

Outbound Open Innovation Policy for Exploitation of Intellectual Creation, Design and Creativity in Malaysian Public Universities

Haswira Nor Mohamad Hashim ^{1*}, Muhamad Helmi Muhamad Khair², Anida Mahmood ³ Zeti Zuryani Mohd Zakuan ⁴

¹Faculty of Law, Universiti Teknologi MARA,
UiTM Shah Alam Campus, 40450 Shah Alam, Selangor, Malaysia
haswira648@uitm.edu.my

²Department of Law, Universiti Teknologi MARA,
UiTM Seremban Campus, 70300 Seremban, Negeri Sembilan, Malaysia
muham8041@uitm.edu.my

³Faculty of Law, Universiti Teknologi MARA,
UiTM Shah Alam Campus, 40450 Shah Alam, Selangor, Malaysia
anida131@uitm.edu.my

⁴Department of Law, Universiti Teknologi MARA,
UiTM Arau Campus, 02600 Arau, Perlis, Malaysia
zeti@perlis.uitm.edu.my

*Corresponding Author

<https://doi.org/10.24191/ajue.v16i4.11957>

Received: 18 November 2020

Accepted: 11 December 2020

Date Published Online: 24 January 2021

Published: 25 January 2021

Abstract: The objective of the research is to explore the aim, application and strategy perceived as important in the development of an outbound open innovation policy for exploitation of intellectual creation, design and creativity in Malaysian public universities (MPUs). Under existing intellectual property, innovation and commercialization policies, a large portion of intellectual design, creation and creativity in MPUs remain unexploited. Hence, the need to develop a new set of aim, application and strategy to promote the exploitation of intellectual design, creation and creativity in MPUs. The research conducts a survey involving respondents representing the Technology Licensing Office of 15 MPUs. The research also analysed outbound open innovation policies from five universities in Australia, UK, US and South Africa. These policies provide the basis in the development of the survey instrument of the research. The survey instrument contains nine items outlining the aim, application and strategy for exploitation of an outbound open innovation policy. The survey findings indicate that eight of the items are perceived as important for the development of the policy. The findings of the survey provide a beneficial input for the development of an outbound open innovation policy for exploitation of intellectual design, creation and creativity in MPU.

Keywords: Creation, Creativity, Design, Innovation, Institutional Policy

1. Introduction

Intellectual creation, design and creativity include new, useful and nonobvious products or processes, new plant varieties, original works of authorship including literary, dramatic, musical, artistic works, industrial and layout designs whether or not they are protected as intellectual property (IP). “Outbound Open Innovation Policy” means a policy which is aimed at making unexploited intellectual design, creation and creativity more accessible to external users/outside partners to exploit through permissive licensing scheme. An outbound open innovation involves outward-oriented ideas, knowledge and

technology transfer intended to improve innovation performance and enabled exploitation outside the universities' boundaries. Outbound open innovation methods for exploitation include licensing, open-source innovation, participation in other companies' innovation activities and divestment (Chesbrough and Brunswicker, 2013; Inauen and Schenker-Wick, 2012). Open innovation is the dominant innovation model of the twenty first century (Villareal and Calvo, 2015; Chesbrough, Vanhaverbeke and West, 2014; Marques, 2014; Brant and Lohse, 2014). Through open innovation, innovative ideas, design and creativity can be exploited from inside (outbound) or outside (inbound) the universities (Carayannis and Campbell, 2011; Rufat-Latre, Muller and Jones, 2010).

Outbound open innovation allows the external use of universities' intellectual creation, design and creativity and is part of a larger model framework known as Quadruple-Helix model. The Quadruple-Helix model links the government-industry-universities-society to optimize the socio-economic return of the output of academic and research activities in public universities. Under the Quadruple-Helix model, the universities collaborate with the government, industry and society in the open innovation ecosystem to share intellectual creation, design and creativity arising from academic and research activities (Lopez, Asyraf, Pasoz and Calvo, 2015; Sargsyan, 2014).

