Athens Journal of Law 2023, 9: 1-23
https://doi.org/10.30958/ajl.X-Y-Z

Is an "Open Innovation" Policy Viable in Southeast Asia? - A Legal Perspective

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In recent years, particularly in Europe, increasing attention is being paid to managing Intellectual Property (IP) competitive effects. Europe achieves greater innovation output with IP overall whilst also implementing the globally harmonised IP laws. The performance differences in innovation output are due to many variables. However, the EU has focussed on three policy goals: "open innovation", "open science", and "open to the world", aiming to foster access to knowledge for advancement as well as overcoming innovation barriers while retaining alignment with harmonised international IP frameworks. Whilst it is still premature to draw conclusions about the effectiveness of the EU approach, it is possible to hypothesise whether such an approach is a viable option in Asia. In this case, the focus will be on the eleven countries of the Southeast Asia region with their various levels of development, from least developed (Cambodia, Laos, Myanmar and Timor-Leste) to highly developed (Singapore). The paper describes the concept of the EU "open innovation" policy, its drivers and its legal basis. From these examples, a framework will be developed against which to test its viability in Southeast Asia. Analysis shows that each of the ten ASEAN member states, including Singapore, is a net importer of patents rather than a developer. Nonetheless, it is considered that the IP ecosystems in Malaysia, Singapore, Thailand and Vietnam are sufficiently robust to at least consider a trial of the Open Innovation, Open Science and Open to the World concepts as being tested in the European Union.

Keywords: *"Open Innovation"; European Union; Association of Southeast Asian Nations; Intellectual Property legislation*

Introduction

The concept of open innovation was first articulated by Chesbrough in a paper published in the MIT Sloan Management Review.[1] He observed that companies were increasingly "harnessing external ideas while leveraging their in-house R&D outside their current operations".[2] It is the sourcing of technology and innovation in the broader research and innovation community "beyond a specific

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[1]Chesbrough, Vanhaverbeke, Bakici & Lopez (2003) at 35-41.
[2]Ibid, at 41.

industry, discipline or type of collaborative partner".[3] Challenges associated with a new approach to innovation include issues associated with people, competition, intellectual property, and connection or reach issues.[4] Ensuring the proper IP safeguards are in place is critical.

> "The fact that the term "open" is usually thought of as cost-free creates confusion; however, in contrast to open source, for example, open innovation typically implies the payment of licence fees as well as other financial arrangements. In this context, therefore, open does not mean free".[5]

> "Thus, "free software" is a matter of liberty, not price. To understand the concept, **you should think of "free" as in "free speech," not as in "free beer".**"[6]

Open innovation requires both value creation and value capture to enable collaborative risk-sharing.[7] The two operate simultaneously: "value creation by the partners working in collaboration, co-creating knowledge to boost innovation output, and value capture under conditions that enable each partner of the collaboration to capture a share of the economic value in common".[8]

While open innovation is becoming more pervasive, it is most noticeable in academic publishing, with an increasing number of open access journals and even open-access books being published to provide "ready access to ideas".[9] Rather than dispute whether or not a journal should be called predatory, Papanikos suggests that the test for any journal is whether readers access the papers and researchers submit papers.[10] Open-access journals have been found to create more open innovation than closed-access journals.[11] It increased in response to the digital transformation, with the "increased moderating effects of references on the correlation between collective intelligence and open innovation".[12] Open access in patents "is a much more fraught area, and it is considered that many battles will be fought before it is a widespread phenomenon".[13]

This article is part of a larger research project focussing on how Southeast Asian nations can improve their innovation potential based on lessons learned from the nine Western European nations, eight of whom are in the European

[3]Strategic Direction (2007) at 35.
[4]Ibid.
[5]Organisation for Economic Co-operation and Development (2008) at 9.
[6]GNU Operating System (2022).
[7]European Association of Research and Technology Organisations (2020).
[8]Ibid, at 2.
[9]Smith & Perry (2022) at 509.
[10]Papanikos (2022) at 260.
[11]Yun, Liu, Jeong, Kim & Kim (2022).
[12]Ibid, at 16.
[13]Smith & Perry (2022) at 509.

Union (EU).[14] Specifically, the paper focuses on three policy goals of the EU, namely: "open innovation", "open science", and "open to the world".[15]

The literature review is a brief introduction to Open Innovation research with the legal opportunities and constraints left for the later analysis. The analysis will focus initially on the Open Innovation policies of the EU and the associated legal framework, as well as lessons learned. It will then focus on the countries of Southeast Asia to ascertain the benefits and pitfalls associated with the promotion of Open innovation in their jurisdictions bearing in mind that there is no overarching legal entity as is the case with the European Union.

