

# **Critical Success Factors in Intellectual Property (IP) Commercialization among Academia**

Siti Hajar Arani<sup>a</sup>, Nurul Fadly Habidin<sup>b\*</sup>, Nur Yuhainis Ab Wahab<sup>c</sup>

<sup>a, b, c</sup> *Faculty of Management and Economics, Sultan Idris Education University, Malaysia,*

*\*Corresponding author: fadly@fpe.upsi.edu.my*

**To cite this article (APA):** Siti Hajar Arani, Nurul Fadly Habidin, & Nur Yuhainis Ab Wahab. (2022). Critical Success Factors in Intellectual Property Commercialization among Academia. *International Business Education Journal*, 15(2). <https://doi.org/10.37134/ibej.Vol15.2.5.2022>

**To link to this article:** <https://doi.org/10.37134/ibej.Vol15.2.5.2022>

## **Abstract**

The commercialization of research is defined as the process of implementing ideas following the development of current innovations. It can also be defined as the process of translating research knowledge to improve the quality of a product or service so as to be able to enter the market. Previous research has suggested that academia should have networks with industry sectors for idea or technology consultation. Academia should also be involved in developing the idea of technology creation from industry so that the product or service produced can meet consumer demand. Specifically, the proposed objectives of this paper are to discuss and identify the critical success factors in intellectual property commercialization among academia. This paper will also discuss the concept, followed by the underpinning theory, conclusions as well as recommendations for future research.

## **Keywords:**

Critical success factors, intellectual property, commercialization

## **INTRODUCTION**

Intellectual property (IP) can be contemplated as an asset category that includes intangible creations developed by human intellect (Dobrenkov et al., 2017). Commercialization of IP can be contemplated as the underlying process of developing a particular IP and getting it into the market to ensure revenue stream (Chandra & Liaqat, 2019). In most of the cases, commercialization is failed as organizations lags knowledge in terms of commercialization and organizations are mostly incompatible with the underlying ethics and science of the IP commercialization process. In accordance with the ideas of Sharif et al. (2018), managing copyright, trademark, patent and trade secret requires a significant level of legal support which is mostly missing in developing countries.

The Malaysia Education Blueprint 2015–2025 (Malaysia Education Ministry, 2015) reports that the commercialization of academic research is the responsibility of all parties that require interaction between academics, government, industry and the community. Academicians have been regarded as agents who can help universities to commercialize research results successfully because they are not just lecturers, although the task of educating is indeed their primary responsibility (Suhaimi et al., 2020).

IP commercialization requires a three-tiered roll-out as well as marketing strategy that needs to be properly managed to ensure proper proceeding including initiation, business processing and stakeholder management (Hashim et al., 2020). In the mentioned phases, challenges associated with improper research environment, conflict of interest, economic risks, and bureaucratic disturbance can be highlighted as some crucial aspects that tend to constraint a proper process of IP commercialization. Commercialization of IP demands a significant time and interest from the developers which is mostly missing in maximum context. Ethical alignment of the planned commercialization aspect can be highlighted as another key challenge that tends to create issues for universities (Suhaimi et al., 2020).

Malaysia's existing IP legal system is depicted to be in line with global standards. Nevertheless, apart from the Patent Act 1983, any significant pieces of legislation that can help providing a direction to different IP usage as well as commercialization are not found. The Patent Act 1983 only covers industrial property and patents (Abd Jamil et al., 2019). However, a University's IP can consolidate multiple aspects that are unrelated to patent such as original study marital, original method of solving an issue and other related contents associated with copyright. Nonetheless, the existing regulatory aspects cannot be considered enough as it grants fallacies and the copyright protection is somehow overlooked.

Additionally, cultural orientation of research and capabilities of universities to support the context can be highlighted as another issue. This is because tertiary institutions in Malaysia generally face some issues such as racial quotas, language and others that overshadow the context of IP commercialization (Lai, 2018). Understanding research duration to plan IP filling and copyright management can be highlighted as one of the most crucial aspects of consideration in universities as well as research institutes (Siegel & Leih, 2018).