The Organisation for Economic Co-operation and Development (OECD) published a report on Malaysia's IP and innovation in 2015 which contains a suggestion for Malaysia to embrace the "IP for Innovation" agenda to boost its IP system for innovation. The report also contains a suggestion for Malaysia to introduce suitable policy to support the commercial exploitation of intellectual creation, design and creativity of universities and public research institutions in Malaysia (OECD, 2015). Based on the OECD's suggestions, it becomes the objective of the research to explore the aim, application and strategy perceived as important for the development of outbound open innovation policy for exploitation of intellectual creation, design and creativity of Malaysian public universities.

2. Literature Review

The public universities may not exploit intellectual creation and design that may be of little or no practical or economic value. Under existing IP, innovation and commercialization policies, intellectual design, creation and creativity which have less or no commercial value were abandoned and written off as a cost of doing academic or research activities. With reference to Malaysian public universities, a large portion of intellectual design, creation and creative works by academic staff, researchers and students remain unexploited as they are neither registered, licensed nor used internally (Azlin, Kamariah, Amran and Kamarulafizam, 2016; OECD, 2015; Kamariah, Wan Zaidi and Izaidin, 2010). This research includes a survey involving the representatives of the Technology Licensing Office (TLO) of 15 Malaysian public universities. The survey found that between 60% to 80% of intellectual creation, design and creativity that include patent, industrial design and copyright works remained unexploited. The highest number of unexploited creation, design and creativity are patents, (66.7%), followed by industrial design (60%). Besides that, 53.3% of the TLOs also identify copyright works, layout design and software as among unexploited intellectual creation, design and creativity in their respective universities. The findings of the survey echoed the findings of a case study conducted by the OECD in Malaysia which found that the socio-economic impact of public funded intellectual creation, design and creativity from Malaysian public universities remains limited, despite the fact that public universities are the highest recipient of public funded research (OECD 2015).

As outbound open innovation is not a matter of policy requirement, the intellectual creation, design and creativity that are not commercially exploited will be locked behind proprietary licensing regimes. Hence, a policy that promotes the exploitation of intellectual creation, design and creativity is deemed important to avoid wastage of public money used to fund academics and research activities that produced intellectual creation, design and creativity. Through an outbound open innovation policy, the intellectual creation, design and creativity in Malaysian public universities may potentially be exploited which could increase the return of investment from public funding. Intellectual creation, design and creativity thrive in an environment characterized by supportive policy and administrative structures (Ramoso & Cruz, 2019).

While there were several studies on IP, innovation and commercialization policies of Malaysian public universities (Ida Madieha, 2014; Nasibah & Zinatul, 2014) there is yet a study on outbound open innovation policy in Malaysian public universities. Similarly, there is yet a study that explores the aim, application and strategy of a policy to promote the exploitation of intellectual creation, design and creativity in Malaysian public universities.

Previous studies on the exploitation of public universities’ academic and research outputs, were mainly focused on patents (Naqshbandi, Kaur and Ma, 2014; Jaekel, Wallin and Isomursu, 2015). None of the studies were conducted on the exploitation of other types of intellectual creation, design and creativity such as industrial design, lay out design, copyrights and computer software. Previous studies were also mainly focused on the commercial exploitation of the intellectual creation, design and creativity by public universities through licensing, outright sales, start-up companies (Azlin et al., 2016; Khademi, Ismail, Chew and Shafagat, 2015; Kamariah et al., 2010) . So far, there is yet a study that explores the non-commercial exploitation of intellectual creation, design and creativity through outbound open innovation policy.

At international level, studies on open innovation by Skarzauskiene and Zaitsava (2016), Verbano, Crema and Venrturinet (2015) and Hossain (2015) were focused on exploring the outbound open innovation policy and practices of private firms/small medium enterprises. There is no known reported studies which explores outbound open innovation innovation policy and practices in public universities, in particular, Malaysian public universities.

As this is a neglected area of study, not much input can be gathered from local and international literature on outbound open innovation policy for intellectual creation, design and creativity. Hence, the research fills in the gaps left by the previous studies by exploring the aim, application and strategy perceived as important for the development of outbound open innovation for exploitation of intellectual creation, design and creativity in Malaysian public universities.

