occurred and was confirmed to be attractive to the market, they found a competitive advantage. Competitors are also starting to grab innovation. Their innovative companies are in a very insecure position, and to overcome the threat, the application of Intellectual Property Rights (IPR) is seen as one of the best solutions. IPR serves to protect a company's innovation from copying, manufacturing and selling without the owner's permission. Therefore, IPR will be used to protect innovative people and companies.

Broadly, universities are also seen as increasingly required to make their research more relevant to industry needs and to link their research to commercial applications more effectively. Lately, we can also see that the Malaysian government, through the Ministry of Science, Technology and Innovation (MOSTI) and the Ministry of Higher Education Malaysia (MoHE), has encouraged publicly funded research to smooth the transfer of results to industry by establishing intellectual property rights over academic research. Therefore, universities need to ensure the direction of technology and the focus of academic researchers' patent activities in order to encourage the disclosure of discoveries presented by academics and researchers (O'Sullivan et al., 2020). In research settings, individual learning occurs during knowledge sharing, which can improve individual research performance and thereby increase university productivity (Gerbin & Drnovsek 2020). Abu Hasan et al. (2020) stated that the creation of strategic assets is seen as important for the purpose of contributing to better organizational performance. Therefore, Universities also need to consider the advantages of patents, and consideration must be directed to the potential benefits of patents to academic researchers.

Furthermore, universities that carry out the commercialization of research products have provided organizational management (Lasambouw, Sutjiredjeki & Nuryati, 2021). Intellectual Property (IP) management is the strategic and systematic handling of intellectual property assets in an organization. According to Teixeira and Ferreira (2019), the strategic and

systematic management of Intellectual Property Rights (IPR) in universities is very important in the academic context because the inventions produced, although usually developed. The management of academic intellectual property rights starts from the collaboration agreement, the implementation of research, followed by acceptance and evaluation, and finally, the application and promotion of intellectual property rights (Li, 2024). Intellectual property (IP) needs to be managed strategically. Strategic, according to Smith and Hansen (2002), is having an IP strategy instead of managing IP according to business strategy. Therefore, the university needs to look more closely and in detail at how the planned research is in line with the university's strategic goals. This is an important implication for the purpose of the strategy because the strategy is a "bet" from the university to be able to achieve and maintain returns above the capital value.

### **Commercialization of Academia in Malaysia**

The Bayh-Dole Act enacted in the United States in 1980 serves as a model to facilitate university patents to promote the commercialization of university research. It has been imitated by most countries around the world (Weckowska et al., 2018). Therefore, recently, universities around the world have been very active in carrying out scientific research activities and are encouraged to patent the discoveries produced under the Bayh-Dole Act. Malaysia is also no exception to being active in academic research in universities with the involvement of academics and students. According to Syazwani, Sofian & Hafiza (2022), the Ministry of Higher Education (KPT) Malaysia has established Collaborative Research in the Engineering, Science and Technology Program (PKST) to strengthen industry participation and commitment further. In 2014, the ministry also introduced the Public-Private Research Network (PPRN) initiative. PPRN was established to provide a platform and drive collaboration between industry and academia (Ministry of Education Malaysia, 2015).

IPR commercialization refers to business activities with intellectual property, i.e., some inventions that are protected under IPR through some type of business operation, for example, joint ventures (Mohammad & Newaz 2018). O'Sullivan et al. (2020) listed two factors of the commercialization of academic research, namely incentive benefits and reputation effects on the commercialization of academic research. In the United States, academic researchers can benefit from incentives from university patent royalty schemes, where universities share patent royalties with inventors. However, the financial remuneration to academic researchers from royalty-sharing schemes is seen to be quite limited. Accordingly, Ouellette and Tutt (2020) reject that financial benefits are a factor in the commercialization of intellectual property because, according to them, there is no compelling empirical evidence in the United States that increasing the share of royalties to university researchers has a significant impact on university licensing income. As for the impact of reputation on the commercialization of research, some individuals value patents because of the certification awarded by their government related to a novel idea and together with the identification of the person as its creator (Rantanen et al. 2019). Therefore, a patent listed in the curriculum vitae of a professor or researcher is seen as a norm.