Literature Review

A study by the Organisation for Economic Cooperation and Development in 2008 found that companies saw the theft of Intellectual property as the most significant risk to global innovation networks.[16] It found that[17]:

1. For global innovation networks to be effective, they require that the economy has appropriate structural policies in place, such as labour market and competition policies, public infrastructure for innovation together, with a highly skilled workforce;
2. Universities and public research organisations need to play a significant role as a source of essential knowledge and as potential development partners;
3. Potential for knowledge flows and integration across borders depends on how well the system is developed;
4. Intellectual property sharing may require different kinds of management tools in both the research organisation and the commercial organisations;
5. "People must be able to work in networks and across borders, sectors and at the interface of converging technologies";[18]
6. "Much public support for innovation still focuses on R&D and technological innovation and less on non-technological innovation or other forms of user-driven innovation";[19]
7. "National [research and development] programmes need to be more open while ensuring benefits via reciprocity and cost-sharing agreements" and
8. "Building a strong knowledge base is necessary to develop next-generation innovation policies and best practices".[20]

[14]EU members: Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Monaco, Netherlands plus non-EU member: Switzerland
[15]European Commission, Directorate-General for Research and Innovation (2016).
[16]Organisation for Economic Co-operation and Development (2008) at 11.
[17]Ibid, at 12-13.
[18]Ibid, at 12.
[19]Ibid.
[20]Ibid, at 13.

Curley[21] argued in 2015 that Open Innovation had already evolved into Open Innovation 2.0. He identified what he called *Quadruple Helix Innovation,* "where government, industry, academia and civil participants work together to co-create the future and drive structural changes far beyond the scope of what any one organisation or person could do alone. When all participants commit to a significant change […] by collaborating together everyone can move faster, share risk and pool resources".[22] This reflects Linus' Law that "given enough eyeballs, all bugs are shallow" in software development.[23]

Ji et al. analysed open innovation network frameworks from the perspective of patent citation networks, with driver assistance systems (DAS) as the research case.[24] They found that the flow of knowledge that "exists between different types of firms significantly facilitates the [Open Innovation] network".[25] The geographic proximities of firms improved the formation of networks.[26] Their research confirmed that "small firms are more active in OI strategies, as they hope to rapidly increase their capabilities and quickly bridge funding gaps by marketing their technologies, while the flexible organisational structure within them also indirectly promotes the above behaviour".[27] This is in contrast to the earlier OECD study which found that "[l]arger firms innovate more openly than small firms. Innovation survey data indicate that large companies are four times more likely than small and medium-sized enterprises (SMEs) to collaborate on innovation".[28]

The move from closed to open innovation requires a paradigm change in the diffusion of innovations within open innovation ecosystems.[29] This has resulted in a shift in focus from firm-centric innovation to platform-centric innovation; and a shift in focus from physical goods to digital goods and services.[30] Several models have been developed for implementing innovation.[31] For instance, Arvaniti et al. have developed a nine-step model:[32]

- Step 1 – show an interest in working with open innovation
- Step 2 – arrange capital for the associated expenses
- Step 3 – pinpoint projects to be pursued and filter them until the final projects are selected
- Step 4 – track the right partners for each project
- Step 5 – create a communication channel between partners

[21]Curley (2015).
[22]Ibid, at 12.
[23]Raymond (2000).
[24]Ji, Yu, Sun & Zhang (2020).
[25]Ibid, at 9.
[26]Ibid.
[27]Ibid.
[28]Organisation for Economic Co-operation and Development (2008) at 10.
[29]Xiong, Lim, Tan, Zhao & Yu (2022) at 1757.
[30]Ibid, at 1760-1761.
[31]See for instance: Xiong, Lim, Tan, Zhao & Yu (2022). and Arvaniti, Dima, Stylios & Papadakis (2022).
[32]Arvaniti, Dima, Stylios & Papadakis (2022) at 5.

- Step 6 – undertake negotiations for all pertinent partners
- Step 7 – organise the partnership
- Step 8 – project management
- Step 9 – evaluate project outcomes and their adoption

They provide a salutary warning: "transforming a firm that has a closed R&D to an open innovation concept can be a long and arduous multistep process, as many things must be considered in order to have a successful result".[33]

Whether or not a company will eventually proceed down the path of open innovation, the law firm Gilbert+Tobin has prepared a list of the critical actions an organisation should undertake to position themselves for the possible eventuality of going down the path to open innovation:[34]

a) Identify all of the different categories of products that the company offers[35] and the IP links to each of those categories;
b) Determine whether all of the registerable IP has maximum protection under the relevant legislation;
c) If IP is created by employees, determine whether the IP is vested in the employees, the organisation or both; and
d) Determine whether the organisation has control over access to its confidential information, including know-how and trade secrets. Further, determine whether robust confidentiality provisions cover its employment and third-party contracts.