However, pertaining to the complexity of research, lack of confidence on final outcome, strategic management and lagging IP related knowledge creates issues. Attaining this issue requires maintenance of deadline and timely updates. Additionally, increasing understanding on the entire process of IP commercialization can help the researchers to feel the urgency of completion as well as importance of confidentiality (Gachie & Govender, 2017).

Research culture and university capability regarding hosting as well as managing the core research particles can be highlighted as one of the most crucial paradigms of consideration to ensure furtherance (Bae, 2018). Even though universities provide proper guidance on the context of proceeding with research; yet the activities regarding patent management and post-research IP commercialization mostly tend to lag. Nevertheless, with given time and clear prediction from researchers' universities and research institutes apply for copyright, patent, and other IP related paradigm. However, the degree of considering this particular aspect is low.

As educational institutes as well as research institutes generally focuses on academia instead of commercialization, a weak link with the industry standards for complying with patent management is identified (Chandra & Liaqat, 2019). However, the core steps of IP commercialization are being followed in potential researches to ensure effective growth in this particular context. Lack of incentive structure for researchers can be highlighted as a crucial context of consideration behind the discussing issues of IP commercialization. This is because researchers generally get stipend or grants which may indulge monotony (Mody, 2019).

Therefore, this study is going to focus on academia at the university who have served more than a year, and to identify critical success factors in intellectual property

commercialization among academia by ranking it with the highest ranking to the lowest ranking factors.

## **INTELLECTUAL PROPERTY COMMERCIALIZATION AMONG ACADEMIA**

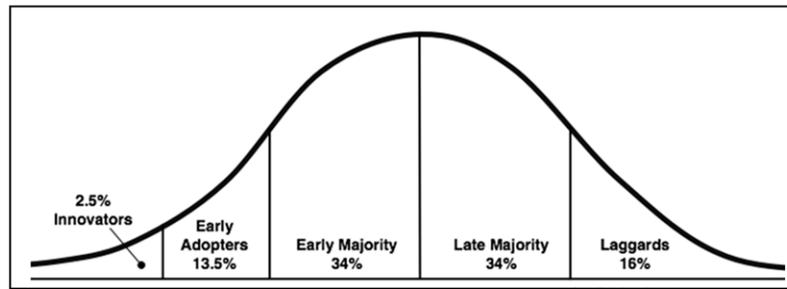
In the views of Mazzarol and Reboud (2020), IP in academia can be contemplated as ideas, knowledge, and information. The term intellectual is justified in academia or research as the results and output is ultimately gained from a new idea. Moreover, the term property is justified as it can be viewed as a tradable commodity. Furthermore, in recent times, it is commonly agreed upon that universities are considered as a key source of new knowledge for industries. In addition to that, Balachandran and Madhusudhanan (2017) have explained that colleges and universities around the world are one of the major suppliers of IP. Moreover, in academia IP created within colleges as well as universities are often the products of multiple creators who share important relations such as fellow students, alumni-students, or student-supervisors.

Apart from that, creation and use of IP created within colleges and universities are mostly carried out by a diverse array of individuals. Additionally, the creative activities within colleges or universities are supported by a variety of sources. Apart from government investment through grants and affiliation, private funds from foundations, endowment, alumni, and businesses can be done. Furthermore, Mazzarol and Reboud (2020) has explained that, creation of IP in academia is intrinsically associated with the underlying activities of the institutions such as guidance, research facilities, scholarship and others. Moreover, studies have found that with proper guidance and adequate research facility, the context of research proceedings can be predominantly improved. Seeking patent and copyright protection by universities and research institutes are being increased in current times which ensures a clear approach of moving towards the context of proper policy development to align academia and IP.

## **THEORITICAL UNDERPINNING**

The diffusion of innovation theory can be seen as an important theoretical aspect that seeking to explain the rate of technology infusion (Davenport, Mann & Daellenbach, 2017). The core elements of innovation diffusion theory include innovation, communication through specific channels, becoming a member of the social system, and development over time. Apart from that, the diffusion rate of innovation management can be divided into five basic areas, including innovators, early adopters, early masses, late masses, and laggards. Moreover, the diffusion rate of innovation is highly dependent on organizational culture, because employees are motivated to come up with ideas that promote innovation. In a state of managing a clear approach for IP protection, characteristics of innovation needs to be taken into consideration. The meta-review has identified several characteristics that are common in most studies.

