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ASEAN Economic Community and intellectual property rights: an assessment of framework conditions for innovation
Over the past few years, the SEA-EU-NET project has launched a series of reports that informed ASEAN-EU science and innovation cooperation policy and decision-makers. The project’s analyses primarily focused on research cooperation patterns, innovation support schemes and selected framework conditions for innovation. The present report takes the work on framework conditions one step further. It asks the question of the prospects of innovation in ASEAN in the context of the ASEAN Economic Community (AEC) process. Following the project’s mandate, it specifically concentrates on the impact of AEC on framework conditions for research and innovation in ASEAN and the EU. It also centres on the current and potential role of intellectual property rights in regional and bi-regional innovation processes.

These questions are of crucial relevance for the ASEAN-EU policy dialogue on research and innovation. Cooperation at policy and at research level can support innovation in both regions, provided the right framework conditions are in place.

The AEC has been officially launched at the end of 2015. With the AEC set up, the science and technology portfolio has moved to the economic pillar of ASEAN, putting stronger emphasis on the contribution of research and innovation to social and economic prosperity in the region. Furthermore, the ASEAN Committee of Science and Technology (ASEAN COST) has recently endorsed its new ASEAN Plan of Action on Science, Technology and Innovation (APASTI), articulating regional research and innovation policy for the period up to 2020.

In the EU, research and innovation policy is articulated around the Open Science, Open Innovation and Open to the World dimensions. Openness to the world means seeking STI excellence wherever it is located, engaging other countries and regions to address together global challenges, and creating framework conditions that enable cooperation. This openness is largely implemented by the Horizon 2020 programme, also for the period up to 2020. There are therefore great synergies and potential benefits that could be drawn from research and innovation cooperation and from policy exchanges between ASEAN and the EU: promoting an appropriate intellectual property rights framework to boost cooperation and innovation is a good case in point.

On behalf of the ASEAN Secretariat and the European Commission, we welcome the present report and would like to express our appreciation for the work of the experts who contributed.
The ASEAN Economic Community and the European Union

The launch of the Association of Southeast Asian Nation’s (ASEAN) Economic Community (AEC) at the end of 2015 is expected to have an impact on innovation. By facilitating economic integration, it can also forge framework conditions (general macroeconomic conditions, quality of infrastructure, levels of education, product and labour market regulations, tax systems, intellectual property regimes and so on) conducive to innovation performance and a regional knowledge market. The hypothesis is that this might play out in much the same way as economic integration in the Single Market Programme in the European Union (EU). Our argument is that for this to happen, the supranational support structures and innovation incentives at the ASEAN level would need to be strengthened.

In the design of the AEC, the science, technology and innovation (STI) covenant has been shifted from the sociocultural pillar, where it was under the ASEAN framework hitherto, to the economic pillar of ASEAN. This move indicates a more pronounced emphasis on the contribution of research and innovation to social and economic benefits within the region. Both ASEAN and the EU consider STI an engine for growth that is key in any knowledge-based economic development and innovation. The new ASEAN Plan of Action on Science, Technology and Innovation (APASTI), endorsed by the ASEAN Committee of Science and Technology (ASEAN COST), articulates the principles and strategic activities for regional research and innovation policy. APASTI acknowledges the need to enhance public-private partnerships, to engage research and higher education institutions and to support commercialization of R&D and IP policies. This action plan covers the period up to 2025, extending over the EU’s Horizon 2020 timetable. Both regions thus have economic integration projects and regional innovation policies in place.

In the present study, we will analyse the interplay of ASEAN’s economic integration project and its innovation policies and framework conditions. In doing so, we also present European approaches and experiences that might be of value. Concretely, we have set ourselves three coherent objectives by means of which we hope to create a platform for exchange and learning that supports cooperation between the two regions:

1. We explore the AEC and its potential impact on framework conditions for innovation in ASEAN, within a contrasting framework of related developments of economic integration in the EU.
2. We concentrate on the current environment for generating policies, systems and practices for the protection of intellectual property rights (IPR) as a specific set of dedicated framework condition.
3. We compare the developments in framework conditions in ASEAN in areas related to IPR to the European Single Market Programme.

As to the potential impact of AEC, a first widely acknowledged observation is that the process of economic integration in ASEAN is still a work in progress. AEC has been formally launched, but a variety of particularly non-tariff barriers hamper true regional free trade. Reflecting ASEAN’s more intergovernmental and less supranational nature, AEC is designed as a free trade area, whereas the European Union established a single market. AEC further facilitates the growth of regional trade and movement of goods, services, capital and people. However, as to innovation activities, countries are wary of opening their labour markets to other ASEAN member states have with non-ASEAN countries.

Probably most importantly for innovation and innovation framework conditions, the establishment of AEC is not accompanied by supranational innovation policy incentives in ASEAN. APASTI introduces highly relevant lines of activity for regional cooperation in research and innovation, but beyond a small ASEAN Science, Technology and Innovation Fund (ASTIF), it does not comprise resources to tackle them without outside help. In this
situation, AEC will affect innovation framework condi-
tions through developments in areas that are both trade 
and technology related. The most visible case in point
is IPR.