Open innovation is facilitated by open access to research findings. This has led to the development of the open-access movement in academic publications. One such initiative is the *Budapest Open Access Initiative* which was supported by the Open Society Institute founded by George Soros.[36] The initiative aims "to achieve open access to scholarly journal literature".[37]

In August 2022, the United States announced updated policy guidance on access to peer-reviewed publications. By the end of 2025, all federal agencies must put in place policies and procedures that provide access to anyone anywhere to freely access peer-reviewed publications as soon as they are published, as well as access to data, that is an output of agency funded research.[38] Barbour comments that:[39]

> Open access matters for both the public and academics, as the fast-moving emergency of the COVID-19 pandemic amply demonstrated. Even academics at well-funded universities can mostly only access journals their universities subscribe to – and no institution can afford to subscribe to everything published. Last year,

[33]Ibid, at 10.
[34]Gilbert + Tobin (2022) at 3.
[35]For instance: brands, different types of software and product lines.
[36]Open Society Institute (2002).
[37]Ibid.
[38]Barbour (2022).
[39]Ibid.

> estimates suggest some 2 million research articles were published. People outside a university – in a small company, a college, a GP practice, a newsroom, or citizen scientists – have to pay for access.

Butler-Adam has identified an impediment to publication in open-access journals in that:[40]

> Researchers still have a deeply ingrained preference for publishing in the high-impact, high-profile scholarly journals produced by prominent publishers. This is driven by prestige. If academics have the money to pay the exorbitant author fees, they publish in these journals. These academics' own universities must then pay again to access research that was conducted using institutional resources and taxpayers' money.

It is claimed that whilst university research is usually publicly funded, a university can spend millions of dollars to allow access to published information in peer-reviewed academic journals.[41] Wingfield and Millar argue that even with open-access model impacts academics in poorer countries as open-access publishers often charge the researcher significant fees to publish their article.[42]

Methodology

This research focuses on how the open innovation initiative of the European Union might be transferred to the Southeast Asia economies. It used the documentary research concept where reputable contemporary sources are analysed to understand legal implications associated with the implementation of open innovation into the EU and the possibility of introducing it into Southeast Asia.

Open Innovation in the European Union

Open Innovation, Open Science, Open to the World

In 2021 the World Intellectual Property Organization (WIPO) reported that the most innovative countries are mainly from Europe.[43] In passing, it should be noted that the European Union, in its annual Innovation Scoreboard,[44] measures innovation within its member states using different parameters and scoring methods from WIPO.[45] The EU uses a score, and WIPO uses a ranking.

[40]Butler-Adam (2015).
[41]Wilson (2017).
[42]Wingfield & Millar (2019).
[43]Barbour (2022).
[44]European Commission, Directorate-General for Research and Innovation et al. (2022).
[45]World Intellectual Property Organization (2021).

To achieve even greater innovation output, the EU has focussed on three policy goals: "open innovation", "open science", and "open to the world",[46] aiming to foster access to knowledge for advancement and overcoming innovation barriers while retaining alignment with harmonised IP frameworks.[47]

Chesborough et al. developed a charter for open innovation policies in Europe.[48] They identified five critical areas for development: education and human capital development; financing open innovation: the innovation chain; adopting a balanced approach to intellectual property; promoting cooperation and competition; and expanding open government.[49] In particular, "governments should clarify the ownership of IP and provide the institutional and legal support for its purchase and exchange".[50] The report made the following key observations and recommendations concerning what they considered the then existing (2011) legal impediments to a robust IP open innovation system in the EU:[51]

a) A patent granted by the European Patent Office (EPO) signals "some embedded value", which assists the patent holder when seeking to licence the technology or seek external funding. "The EPO approach also prevents companies becoming easily blocked (in developing or producing new products) by poor quality patent families owned by other companies or non-practising entities (e.g. patent trolls)";[52]
b) The EU system is "the most expensive and complex in the world due to its high level of fragmentation and translation requirements".[53] Patents, once granted, must be enforced by the jurisdictions in which the patent applies. Patents must be "translated, validated, and renewed on a yearly basis".[54] At the time, the EU was making progress on a uniform patent system.
c) There is a need to align the incentives of researchers and industry. At the time of the Report:

> a patent application will be rejected in Europe if the invention has become publicly available before the application was filed. This includes selling the invention, giving a lecture about it, showing it to an investor without a non-disclosure agreement (NDA), or publishing it in a scientific journal.[55]

d) "From a public policy point of view, unused patents represent a large untapped source of knowledge that could create new companies and economic growth if there were an efficient way to 'activate' these unused patents in other companies".[56]

[46] European Commission, Directorate-General for Research and Innovation. (2016).
[47] Margoni (2019).
[48] Chesbrough, Vanhaverbeke, Bakici & Lopez (2011).
[49] Ibid, at 4.
[50] Ibid, at 14.
[51] Ibid, at 14-19.
[52] Ibid.
[53] Ibid, at 15.
[54] Ibid.
[55] Ibid, at 17.
[56] Ibid.