The sphere of IP commercialization includes multiple steps including innovation, evolution, management, protection, and others (da Cruz, Ferreira & Kraus, 2021). Likewise, in the case of commercialization of academic contents, assessment of the degree of commercialization requirements in the context of IP law development and inclusion needs to be emphasised upon. Therefore, insights into the theory can be of significant help to manage a concise understanding of the rate of understanding amongst the creators.



**Figure 1: Diffusion of Innovation Theory. Adapted from da Cruz, Ferreira & Kraus, 2021**

In this study, this theory will be applied to identify critical success factors in IP commercialization among academia. In several cases, it has been identified that the delay in monetizing the portfolio or IP is identified which further explains that protecting the idea of protecting the creative elements are still not clear amongst academia (Cartaxo & Godinho, 2017). The mentioned theory can provide a clear direction on whether an organisation is intrinsically focusing on IP registration and management or only focusing on the idea of development the product.

## **CRITICAL SUCCESS FACTORS IP COMMERCIALIZATION AMONG ACADEMIA**

Critical success factors (CSFs) can be defined as areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization (Vargas & Zambalde, 2018). In simpler terms, CSFs are those few things that must go well to ensure the success of an organization. CSFs as the areas or functions where things must go right to ensure successful competitive performance for an organization.

### **Networking**

Open communication and a trusting relationship between the company and university are essential for better cooperation. In this concept, Kirchberger & Pohl (2016), referred to networking as the key driver of communication where the sender transmits data from one end to the receiver residing at the destination end. However, as per Lipkova and Braga (2016), networking refers to the communication process which is conducted in an informal social setting and lead to a trusting relationship between partners. Karaev et al. (2007), in their review of the effect of a cluster approach on SMEs (based on 250 articles and 50 conference papers), also conclude that entering into cooperative relations with other SMEs and related partner institutions has a positive effect on competitiveness. Prior studies further suggest that networking show their positive effects in the long term reinforcing their impact on long term survival (Baum & Locke, 2004).

### **Entrepreneurship Orientation**

M'chirgui et al. (2018), defined entrepreneurship orientation (EO) as the organization process or concept conducted by the organization superiors in strategizing the organization operation for innovating the organization products and services which tends to exploit the opportunities of other organizations who are operating in the same marketplace. As per Kim et al. (2018), EO refers to the organization's practices, processes and decision-taking patterns that act as an entrepreneur. This process helps the organizations in constructing and also in linking the

organization operations. This process is mainly implemented by the university for meeting the organization objectives and goals which tends the organizations in meeting the financial target or expected revenue margin.

### **Marketing Mix**

Marketing mix can be referred to as the organization strategy which is mainly used by the organizations in promoting their goods, services and brands in their operating marketplace. This strategy tends the organization in attaining high brand awareness. Promotion of goods and service in the marketplace allows the audience to examine the products and brand. As per Ghaffari et al. (2017), the marketing mix strategy also helps the organization in increasing the consumer base. However, Huang-Saad et al. (2017), argued that marketing mix strategy in the modern era may adversely work due to some factors like cultural difference and other factors. In this aspect, the marketing mix strategy is used by the organization by forming 4P's model which is Product, Price, Place, and Promotion.

### **Entrepreneurial Culture**

Entrepreneurial culture is seen as a contributing factor towards the success of the commercialization of intellectual property among academia. Entrepreneurial culture can support entrepreneurial orientation among academics at the university. According to (Tam, 2019), entrepreneurial culture serves as a unique resource that helps commercialize university intellectual property output. Therefore, it is very important for university management to implement university -wide mechanisms with the aim of fostering an entrepreneurial culture. Universities can foster an entrepreneurial culture through proper motivational schemes, interdisciplinary research and entrepreneurship development programs (Tam, 2019).