3. Research Methodology

The research is classified as policy study as the research problem stems from the fact that there is yet an outbound open innovation policy for exploitation of intellectual creation, design and creativity in Malaysian public universities. The research adopts exploratory research design as its objective is to explore the aim, application and strategy perceived as important for the development of outbound open innovation policy for exploitation of intellectual creation, design and creativity in Malaysian public universities. The research applies an inductive approach by using a research question to narrow down the scope of the research. In terms of data collection, the research employs a mixed-mode data collection method that is divided into two phases.

In the first phase of data collection, a library search was conducted to analyse outbound open innovation policy adopted by selected universities to promote exploitation of intellectual design, creation and creativity. The selected universities are from Australia, United Kingdom, USA and South Africa. Altogether, five policies were collected for policy analysis, listed below:

Table 1. Universities with Outbound Open Innovation Policy for Exploitation of Intellectual Creation, Design and Creativity

Universities	New South Wales (Australia)	Edinburgh University (UK)	Minnesota University (USA)	North Carolina (USA)	Stellenbosch University (South Africa)
Policy	Easy Access IP	Open Technology	Minnesota Innovation Partnership	Carolina Express License	Innovus Instant Access Program

In the second phase of data collection, self-administered survey questionnaires were distributed by the researchers to the respondents who are representatives of the TLOs of Malaysian public universities.

The purpose of the survey was to determine the aim, application and strategy perceived as important for the development of outbound open innovation policy for exploitation of intellectual creation, design and creativity in Malaysian public universities. A cross-sectional survey was conducted between 1 March 2019 to 1 August 2019 with 15 technology licensing officers of Malaysian public universities who agreed to participate. These public universities consist of 1 APEX university, 4 research universities, 9 focus universities and 1 comprehensive university. The respondents for the survey are three Directors, two Heads of Department and 10 senior officers of the TLO of Malaysian public universities. The respondents were selected using stratified, purposive sampling based on their occupational roles and expertise in dealing with the exploitation of intellectual creation, design and creativity in their respective universities.

The survey instrument was developed based on the analyses conducted on the policies of the selected universities. The survey questionnaires are divided into two sections. The first section (Part A) was constructed with the purpose of obtaining the demographic information of the respondents by using nominal data. The second section of the survey (Part B) was constructed to meet the objective of the research. This section which surveyed on the aim, application and strategy of outbound open innovation policy contains 9-items based on five-point Likert scale ranging from the lowest to the highest (1=Not Very Important, 2= Not Important, 3=Not Sure, 4=Important, 5=Very Important). The items were derived from the policy analysis of six universities in Australia, United Kingdom, USA and South Africa that adopt outbound open innovation policy.

Prior to data collection, the survey instrument was validated by language and content experts. A pilot survey was conducted to ensure trustworthiness of the survey instrument. The language of instruction for the survey was English and the researchers distributed the survey forms to the respondents by hand. Each respondent was allocated approximately thirty minutes to answer the self-administered survey. Statistical Package for Social Science (SPSS) software was used as a statistical tool for quantitative data analysis. The survey data was analysed using descriptive and statistical data analysis. The ordinal data was statistically analysed to rank and to find the Median for each statement in the Likert scale. The Mean was used to describe the scale.

4. Findings

This section reports the findings from the survey conducted on 15 technology licensing officers of Malaysian public universities. The survey questionnaire contained nine items that measure three variables in policy development i.e. the aim, application and strategy. Likert scale is used to depict the importance of these items in the development of an outbound open innovation policy to exploit intellectual creativity, design and creation in Malaysian public universities. The items in the survey that measure the policy aim, application and strategy are listed below:

Table 2. Universities with outbound open innovation policy for exploitation of intellectual creation, design and creativity