e) Current IP transfer provisions can be quite complex when multiple parties are involved. The process requires "collaborative IP rules based on good practices", while the current rules had not been adapted to complex forms of collaboration;[57]
f) There is a need for streamlining the process, and hence the costs, whereby intermediaries provide platforms that link companies with problem solvers;
g) Regulators must think beyond patents as "trademarks, copyrights, trade secrets and industrial design rights are important in the discussion of an open innovation policy".[58]

In 2016 the European Political Strategy Centre issued a strategic note on how innovation requires a balanced regulatory approach.[59] They considered that two elements define innovation. Firstly it must have novelty in that it is "a new idea in relation to something that is established".[60] Secondly, "a technical novelty or a new approach can only be regarded as innovative if it brings societal and social benefits".[61] In other words, "an innovation is to be understood as a process through which the novelty has to win social recognition and acceptance over time".[62] To foster an innovative regulatory framework, they proposed several possible approaches, including:[63]

a) In the case of emerging technologies, there may be a role for *experimental legislation* such as that developed in several EU member states in the regulation of self-drive vehicles. For instance, Finland, France and the Netherlands adopted a legal framework, whilst Germany and Sweden opted for the introduction of special exemptions from existing legislation;
b) *Mutual recognition* and *country-of-origin provisions* can drive innovation through competition in the marketplace. Mutual recognition ensures that any product sold in one EU country can be sold in another. On the other hand, in the country of original principle, entities in one state can trade in the other states on the basis of their home regulations;
c) The *test of alternatives* in which rather than an applicant submitting a clearly defined request for authorisation, the applicant must test alternatives and report on alternative solutions;
d) Legislation should *focus on outcomes*;
e) The right for companies to *challenge regulatory requirements* provided that can demonstrate they can surpass the standard or they can comply with a different approach; and

[57]Ibid, at 18.
[58]Ibid, at 19.
[59]European Political Strategy Centre (2016).
[60]Ibid, at 2.
[61]Ibid.
[62]Ibid.
[63]Ibid, at 8-9.

f) "When little is known about a situation, a temporary legislative measure can be a better option than no legislative action".[64]

Modelling of the Open Innovation model found that it is susceptible to many risks:[65]

a) Misalignment of objectives between innovation and the strategic direction of the organisation;
b) Unrealistic expectations of the utility and market potential of the innovation;
c) Deficit of suitable human resources;
d) Insufficient integration of the parties within the innovation network;
e) Ineffective internal communication;
f) Ineffective communication with partners;
g) Inappropriate or underdeveloped Key Performance Indicators;
h) Lack of funding;
i) Poor management of the intellectual property produced by both the organisation and its partners;
j) No markets at the time the innovation is ready for launch; and
k) Superior technology developed by a competitor.

The European Associations of Research and Technology Organisations (EARTO) considered that a stable EU regulatory and policy framework must recognise the crucial role IP plays in fostering the co-creation of knowledge.[66] In addition, there should be a balance between open science and open innovation based on intellectual property rights (IPRs) and should be "promoted hand in hand".[67]

Despite these initiatives, a number of researchers consider that it is still premature to determine the effectiveness of the EU approach.[68]

[64]Ibid, at 9.
[65]Banu, Dumitrescu, Purcărea & Isărescu (2016) at 1026.
[66]European Association of Research and Technology Organisations (2020) at 9.
[67]Ibid, at 10.
[68]Guibault (2020); Guibault & Margoni (2015); Margoni, Caso, Ducato, Guarda, & Moscon (2016).

Legal Analysis

In May 2021, a Decision by the Council of the European Union established Horizon Europe - the Framework Programme for Research and Innovation.[69] The aim of the Regulation is, "for the duration of the MFF 2021-2027, sets out the rules for participation and dissemination concerning indirect actions under the Programme and determines the framework governing Union support for R&I activities for the same duration.[70]

> The general objective of the Programme is to deliver scientific, technological, economic and societal impact from the Union's investments in R&I so as to strengthen the scientific and technological bases of the Union and foster the competitiveness of the Union in all Member States, including in its industry, to deliver on the Union strategic priorities and to contribute to the realisation of Union objectives and policies, to tackle global challenges, including the SDGs by following the principles of the 2030 Agenda and the Paris Agreement, and to strengthen the ERA. The Programme shall thus maximise Union added value by focusing on objectives and activities that cannot be effectively realised by Member States acting alone but in cooperation.[71]

In brief, its specific objectives are to:

a. Develop, promote and advance scientific excellence;
b. Generate knowledge;
c. Foster all forms of innovation; and
d. Optimise the Programme's delivery.[72]

It was structured into three pillars: Pillar 1: "Excellent Science", Pillar II: "Global Challenges and European Industrial Competitiveness", and Pillar III: "Innovative Europe".[73]