In addition, the commercialization of intellectual property is usually linked to the ability of science and technology, and it is closely related to the national development of a country. Meanwhile, national development is linked to the ability of a country's competitiveness to produce productivity produced by humans and be able to compete with foreign countries (Minh & Van, 2022). The commercialization of this intellectual property and innovation can increase the contribution to the university and is important for social and economic

development for sustainable growth. Therefore, maintaining a competitive advantage is very important for a business organization (Abu Hasan et al., 2020).

This is seen as a problem that arises in public universities in Malaysia, where the efficiency of commercializing academic research results in universities is not high (Syazwani, Sofian & Hafiza, 2022). Only 8% of the Intellectual Property Rights (IPR) produced by universities in Malaysia are being commercialized to increase the university's success rate. For the purpose of sustainable income generation by public universities in Malaysia, they need a university framework for the Commercialization of Intellectual Property Rights (Shahidan, Abdul Latif & Abdul Wahab, 2019). In Malaysia, the Ministry of Science, Technology and Innovation (MOSTI) is a government agency that is committed to providing appropriate support and assistance to commercialize research so that it does not stop at higher education institutions (HEIs) alone. There are several methods of commercialization that can occur, such as licensing, sales, new ventures, joint ventures, acquisitions and strategic alliances. The preparation of a business plan or incubation stage must be carried out, especially in the commercialization of new ventures, joint ventures, acquisitions and strategic alliances (Kusmintarti et al., 2022). Minh & Van (2022) have proposed to develop academic spin-offs to commercialize university scientific research results to meet industry needs as a solution to academic research efficiency problems. ASO is a new venture established for the purpose of commercializing research results from publicly funded research organizations (Huynh Evertsen, Rasmussen & Nenadic, 2022).

Nowadays, there are several universities establishing academic spin-offs in Malaysia. Among them are Universiti Kebangsaan Malaysia (UKM) and Universiti Putra Malaysia (UPM). In addition, there are two successful cases of commercializing public university academic research in Malaysia through spin-offs in the field of robotics manufacturing and skin care solution products (Shamsir & Abd Jamil, 2019). However, there is still no framework or guidelines that can be used as a template to facilitate the commercialization of universities through startup or spin-off companies (Shahidan, Abdul Latif & Abdul Wahab 2019). This is because most of the literature related to the commercialization of university research in Malaysia only focuses on the institutional and external factors of technology transfer (Khademi et al. 2015).

### **Purpose and Objectives of the Study**

This systematic literature review aims to identify the elements of academic intellectual property commercialization in Malaysia. Among the objectives of the study to be achieved are as follows:

1. Intellectual Property and;
2. Commercialization of academia in Malaysia.

### **Methodology**

This study has used the systematic literature review (SLR) method. This method aims to find and identify research information in a systematic and grounded manner. According to Mohamed Shaffril, Samsuddin & Abu Samah (2021), when doing SLR, researchers need to analyze, interpret, and critically evaluate existing knowledge. This process allows them to discover patterns of previous results, understand the depth and detail of existing knowledge, and identify gaps for further exploration. Systematic literature review (SLR) also aims to find and synthesize related research in a comprehensive manner using procedures that are

organized, transparent, and can be replicated at each step in the process (Higgins et al., 2011). Because of this, the researcher has used this method as the main methodology of the study.

### Procedures and Literature Search

The method of conducting a literature search starts with the guidance of the objective of the study, which is the intellectual property and commercialization of academia in Malaysia. Since this study focuses on the elements of intellectual property and academic commercialization, the keywords used are the theme of the study title. The main databases that have been used by researchers in this literature search are Google, Google Scholar, Researchgate, SpringerLink, Sage Publications, Scopus, Wiley Online, Taylor and Francis Online and Academia. The use of this database aims to facilitate literature search in a more organized and systematic way.