Variables	Items	ID
1. Aim	To prevent and reduce the accumulation of unexploited intellectual design, creation and creativity	B1
	To counter rigid licensing procedures for unexploited intellectual design, creation and creativity	B2
	To facilitate innovation of unexploited intellectual creation, design and creativity through permissive licensing	B3
2. Application	Applicable to intellectual creation, design and creativity which are registered for purely defensive purpose without any intention to develop or exploit it	B4
	Applicable to intellectual creation, design and creativity which have been left out from the university's IP management portfolio	B5

3. Strategy	Applicable to intellectual creation, design and creativity which are neither sold nor licensed to the external party for commercial purposes	B6
	Allow permissive licensing for intellectual creation, design and creativity with less commercial value	B7
	Allow permissive licensing for intellectual creation, design and creativity where IP rights application is not pursued	B8
	Allow permissive licensing for intellectual creation, design and creativity that is not in line with the institution's mission/strategic goal	B9

Based on descriptive analysis of the items contained in the survey questionnaire, the respondents from the research university record a Mean value between 3.5 to 4.75 for the items measuring aim, application and strategy for the development of outbound open innovation policy for exploitation of intellectual creation, design and creativity in Malaysian public universities. The Mean value of the respondents of the research university is higher than the mean value of the focus university which records between 3.20 to 4.30 respectively. The lowest Mean value for all items are 3.00 to 4.00 that are recorded from the response of the respondents from comprehensive universities. However, there is only one comprehensive university in Malaysia. The figures below illustrate the Mean and Median values of nine items contained in the survey.

Table 3. Mean and median of nine (9) items measuring aim, application and strategy for the development of outbound open innovation policy

		B.1	B.2	B.3	B.4	B.5	B.6	B.7	B.8	B.9
Mean	Research University	4.75	3.50	4.25	4.00	3.75	4.50	4.25	3.50	3.50
	Focus University	4.30	4.40	4.30	4.00	4.10	4.20	3.40	3.60	3.20
	Comprehensive University	4.00	4.00	3.00	3.00	4.00	4.00	3.00	3.00	3.00
Median	Research University	5.00	3.50	4.00	4.50	4.00	4.50	4.00	4.00	4.00
	Focus University	4.00	4.00	4.00	4.00	4.00	4.00	3.50	4.00	3.00
	Comprehensive University	4.00	4.00	3.00	3.00	4.00	4.00	3.00	3.00	3.00

Frequency analysis is also conducted on the items contained in the survey questionnaire. The frequency analysis indicates that, six respondents (40%) perceived prevention and reduction of unexploited intellectual design, creation and creativity as very important aims, while nine respondents (60%) perceived it as important. As for the aim to counter rigid licensing procedures for unexploited intellectual creation, design and creativity only 5 respondents (33.3%) perceived it as a very important aim while 8 respondents (53.6%) perceived it as important. One respondent (6.7%) perceived the aim as not important, while another respondent is not sure about this aim. The aim of facilitating innovation of unexploited intellectual creation, design and creativity is perceived as very important by 4 respondents (26.7%). Majority of the respondents i.e. 10 (66.7%) perceived it as important. One respondent (6.7%) is not sure about the importance of this aim.

In terms of policy application, 12 respondents (80%) perceived it as very important for the policy to be applicable to intellectual creation, design and creativity which are registered for purely defensive purposes without any intention to develop or exploit it, while one respondent (6.7%) perceived it as not important. Majority of respondents also perceived it as either very important or important for the policy to be applicable to intellectual creation, design and creativity which have been left out from the university's IP management portfolio, with the response rate at 13% (very important) and 80% (important). As for the application of the policy to intellectual creation, design and creativity which are neither sold nor licensed to the external party for commercial purposes, 4 respondents (26.7%) perceived it as very important, compared to 11 respondents (73.3%) who perceived it as important.