The Regulation also established the European Innovation Council (EIC) as a centrally managed one-stop shop for the "Innovation Europe" Pillar.[74] Its focus is breakthrough and disruptive innovation, with a particular target being market-creating innovation.[75] Nevertheless, it should support all types of innovation, including incremental innovation. The EIC must be open to all types of innovators.[76]

The Programme is to: "encourage open science as an approach to the scientific process based on cooperative work and diffusing knowledge", ensure "open access to scientific publications resulting from research funded under the Programme", and ensure "open access to research data, including those underlying scientific publications, in accordance with the principle *as open as possible, as*

[69]Council Decision (EU) 2021/764, art 1.
[70]Ibid.
[71]Ibid, art 3(1).
[72]Ibid, art 3(2).
[73]Ibid, art 4(1).

closed as necessary".[77] The remainder of the articles cover the program's operation, including the selection of projects and provision of funding.

Annex II notes that:

> Throughout Europe, efforts are still needed to develop ecosystems where researchers, innovators, industries and governments can easily interact. Innovation ecosystems, in fact, still do not work optimally due to a number of reasons, such as:
> (a) interaction among innovation players is still hampered by organisational, regulatory and cultural barriers between them;
> (b) efforts to strengthen innovation ecosystems shall benefit from coordination and a clear focus on specific objectives and impact.[78]

Furthermore, it provides Guidance to the European Institute of Innovation and Technology (EIT) on how to implement the programme activities within EIT.[79] Key impact pathway indicators for short-term, medium-term and longer-time monitoring are also outlined.[80]

The enabling Regulations[81] included much of the similar text as used in the Decision.[82] Both were promulgated in the *Official Journal of the European Union* on 12 May 2021 to apply from 1 January 2021.

In May 2022, the European Commission publicised "The Innovation Principle", namely:

> EU policy and legislation should be developed, implemented and assessed in view of encouraging innovations that help realise the EU's environmental, social and economic objectives, and to anticipate and harness future technological advances.
> Specific objectives are:
> - Improving the design of existing and future EU regulations to enhance their impact on encouraging beneficial innovation.

[74]Ibid, art 9(1).
[75]Ibid.
[76]Ibid, art 9(2).
[77]Ibid, art 14(1).
[78]Ibid, Annex II s 1.
[79]Ibid, Annex II.
[80]Ibid, Annex V.
[81]Regulation (EU) 2021/695.
[82]Council Decision (EU) 2021/764.

- Steer the development of innovative solutions addressing new and complex challenges in a way that embeds EU values and protects Europeans.
- Achieve an optimal balance between predictability of the regulatory environment and adaptability to scientific and technological progress.
- What is it, and why do we need it? [83]

The principle aims to "ensure that EU legislation is analysed and designed so as to encourage innovation to deliver social, environmental and economic benefits and to help protecting Europeans".[84]

The key issue to resolve is whether the Open Innovation concept is applicable to ASEAN member states or to the organisation as a whole.

Potential for Introduction of Open Innovation to Southeast Asia

Intellectual Property Rights Protection within the Southeast Asian Nations

All eleven Southeast Asian nations are members of the World Intellectual Property Organization (WIPO)[85] , whilst all but Timor Leste are members of the World Trade Organization.[86] Timor Leste is in the accession stage.[87]

Once a nation becomes a member of the World Trade Organization, it also becomes a party to the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).[88] Under TRIPS, members can meet their obligations without acceding to any other Intellectual Property treaties.[89] Nevertheless, the ten ASEAN member states are contracting parties to several World Intellectual Property Organization (WIPO) treaties.[90]

A number of the ASEAN economies assemble manufactured goods such as motor vehicles and electronics for external corporate entities. Many of these goods are then exported to third countries. For instance, manufacturers such as Toyota, Isuzu, Honda, Mitsubishi, Nissan and Ford export from Thailand to global motor vehicle markets.[91] Intellectual property remains with the external corporate entities and must be protected in the country of assembly.

In 1996 ASEAN established the Working Group on Intellectual Property Cooperation (AWGIPC)[92] The 2016-2025 IPR Action Plan includes four strategic

[83]European Commission (2022).
[84]Ibid.
[85]World Intellectual Property Organization (2022b).
[86]*World Trade Organization: Members and Observers* (2019).
[87]World Trade Organization. (2022).
[88]Agreement on Trade-Related Aspects of Intellectual Property Rights (as amended on 23 January 2017).
[89]Ibid, art 1(1).
[90]Smith, Smith & Perry (2023).
[91]Australian Trade and Investment Commission (2022).
[92]ASEAN Secretariat (2021).