In order to systematically analyze this study, several literature reviews have been identified as important instruments that fit the research theme, which is the commercialization of academic research results. Table 1 lists the journal articles resulting from the SLR analysis.

### Instrumental Criteria

Survey research is a form of criticism that involves comparing a group of literature. Therefore, this study has set some specific criteria to facilitate the search for literature where the duration range of the literature review is set to be around 2018 and above.

### Data Extraction and Synthesis

Data extraction and data synthesis were conducted to facilitate and summarize the comparison of literature materials (Liu et al., 2020). The extraction process is carried out by organizing the data of research instruments according to categories. Once these categories are compiled, they will be synthesized to give a clearer picture in producing meaningful comparisons (Burhan & Aini, 2021).

### Findings and Studies

In order to analyze this study more systematically, eight literature reviews have been identified as important instruments that fit the research theme, which is the commercialization of academia. Table 1 lists the journal articles resulting from the SLR analysis. Table 1

#### *SLR of Commercialization of Academic Research Results*

No.	Author	Background	Issues/Gaps	Method	Results
1	Jiafeng Gu (Gu 2023)	Commercialization of academic patents in Chinese universities	This study was conducted to analyze the factors and mechanisms of academic patent commercialization in universities in China.	Quantitative Study	The factors that have influenced the commercialization of academic patents in universities are the rank of an academic, the promotion of commercialization of academic patents in universities, the concern of some academics to commercialize their

No.	Author	Background	Issues/Gaps	Method	Results
					research and the disclosure of the relationship between the university and other universities in the commercialization of academic research.
2	Nur Syazwani Suhaimi, Muhammad Abi Sofian Abdul Halim dan Hafiza Aishah Hashim (Syazwani, Sofian & Hafiza 2022)	The perception of academics at a university in Malaysia towards academic commercialization	This study examines the perceptions and attitudes of academics regarding the factors that affect the commercialization of university research.	Quantitative Study	The results of the study show that two factors are important and positively related to commercialization: the behavior of academics and University-Industry collaboration. This study also shows that innovative factors and Intellectual Property management do not have a significant relationship with commercialization.
3	N Dyantyi dan T Ncanywa (Dyantyi & Ncanywa 2022)	Commercialization of Research in Higher Education Institutions (HEIs): The Transformation Process	Explores ways in which institutions can combine commercialization through research concepts to impact their output.	Qualitative Study	The results of the study found that commercializing research has meaningful results in the institution and a large impact on the economy and society. The study also revealed that the commercialization of research requires active participation from leadership, understanding of the roles of all stakeholders involved, creating an enabling environment and having an incentive program for motivation.
4	Jonathan C. Ho, Demei Lee (Ho & Lee 2021)	Research commercialization performance in different types of	Explore the differences between different types of universities	Case Study	The results of the study show that there is a significant difference between

No.	Author	Background	Issues/Gaps	Method	Results
		universities: a case from Taiwan	in Taiwan and benchmark their research commercialization performance. Examines differences between types of universities in terms of size, their total funding and resources, and patent performance.		public and private universities in terms of the number of students, the amount of government funding, and the number of guaranteed US patents. The results of the Data Environment Analysis (DEA) identified the 14 most efficient universities in terms of research commercialization, of which eight are private.
5	Carolina M. Lasambouw, Ediana Sutjiredjeki, Neneng Nuryati (Lasambouw, Sutjiredjeki & Nuryati 2021)	Business Model Requirements in Research Products Commercialization of Higher Education Institutions (HEIs)	This study shows the need for the production of business models for the purpose of commercializing research products in Indonesian HEIs.	Qualitative Study	The results of the study found that a good business model for each type of research product is still needed to reduce the gap between researchers and other stakeholders. In addition, every researcher needs to prepare a comprehensive research roadmap from the beginning so that research products can be predicted in advance. Therefore, the development of a good business model as a commercialization tool can be achieved.
6	SM. Sharif, A. Isa, A.Y.M. Noor, A.Z. Samsudin, M.A.M Nizah and M.S.A. Azzis (Sharif et al. 2020)	Intellectual Property Led by Commercialization University	This study was conducted to explain the intensity of commercialization of IP, processes and factors that influence the commercialization of IP in selected	Qualitative Study	The results of this study show that the intensity of IP commercialization depends on experience, industrial relations, properly planned research areas and active researchers