As for the policy strategy, nine respondents (60%) perceived it as very important or important a policy strategy that allows permissive licensing for intellectual creation, design and creativity with less

commercial value. However, 2 respondents (13.3%) perceived it as not an important strategy, while another 4 respondents (26.7%) are not sure about the strategy. For a strategy that allows permissive licensing for intellectual creation, design and creativity where IP rights application is not pursued, only 1 respondent (6.7%) perceived it as very important, while 8 respondents (53.3%) perceived it as important. Five respondents (33.3%) are not sure about the importance of this strategy and one respondent (6.7%) perceived it as not important. Majority of the respondents are either not sure (33.3%), or perceived as not important (13.3%) and not very important (6.7%) a policy strategy that allows permissive licensing for intellectual creation, design and creativity that is not in line with the institution's mission/strategic goal. In comparison, only one respondent (6.7%) perceived the strategy as very important. Six other respondents (40%) perceived the strategy as important. Cumulatively, only 46.7% perceived the strategy as very important/important, compared to 53.3% who are either not sure or perceived the strategy as not important/not very important.

5. Discussions

This section discusses the findings of the survey that covers three main areas, i.e. policy aim, policy application, and policy strategy.

5.1 Policy Aim

An outbound open innovation policy for exploitation of intellectual creation, design and creativity should have at least three specific aims (United Nations, 2013). First, to prevent and reduce the accumulation of unexploited intellectual design, creation and creativity. The term "unexploited" means IP creation, design and creativity which is unused, abandoned or underutilized. Patents are the highest type of unexploited intellectual creation, design and creativity in Malaysian public universities (66.7%), followed by industrial design (60%). In addition, 55.3% of copyright works and computer software are unexploited in Malaysian public universities. Utility innovation, lay-out designs of integrated circuit and new-plant varieties that remained unexploited are 46.7%. These unexploited intellectual creation, design and creativity should either be given back to the creators, designers and authors or be given back to the industry or community under permissive licensing as public goods.

Second, to counter rigid licensing procedures for unexploited intellectual design, creation and creativity. The licensing process between industry-community and the university should be streamlined by eliminating lengthy negotiation processes, burdensome legal costs and reducing the time required for exploitation of intellectual creation, design and creativity. An outbound open innovation policy that simplifies sharing and transfer of knowledge and rights to use will increase the exploitation of intellectual creation, design and creativity. The exploitation of intellectual creation, design and creativity should be made easier, faster, more cost-efficient and low-risk with minimal effort. Third, to facilitate innovation of unexploited intellectual creation, design and creativity through permissive licensing. Where the intellectual creation, design and creativity is unexploited for more than three years, the universities should make available their intellectual creation, design and creativity under free access/open technology/open source licenses.

5.2 Policy Application

An outbound open innovation policy for exploitation of intellectual creation, design and creativity, should have a broad scope of application. The policy should apply to intellectual creation, design and creativity as IP which have been registered for purely defensive purposes or academic merit without any intention to exploit it (Lemley, 2008). The Malaysian public universities registered their IP based on merit and did not practice defensive registration due to costs. However, it has always been the aim of the universities to get as many IP registered for university ranking purposes, but at the same time unable to commercially exploit the IP. Based on the survey conducted by the research, the stage of unexploited intellectual creation, design and creativity ranges from completed research (60%),

incubator (53.3%), prototype (60%), and ready to market (73.3%). The IP that has not been commercially exploited should be included under an outbound open innovation policy as it enables permissive licensing for unexploited intellectual creation, design and creativity.

The policy should also apply to intellectual creation, design and creativity which have been left out from the universities' IP management portfolio due to lack commercial value. While the intellectual creation, design and creativity may be left out from the universities' IP management portfolio, they may still be counted for ranking purposes if they can be exploited through non-commercial means such as by way of publication, transfer of knowledge or as a gift to the industry or public. The policy should also apply to intellectual creation, design and creativity which are neither sold nor licensed to the external party for commercial purposes. Based on the survey, IP licensing ranks as the most common type of exploitation (66.7%), followed by outright sales of the IP (53.3%). Formation of start-up/spin-off/spin-out are the least common type of IP exploitation (40%) among Malaysian public universities.