goals, namely:[93] development of a more robust ASEAN IP System by institutional of strengthening the staff in IP offices of member states and improving their IP infrastructure; developing regional IP platforms and infrastructure to contribute to enhancing the role of ASEAN; develop an inclusive ASEAN IP ecosystem; and develop regional mechanisms which promote asset creation and commercialisation, particularly enhancing the fields of *geographical indications and traditional knowledge*.[94] Smith, Smith and Perry discuss in detail the implementation of Plurilateral Free Trade Agreements on the Intellectual Property Protection of ASEAN Members and how the parties have agreed to work together to improve IP systems in ASEAN through cooperation, training and institutional support.[95]

Innovation Potential

The Global Innovation Index (GII) developed by the World Intellectual Property Organization (WIPO) is an indicator of the current status of innovation potential. As seen from the data shown in Table 1, there is quite a range of QIIs between the ASEAN member states. No data is available for Timor Leste. Essentially, the members sit in one of four bands:

a) Excellent GII – Singapore
b) Very good GII – Malaysia, Thailand and Vietnam
c) Fair to Good GII – Philippines and Indonesia
d) Low GII – Brunei Darussalem, Cambodia, Lao PDR and Myanmar

[93]The ASEAN Intellectual Property Rights Action Plan 2016-2025: Meeting the Challenges of "One Vision, One Identity, One Community" through Intellectual Property (2016).
[94]Italics added by the authors.
[95]Smith, Smith & Perry (2023).

Table 1. *Global Innovation Indices of ASEAN Members 2015-2022*

Country	Global Innovation Index							
	2015[96]	**2016**[97]	**2017**[98]	**2018**[99]	**2019**[100]	**2020**[101]	**2021**[102]	**2022**[103]
Brunei Darussalam	-	-	71	67	71	71	82	92
Cambodia	91	95	101	98	98	110	109	97
Indonesia	97	88	87	85	85	85	87	75
Lao PDR	-	-	-	-	-	113	117	112
Malaysia	32	35	37	35	35	33	36	36
Myanmar	138	-	-	-	-	129	127	116
Philippines	83	74	73	73	54	50	51	59
Singapore	7	6	7	5	8	8	8	7
Thailand	55	52	51	44	43	44	43	43
Vietnam	52	59	47	45	42	42	44	48

Source: WIPO with analysis by authors

Legal Analysis

From the outset, it is essential to recognise that ASEAN is an association, not a union. The European Union is a legal entity with the competencies of its members specified in various EU treaties. The countries of Southeast Asia are in an association (ASEAN) where the Charter is explicit that members must not interfere in the internal affairs of other members.[104]

The ASEAN member states have recognised the importance of the development and protection of intellectual property, as can be seen from their membership in a significant number of patent and trade mark treaties, as presented in Table 2. In addition, each member state has an extensive patent and trade-mark legislation portfolio.[105] Analysis by Smith et al. found that "much of the legislation has been promulgated following ASEAN members' accession to bilateral and plurilateral free trade agreements".[106]

Fowler argues that whilst a harmonised and integrated transnational IP enforcement system "may seem a bridge too far", establishing a regional IP administration should be considered to protect and enforce IP on an ASEAN-wide basis.[107]

[96]Cornell University, INSEAD & WIPO (2015).
[97]Cornell University, INSEAD & WIPO (2016).
[98]Cornell University, INSEAD & WIPO (2017).
[99]Cornell University, INSEAD & WIPO (2018).
[100]Cornell University, INSEAD & WIPO (2019).
[101]Cornell University, INSEAD & WIPO. (2020).
[102]World Intellectual Property Organization (2021).
[103]World Intellectual Property Organization (2022a).
[104]Charter of the Association of Southeast Asian Nations (2007).
[105]Smith, Smith & Perry (2023).
[106]Ibid.
[107]Fowler (2021).

Table 2. *ASEAN Member State Membership of International Patent and Mark Treaties (as of 30 November 2022)*

Brunei Darussalam	Cambodia	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Vietnam
World Intellectual Property Convention[108]									
□	□	□	□	□	□	□	□	□	□
Paris Convention for the Protection of Industrial Property[109]									
□	□	□	□	□	-	□	□	□	□
Hague Agreement Concerning the International Registration of Industrial Designs[110]									
□	□	-	-	-	-	-	□	-	□
Geneva Act (1999)[111] [of the Hague Agreement Concerning the International Registration of Industrial Designs]									
□	□	-	-	-	-	-	□	-	□□
Patent Cooperation Treaty (PCT)[112]									
□	□	□	□	□	-	□	□	□	□
Madrid Protocol Concerning the International Registration of Marks[113]									
□	□	□	□	□	-	□	□	□	□
Agreement on Trade-Related Aspects of Intellectual Property Rights[114]									
□	□	□	□	□	□	□	□	□	□

Source: WIPO (2022)[115] and authors.