No.	Author	Background	Issues/Gaps	Method	Results
			universities in Malaysia.		researching different research institutes.
7	Raju Mohammad Kamrul Alam, Mohammad Nazmi Newaz (Mohammad & Newaz 2018)	Commercialization of intellectual property rights	This study was conducted to identify the factors that lead to success in the commercialization of intellectual property rights (IPR).	Qualitative Study	Intellectual property rights (IPR) have a great influence on competitive companies. The commercialization of IPR has a large effect on the competition of companies by creating "oligopoly" competition. In addition, the high cost of commercialization causes it to have risks. Therefore, only companies with strong financial capabilities and enriched high-tech R&D can enjoy the benefits of commercialization.
8	Ramya Ravi Manthan D. Janodia (Ravi & Janodia 2022)	Factors affecting technology transfer and commercialization of university research in India: a cross-sectional study	This study aims to examine and understand the factors and barriers to technology transfer among Indian universities. This study covers three main aspects: (1) awareness and practice of patenting and commercialization of research among Indian academics, (2) understanding strategies adapted to commercialize research activities, and (3) barriers to university-industry technology transfer.	Qualitative and Quantitative Study	In India, intellectual property rights have introduced new dimensions and opened opportunities in the business arena. However, the research carried out in the academic field does not meet the demands of the industry. Therefore, they are unable to channel resources for innovation that the local community can use.

### Summary of Study Findings

Based on the literature review, the researcher has identified several factors of academic commercialization that occur, as shown in Figure 2. Next, with strategic planning that is a comprehensive research direction, a good business model and competitiveness, it is seen as very important to ensure the commercialization process is on the right track. In addition, the

implication for research in universities is that it can reduce the research gap in universities in a perfect commercialization ecosystem. Nevertheless, according to Mohammad & Newaz (2018), good IPR management is not a factor for commercialization; it is more about legal rights to innovation creation. The impact is that good and useful innovative products in an institution will have a great impact on the economic sector and in society.