5.3 Policy Strategy

An outbound open innovation policy for exploitation of intellectual creation, design and creativity should adopt policy strategy that enables permissive licensing for intellectual creation, design and creativity with less commercial value and where IP rights application is not pursued. This policy strategy could be achieved by making available unexploited intellectual creation, design and creativity under free access, open technology and open source licenses (Wen, Ceccagnoli, and Forman, 2016). This strategy ensures that the intellectual creation, design and creativity will not remain unexplored or written off by the university as a cost of conducting academic and research activities. From legal perspectives, permissive licensing provides a legitimate means of countering proprietary rights and rigid licensing arrangements which have been used to lock up intellectual creation, design and creativity (Belingeri, 2017). Permissive licensing recognizes the IP rights of the creators, designers and innovators but at the same time facilitates their exploitation either as commercial products or public goods.

Based on the survey, the respondents perceived the policy strategy as either important (53.3%) or very important (46.7%) in forging greater bonds between the public universities with external parties. Sixty percent (60%) of respondents also perceived the policy strategy as very important towards increasing the institutional reputation of the public universities in the event of successful exploitation of the intellectual creation, design and creativity through permissive licensing.

6. Conclusion

This study compared the outbound open innovation policy of five leading universities from four countries that are known to adopt outbound open innovation aims and strategy for exploitation of intellectual creation, design and creativity. Based on the comparative analysis, this study identifies and recommends the most appropriate policy for exploitation of intellectual creation, design and creativity in Malaysian public universities. The recommendations are suitable for adoption by public universities in Malaysia, as they were made after analysing the policy of the universities in the countries that share similar legal system with Malaysia, i.e. Common Law.

In adopting outbound innovation policy for unexploited intellectual creation, design and creativity, it does not require the existing IP laws to be amended since the proposed policy can be implemented without violating any of the legal provisions. However, the universities that adopt outbound open innovation policy need to modify their IP, innovation and commercialization policies in order to ensure successful implementation of the policy. Likewise, public research funding agencies are also expected to revise their research funding policy by allowing permissive licensing of unexploited intellectual creation, design and creativity through outbound open innovation policy.

It is anticipated that adopting outbound open innovation policy for unexploited intellectual creation, design and creativity would forge stronger bonds between universities and external parties i.e. the government, industry and community. It is also anticipated that the policy would increase the

universities' ranking in the event of successful exploitation of intellectual creation, design and creativity through permissive licensing (Cramer, Yoo and Manning, 2019).

7. Acknowledgements

The authors thank the Ministry of Higher Education Malaysia and Universiti Teknologi MARA (UiTM) for their financial support under the grant 600-IRMI/FRGS 5/3 (005/2017). Special thanks to the Faculty of Law, UiTM for all its support in completing this study. The authors also thank the reviewers for their comments which improved this paper.