Discussion

Patent Registrations

At the outset, it is essential to understand the significant differences in the level of innovation sophistication between the Western European and Southeast Asian economies. Tables 3 and 4 provide an overview of IP registrations from

[108]Convention Establishing the World Intellectual Property Organization (as amended on September 28, 1979).
[109]Paris Convention for the Protection of Industrial Property (as amended on September 28, 1979).
[110]The Hague Act (1960).
[111]Geneva Act (1999).
[112]Patent Cooperation Treaty (PCT) (as modified on October 3, 2001).
[113]Protocol Relating to the Madrid Agreement Concerning the International Registration of Marks (as amended to 12 November 2007).
[114]Agreement on Trade-Related Aspects of Intellectual Property Rights (as amended on 23 January 2017).
[115]WIPO (2021).

2011 to 2020 for the Western European and Southeast Asian economies, respectively.

Table 3. *Western European Economies - IP Registrations 2011 to 2020*

Country	Patent Grants (2011-2020)		Patents in Force (2020)	Trademark Registrations (2011-2020)		Designs in Industrial Design Registrations	
	Resident	Non-Resident		Resident	Non-Resident	Resident	Non-Resident
Austria	22,373	1,639	159,581	156,702	61,363	28,117	3,113
Belgium	17,380	1,519	209,751	155,309	0	14,601	0
France	171,324	15,569	674,334	546,625	33,332	79,629	41,578
Germany	269,283	47,758	834,734	2,027,976	185,220	605,229	85,996
Liechtenstein	1,525	0	0[116]	1,247	15,148	67	1,469
Luxembourg	3,390	1,663	165,249	49,427	0	6,182	0
Monaco	152	54	109,213	14,934	78,373	293	12,733
Netherlands	43,263	3,017	212,855	331,947	0	36,445	0
Switzerland	39,679	1,987	250,143	332,549	520,612	37,905	78,985

Source: WIPO database updated to November 2021[117] with analysis by the authors.

What is clear from the data in Table 2 is that the leading Western Europe economies are significant generators of patents, as can be seen by the ratio between resident and non-resident patents. They are also generators of registered industrial designs. The number of patents in force as of 2020 is in the six digits except for Liechtenstein.

Turning to the data of ASEAN members in Table 3, the trend is quite different. All major economies, including Singapore, one of the top ten economies on the Global Innovation Index, register significantly more non-resident patents than resident patents. The major manufacturing economies, namely Indonesia, Thailand and Vietnam, generate more industrial designs than are registered by non-residents. Again Singapore is an outlier where the number of non-resident industrial designs is around six times greater than resident designs.

Table 4. *Southeast Asian Economies - IP Registrations 2011 to 2020*

Country	Patent Grants (2011-2020)		Patents in Force (2020)	Trademark Registrations (2011-2020)		Designs in Industrial Design Registrations	
	Resident	Non-Resident		Resident	Non-Resident	Resident	Non-Resident
Brunei Darussalam	14	147	652	868	19,335	1	738
Cambodia	0	279	0[118]	8,580	50,083	72	315
Indonesia	2,150	25,724	59,394	254,201	169,477	12,924	8,744
PDR Lao	0	27	574	1,147	24,902	0	0
Malaysia	4,554	33,487	31,975	108,757	187,756	5,322	10,694

[116]This value appears to be erroneous.
[117]World Intellectual Property Organization. (2022b).
[118]This value appears to be erroneous.

Country	Patent Grants (2011-2020)		Patents in Force (2020)	Trademark Registrations (2011-2020)		Designs in Industrial Design Registrations	
	Resident	Non-Resident		Resident	Non-Resident	Resident	Non-Resident
Myanmar	0	0	0	8,429	6,446	0	0
Philippines	292	20,066	25,715	139,421	205,193	6,992	5,802
Singapore	3,889	54,164	46,640	79,874	362,697	5,724	37,010
Thailand	1,054	20,035	17,306	149,174	174,279	19,039	10,931
Timor Leste	0	0	0	0	0	0	0
Vietnam	958	17,409	12,625	256,796	245,493	11,465	8,968

Source: WIPO database updated to November 2021[119] with analysis by the authors.

In brief, the Western European economies are developers and exporters of IP, whilst ASEAN economies are importers of IP. It is easier for the developers of IP to be part of an Open Innovation ecosystem. This does not preclude the "importers" of IP from also being part of an Open Innovation system. It is just more complex as the parties would probably not be close geographically to interact on a regular basis. The internet assists, but it is not a panacea. Face-to-face interaction is highly desirable.

Open Science

To investigate the open access to information, the authors analysed the SCImago database to ascertain the number of journals indexed in Scopus.[120] The split between the total number of Scopus-indexed journals and the number of indexed journals listed as Open Access is provided in Table 5 (Western Europe) and Table 6 (ASEAN). The data must be treated with caution as it refers to the place of publication and not the country of origin of the journal. This applies particularly to France, Germany, Netherlands, Singapore and Switzerland, all major publishing centres. Also, the quality of the publications has not been considered. The test has been a simple "yes" or "no". Nonetheless, the data shows that the open-access publication model is gaining traction in both regions.