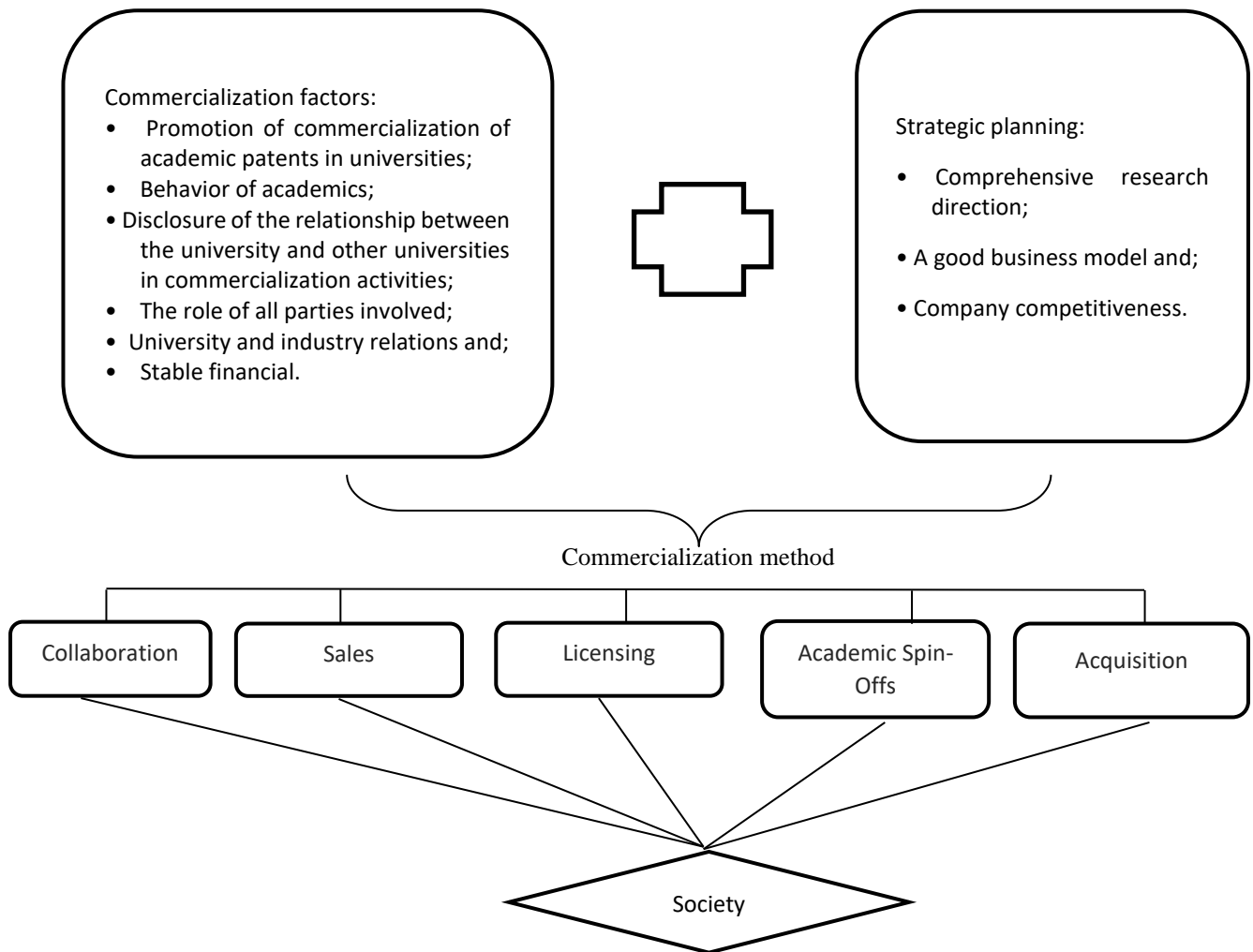


Figure 2: Factors and Trajectories of Commercialization

**Conclusion**

The commercialization of academia has great implications for the well-being of society as well as economic growth in our country. This is because the competitive attitude that exists between companies involved in innovation activities such as digitization companies can bounce the knowledge-based economy further (Fernández-Portillo et al., 2022; Ardito & Svensson, 2023). The commercialization of academia in Malaysia is seen to be still in the improvement stage but not far behind (Ismail, Samuri & Ishak, 2016). Apart from effective technology, Malaysia also needs a clear and dynamic guide that all public and private universities in Malaysia can use.

Malaysia is also recommended to use an open innovation model to access external knowledge, resources and skills to improve their internal innovation performance and achieve innovation attractiveness (Jia et al., 2023). In addition, universities also need to be more active in improving their research into sources of innovation that can be used by society. Academic behavior, relationships between other universities, and academic research need to be disclosed to the public more clearly. This is because the industry in Malaysia still lacks confidence in academia (Gerbin & Drnovsek, 2020). The researcher suggested that an exhibition of intellectual works could be held for the purpose of publishing the works of lecturers and students open to the public, government and industry.

With that, there will be demand for intellectual works from outside parties, including industry, government, academic spin-offs and various other agencies (Kusmintarti et al., 2022). Disclosure related to academic research is seen as one of the strategies to gain trust from the industry (Kunttu & Neuvo, 2020). In addition, the government also needs to state the real direction in the context of the commercialization of innovative products in universities (Ismail, Samuri & Ishak 2016). Finally, Malaysia also needs further studies related to the commercialization of academia.

This is because, although the commercialization of academia has been in this country for a long time, studies on the commercialization of academia are still lacking. This is important to implement for the purpose of improving practices in innovation as a result of research activities that will help improve the marketing of innovative products as a result of research (Amat & Ishak 2019). Therefore, studies involving academic commercialization can be improved in the future (Muda et al. 2021).

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