8. References

- Azlin, A. J., Kamariah, I., Amran, M. R., & Kamarulafizam, I. (2016, October 18-20). *Impediments and Solutions of Commercialization of UTM R&D: A Case Study*. Paper presented at the International Research Conference and Innovation Exhibition Johor Bharu.
- Azmi, I. M. (2014). Intellectual property policy and academic patenting in Malaysia: Challenges and prospects. *Pertanika Journal Soc. Sci. & Hum.*, 22(S), 1-20.
- Belingheri, P. (2017). *Modern IP Licensing Practices: New Actors and New Strategies*. (Doctoral Thesis), Libera Università Internazionale Degli Studi Sociali Rome.
- Brant, J., & Lohse, S. (2014). *Innovation and Intellectual Property Series: The Open Innovation Model*. Retrieved from <https://ssrn.com/abstract=2426097>.
- Carayannis, E. G., & Campbell, D. F. (2011). Open innovation diplomacy and a 21st Century Fractal Research, Education and Innovation (FREIE) ecosystem: Building on the quadruple and quintuple Helix Innovation Concepts and the "Mode 3" knowledge production system. *Journal of the Knowledge Economy*, 2(3), 372.
- Chesbrough, H., & Brunswicker, S. (2013). *Managing Open Innovation in Large Firms: Survey Report* Retrieved from http://openinnovation.gv.at/wp-content/uploads/2015/08/Fraunhofer-2013-studie_managing_open-innovation.pdf.
- Chesbrough, H., Vanhaverbeke, W., & West, J. (Eds.). (2014). *New Frontiers in Open Innovation*: Oxford University Press.
- Cramer, K. M., Yoo, H., & Manning, D. (2019). Ranking Japan's Institutions of higher education, 2017: A comparative analysis. *Asian Journal of University Education*, 15(2), 12.
- Hossain, M. (2015). A review of literature on open innovation in small and medium-sized enterprises. *Journal of Global Entrepreneurship Research*, 5(1), 1-12.
- Inauen, M., & Schenker-Wick, A. (2012). Fostering radical innovations with open innovation. *European Journal of Innovation Management*, 15(2), 212-231.
- Jaekel, M., Wallin, A., & Isomursu, M. (2015). Guiding networked innovation projects towards commercial success—A case study of an EU innovation programme with implications for targeted open innovation. *Journal of the Knowledge Economy*, 6(3), 625-639.
- Kamariah, I., Wan Zaidi, W. O., & Izaidin, A. M. (2010). Do the characteristics of technology lead to university patents being unexploited? *Jurnal Teknologi*, 52(1), 105-128.
- Khademi, T., Ismail, K., Chew, T.L., & Shafaghat, A. (2015). Enhancing commercialization level of academic research outputs in Research University. *Jurnal Teknologi*, 74(4), 141-151.
- Lemley, M. A. (2008). Are Universities patent trolls? *Fordham Intellectual Property, Media and Entertainment Law Journal*, 18(3).
- Lopez, S. F. n., Astray, B. P. r., Pazos, D. R., & Calvo, N. (2015). Are firms interested in collaborating with universities? An open-innovation perspective in countries of the South West European Space. *Service Business*, 9(4), 637-662.
- Marques, J. P. (2014). Closed versus open innovation: Evolution or combination? *International Journal of Business and Management*, 9(3), 196.
- Naqshbandi, M. M., Kaur, S., & Ma, P. (2015). What organizational culture types enable and retard open innovation? *International Journal of Methodology*, 49(5), 2123-2144.

- Organisation for Economic Co-operation and Development. (2015). *Boosting Malaysia's National Intellectual Property System for Innovation*. Retrieved from https://read.oecd-ilibrary.org/science-and-technology/boosting-malaysia-s-national-intellectual-property-system-for-innovation_9789264239227-en#page1.
- Ramli, N., & Zainol, Z. A. (2014). Intellectual property ownership model in academia: An analysis. *Journal of Intellectual Property Rights*, 19(3), 177-188.
- Ramoso, M. G. D., & Cruz, R. A. O.-D. (2019). Relevance of the national research agenda to the research initiative of a higher education institution in the Philippines. *Asian Journal of University Education*, 15(2), 1.
- Rufat-Latre, J., Muller, A., & Jones, D. (2010). Delivering on the promise of open innovation. *Strategy & Leadership*, 38(6), 23-28.
- Sargsyan, G. (2014). *Socio-Economic Impact of Open Innovation 2.0*. Retrieved from <https://ec.europa.eu/digital-single-market/en/news/socio-economic-impact-open-innovation-20>.
- Skarzauskiene, A., & Zaitsava, M. (2016, July 12-13). *Exploring the potential of open innovation 2.0 and Web 3.0 for SMEs*. Paper presented at the 3rd European Conference on Social Media, Caen, France.
- United Nations. (2013). *Intellectual Property Commercialization: Policy Options and Practical Instruments* (First ed.). New York: United Nations Economic Commission for Europe.
- Verbano, C., Crema, M., & Venturini, K. (2015). The identification and characterization of open innovation profiles in Italian small and medium-sized enterprises. *Journal of Small Business Management*, 53(4), 1052-1075.
- Villarreal, O., & Calvo, N. (2015). From the triple helix model to the global open innovation model: a case study based on international cooperation for innovation in Dominican Republic. *Journal of Engineering and Technology Management*, 35, 71-92.
- Wen, W., Ceccagnoli, M., & Forman, C. (2016). Opening up intellectual property strategy: Implications for open source software entry by start-up firms. *Management Science*, 62(9), 2668-2691.