Table 5. *Western European Economies – Publications Accepted in Scopus*

Country	Publications	
	Total	Open Access
Austria	93	31
Belgium	145	21
France	563	137
Germany	1,545	320
Liechtenstein	-	-
Luxembourg	3	1
Monaco	-	-
Netherlands	1,971	299
Switzerland	755	336

[119]World Intellectual Property Organization. (2022b).
[120]SCImago. (2022).

Table 6. *Southeast Asian Economies – Publications Accepted in Scopus*

Country	Publications	
	Total	**Open Access**
Brunei Darussalam	1	1
Cambodia	-	-
Indonesia	97	76
Lao PDR	-	-
Malaysia	109	55
Myanmar	-	-
Philippines	24	6
Singapore	172	30
Thailand	70	20
Timor Leste	-	-
Vietnam	2	1

Source of Tables 5+6: SCImago database updated to April 2022 with analysis by the authors.

An interesting case study is that of Indonesia, which is claimed to be a world leader in the number of open-access research journals published.[121] Analysis in a 2020 report found that Indonesia had published 1,717 open-access articles ahead of the United Kingdom and Brazil.[122] In 2019 the government mandated that research publications be open access so that the public can access and use the research results. Finally, the authors of the report concluded that:

> The government needs to reduce and even stop the dependence on foreign instruments in assessing the quality of local journals or research, especially if Indonesia already has that instrument. To replace them, the government can use the journal management standard set by international organisations such as COPE […] The Indonesian government should [avoid] non-inclusive standards such as Scopus and Web of Science. In science communication, exclusivity is one thing that should be avoided.[123]

Barriers to Open Innovation, Open Science and Open to the World in ASEAN the Economies

There are several conditions precedent for an economy to be part of an open innovation ecosystem, particularly one involving international partners. These are addressed in the following paragraphs.

***Membership of International Intellectual Property Treaties*:** All 11 Southeast Asian nations are members of WIPO, and all except Timor-Leste are members of the WTO. Such membership assists in developing robust IP frameworks and allows members to participate in global registration of certain IP rather than needing to apply country by country.

***Excellent to a Very Good Global Innovation Index*:** Singapore, with a GII consistently in the top 10, stands out among Southeast Asian nations. Malaysia,

[121]Irawan, Priadi, Muharlisiani, Onie & Rusnalasari (2020).
[122]Ibid.
[123]Ibid.

Thailand and Vietnam are consistently in the top 50 nations. Indonesia and the Philippines are lower, with the remaining four, Brunei Darussalam, Cambodia, Lao PDR, and Myanmar, tending to hover at the lower end of the scale.

Strong domestic IP protection and enforcement regime: The regime in Singapore is robust, while those of the remainder of the economies range from reasonably strong to weak. All ASEAN members see the importance of such a regime and have enacted most of the needed legislation. Enforcement needs improvement across most members except Singapore, where compliance is very high. Capacity development is assisted through cooperation and assistance clauses in Free Trade Agreements with their key trading partners.[124]

***Strong Manufacturing Sector or a Strong Knowledge Economy*:** Only Singapore can claim to have a strong knowledge economy, as can be seen from its status as being regularly in the top ten countries on the WIPO Global Innovation Index (GII). The other economies would need to leverage off a robust manufacturing sector or a mix thereof. At this stage, Malaysia, Thailand and Vietnam would also appear to meet this condition.

***Open Science*:** This is particularly hard to measure. Generally, researchers are free to publish in a journal of their choosing. As noted above, the Indonesian government is encouraging the publication of research in open-access journals. At the same time, the number of open-access journals is increasing.

Conclusion

The "Open Innovation, Open Science, and Open to the World" paradigm, as being tested in the European Union, appears to be a viable concept that could also be trialled in Southeast Asia. Unlike in the European Union, it would not be possible to trial it as an activity of ASEAN. Rather, it would have to be tested out by individual members. Interestingly all the Southeast Asian nations are importers rather than intellectual property developers. This will make the development of an open innovation ecosystem more challenging, but it is considered that this disadvantage could be readily addressed.

The "Open Innovation Open Science and Open to the World" paradigm would be viable in Singapore and probably viable in Malaysia, Thailand and Vietnam. The key is to convince the governments to provide a rigorous legislative platform and the various partners to see the advantages to be achieved from the open innovation ecosystem, and create nuanced frameworks that can fit in with the international IP protection regimes.

Funding

This research is supported by an Australian Government Research Training Program (RTP) Scholarship to the first author.

[124]See for instance: Smith, Smith & Perry (2023).

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