### **Information of IP and Market Readiness**

The readiness of products developed by academia and the readiness of the market to accept new products are important. (Tam, 2019) found that university products are either too basic or not in line with market demand. On the other hand, if a university product is too complex or very sophisticated, it cannot penetrate the market demand or is not at the same level of understanding or knowledge. Thus, linking the strategies and capabilities of universities and companies, and selecting appropriate target market segments including market readiness, has contributed to the success of the commercialization of academia intellectual property in universities.

### **University Management and Government Support**

Past researchers asserted that universities' leadership and their management's support is another critical success factor in intellectual property commercializing among academia (Gao and Haworth, 2016). The university's management needs to prevent cultural bias and potential conflicts of interest, where academic and commercialization of R&D outputs activities should be separated (Van Burg et al., 2008).

Apart from the above mentioned, government also plays a major role to support and motivate academia to be more engaged with companies to increase the efforts to commercialize their product (Striukova & Rayna, 2015; Tartari et al., 2014). The government can directly influence IP commercialization by providing funding for basic research, promulgating of

products and developing process regulations, while indirectly influencing financial and tax regulations.

### **Framing IP as per commercialization prospect**

IP commercialization process is mainly reviewed through three sub-processes which are known as idea generation, product development and lastly, making the product accessible for the customers. As per Hayter (2016), marketing practices are mainly aligned with the commercialization processes for providing high feasibility of the products in the marketplace. The process of commercialization of intellectual property in corporations and universities differs from each other. This is due to the structural change and variations in the management hierarchy.

### **CONCLUSION**

This study aims to identify the critical success factors (CSFs) in intellectual property commercialization among academia. In order to identify these issues and find out its relevance, a clear conceptualization on the core prospect will be demonstrated. Therefore, addressing the underlying issues and managing them with proper idea of proceeding can be eventually ensured with the planned study. This study has important implications on the factors that influence the success in the commercialization of intellectual property as well as the findings of this study can further enrich the empirical study in the field of intellectual property entrepreneurship. This study is expected to fill the knowledge gap found in the writing of the paper as well as help other researchers make research references in the future.

From a theoretical aspect, this study can contribute to the knowledge about the commercialization of intellectual property which is not practiced by most academia (Bae, 2018). By identifying critical success factors to commercialize intellectual property, it is hoped to help academia in meeting the added value of producing the best innovative products in the market and to be one of the leading intellectual property among university. It is hoped that this can be a guide to the university to carry out activities related to the commercialization of intellectual property among academia as well as assist the government in providing funds.

This study only discusses the concept. Thus, no empirical evidence is provided. Future research proposals will identify the highest to lowest success factors by including empirical evidence of research findings in relation to the factors that have been discussed as above.

### **REFERENCES**

- Abd Jamil, A., Ismail, K., Rasli, A. M., & Senin, A. A. (2019). *Systematic University Intellectual Property Exploitation for a Better Technology Commercialization*. In the Proceedings of the 1st International Conference on Business, Management and Information Systems 2019 (ICBMIS 2019) (1), 317-342.
- Bae, Z. T. (2018, August). Academic entrepreneurship: Commercialization of university research and entrepreneurship education at an entrepreneurial university. In 2018 Portland International Conference on Management of Engineering and Technology (PICMET) (1-6). IEEE.
- Cartaxo, R.M. and Godinho, M.M., (2017). How institutional nature and available resources determine the performance of technology transfer offices. *Industry and Innovation*, 24(7), 713-734.

- Chandra, G. R., & Liaqat, I. A. (2019, April). *Commercialization of Intellectual Property; an Insight for Technocrats*. In 2019 International Conference on Automation, Computational and Technology Management (ICACTM) (373-378). IEEE.
- da Cruz, M. D. F. P., Ferreira, J. J., & Kraus, S. (2021). Entrepreneurial orientation at higher education institutions: State-of-the-art and future directions. *The International Journal of Management Education*, 19(2), 100502.
- Davenport, S., Mann, D., & Daellenbach, U. (2017). University Researchers as Nascent Entrepreneurs: Do They Fit the Stereotype? In *Technology-Based Nascent Entrepreneurship* (203-221). Palgrave Macmillan, New York.
- Dobrenkov, V. I., Afonin, Y. A., Gagarinskaya, G. P., Orlova, L. V., Pronina, N. N., & Sabirova, G. T. (2017). Innovative development: International experience of intellectual property commercialization. *Journal of Innovation Management*, 1(11), 1-9.
- Gachie, W., & Govender, D. W. (2017). Commercialization of higher education institutions' research within the National System of Innovation. *African Journal of Science, Technology, Innovation and Development*, 9(4), 387-397.
- Ghaffari, S., Arab, A., Nafari, J., & Manteghi, M. (2017). Investigation and evaluation of key success factors in technological innovation development based on BWM. *Decision Science Letters*, 6(3), 295-306.
- Hashim, H. N. M., Khair, M. H. M., Mahmood, A., Zuallcobley, R. W., & Zakuan, Z. Z. M. (2020). The exploitation of publicly funded research intellectual property in Malaysia. *Queen Mary Journal of Intellectual Property*, 10(4), 486-502.
- Hayter, C. S. (2016). A trajectory of early-stage spinoff success: the role of knowledge intermediaries within an entrepreneurial university ecosystem. *Small Organisation Economics*, 47(3), 633-656.
- Huang-Saad, A., Fay, J., & Sheridan, L. (2017). Closing the divide: accelerating technology commercialization by catalyzing the university entrepreneurial ecosystem with I-Corps™. *The Journal of Technology Transfer*, 42(6), 1466-1486.
- Kim, B., Kim, H., & Jeon, Y. (2018). Critical success factors of a design startup organisation. *Sustainability*, 10(9), 2981.
- Kirchberger, M. A., & Pohl, L. (2016). Technology commercialization: a literature review of success factors and antecedents across different contexts. *The Journal of Technology Transfer*, 41(5), 1077-1112.
- Lai, P. C. (2018). Research, innovation and development strategic planning for intellectual property management. *Economic Alternatives*, 3, 303-310.
- Lipkova, L., & Braga, D. (2016). Measuring commercialization success of innovations in the EU. *Journal of Project Management*, 1(2), 1-9.
- M'chirgui, Z., Lamine, W., Mian, S., & Fayolle, A. (2018). University technology commercialization through new venture projects: an assessment of the French regional incubator program. *The Journal of Technology Transfer*, 43(5), 1142-1160.
- Mazzarol, T., & Reboud, S. (2020). Work Book: Intellectual Property Management. In *Workbook for Entrepreneurship and Innovation* (153-158). Springer, Singapore.

- Mody, A. (2019). New international environment for intellectual property rights. In Intellectual property rights in science, technology, and economic performance (203-239). Routledge.
- Sharif, S. M., Ahamat, A., Abdullah, M. M., Jabar, J., Hariri, M., & dan Teknousahawan, F. P. T. (2018). University intellectual property commercialization: a critical review of literature. *Turkish Online Journal of Design Art and Communication*, 8, 874-886.
- Siegel, D. S., & Leih, S. (2018). Strategic management theory and universities: An overview of the Special Issue. *Strategic Organization*, 16(1), 6-11.
- Suhaimi, N. S., Halim, M. A. S. A., & Hashim, H. A. (2020). Commercialization of academic research: assessing the perception of academicians at a public university in Malaysia. *Journal of Applied Research in Higher Education*, 1(2), 12-21.
- Tam, K. C. (2019). Critical Success Factors for Malaysian SMEs and Large Companies in Commercializing Universities' R&D Outputs. *Asian Journal of Innovation & Policy*, 8(3), 362–377.
- Van Burg, E., Romme, A.G.L., Gilsing, V.A. and Reymen, I.M.M.J. (2008) Creating university spin offs: a science-based design perspective. *Journal of Product Innovation Management*, 25(2), 114-128.
- Vargas, J., & Zambalde, L. (2018). Critical Success Factors (CSF) to Commercializing Technologies in Universities: The Radar Framework. 123–135.