We consider IPR dedicated framework conditions for
innovation that are of importance for open innovation in
the context of globalised innovation processes across
countries and regions. The legal protection of IPR can
take the form of patents (rights over invention), utility
models (similar to patents but with less stringent crite-
ria for novelty etc.), copyrights (rights over artistic work),
trademarks (distinguishing signs for products and ser-
ices), industrial designs (aesthetic aspects), geograph-
ic indications (goods having a specific geographic ori-
gin), trade secrets (industrial or commercial secrets) and
traditional knowledge (knowledge developed by com-
munities over time which needs to be protected against
capture by commercial parties outside the community).

In this report, we concentrate on patents as possi-
bly outputs of R&D-intensive innovation activity. Various
countries in Southeast Asia have intensified their patent
regimes, in particular their domestic patenting, with lim-
ited or unclear effects on their innovation performance.
Copyright and trademarks protection can be challeng-
ing for small and medium-sized enterprises (SMEs) in devel-
oping and emerging economies, such as in ASEAN. High trademark
filing activity is indicative of ASEAN’s relevance as a mar-
ket in the globalised trade regime. Utility models (pet-
ty patents) are also gaining in importance, available in Indon-
esia, Laos, Malaysia and the Philippines) are a downgraded
form of IP similar to patents, which potentially foster lo-
local innovations particularly suited for emerging econ-
omy contexts, with SMEs having limited R&D and investment
capacity.

Patent regimes in the EU

European countries have been amongst the first to es-
establish national patent offices, which to this day remain
core parts of their national IP policies and practic-
es, in addition to their willingness to engage in interna-
tional cooperation and IP standards. European national
patent systems still vary widely from country to country.
However, a European harmonised layer was introduced
It founded the European Patent Office and with it a single
integrated application procedure leading to a bundle of
national patent rights. The EPC thus provided a signifi-
cantly simplified and cheaper procedure for seeking
patent protection. The EPC-based European patent ap-
plications are a significant part of European IP output.

European countries, including the EPC, have also
published patent offices of particular countries, such as
patents held growing in ASEAN. The region has given IPR a key role in the
AEC Blueprint. Southeast Asia’s increasingly impor-
tant role in global value chains and innovation networks
is not only due to growing patents, but also to stronger IPR-regime
International agreements, such as the World Trade Or-
ganization’s Agreement on Trade-Related Aspects of In-
tellectual Property Rights (TRIPS) or international proto-
coles and IP-related guidelines. They have set minimum standards to be
implemented on the national level and hence serve as a platform on which to devel-
up further harmonisation.

ASEAN has organised its work on IPR policy in vari-
ous ways since the early 1990s, co-funded by the EU,
the European Patent Office and other donors. An ASE-
AN Framework Agreement was launched in 1995, aiming
at broadly cooperation to enhance the IP-related insti-
tutional environment in the region. An important body in
this regard has been the ASEAN Working Group on In-
tellectual Property Cooperation (AWGIPC), established
in 1996, with a mandate to develop, coordinate and im-
plement IP-related measures.

The so-called ASEAN way, through the cooperative
efforts of institutions and groups like AWGIPC, takes a point of departure the fact that the member states have
their own IP-related legislation, rules and practices, giv-
ing the national IP offices a key role, as laid down in the
ASEAN IPR Action Plan. In the implementation of these
measures, particular attention is given to the
which the individual member states of ASEAN and their
IP offices implement legislation and regulations in a flex-
ible way and according to their own political and insti-
tutional will. Cooperation, communication and coordina-
tion are key processes, rather than formal multilateral or
regional agreements. The most vulnerable part of the IP
systems may therefore be the enforcement of the rights.

In 2009, AWGIPC established the ASEAN Patent Ex-
amination Co-operation (ASPEC), as a de facto harmo-

nisation of the principle of mutual recognition.

Objectives of the ASPEC programme are to
reduce work and speed up turnaround time as well as to
increase the efficiency of search and examination. Ho-
\vever, ASPEC has its limitations, given the weak capaci-
ties and competences in some of the national IP offices.

While most ASEAN countries have opted for a sys-
tem of institutional ownership of patents coming out of
publicly funded research (Bayh-Dole like system of IP),
a mismatch between the typically low input to the pro-
cess in terms of R&D funding and the expectation on the
output side in terms of valuable patent portfolio occurs.
A major challenge in the region’s patent system is
the slow filing and granting process. Another major
challenge is the lack of trained personnel in technolo-
y transfer offices (TTOs) of universities, in particular in
patent examination and evaluation. Fragile implement-
ation and challenges related to enforcement of legal
rules abound. There are still too few economically valu-
able disclosures as a result of this.

Now awareness of the AEC Blueprint, and in particu-
lar, Action Plan for 2016-2020 provides further guidance and support for IPR within
the context of the AEC. It will build on the previous plan,
with continued ASPEC focus, priority on patent exam-
ination and evaluation. It includes ASEAN harmonious integra-
tion guidelines, and access to international treaties
and protocols. It will particularly concentrate on further
strengthening of IP offices and infrastructure, signing of
relevant international treaties, activities to improve the
capacity, especially in the technical area (access to IP
platforms including TTO platforms), and regional initiatives to pro-
\ote asset creation and commercialisation.

With such diverse systems, harmonisation of IP sys-
\es will stretch over a long time. However, there is growing cooperation between the Eu-
ropean Patent Office and ASEAN in patenting. This in-
\udes a number of activities, such as training of patent examiners, data exchange, search tools and exchange
of best practices. Many of the ASEAN countries are lin-
ing up to join the Madrid Protocol on trademarks. With
international protection similar to what PCT does for patents, the Madrid Protocol will off er protection that is
better and easier to obtain. In addition, the Trans-Pacific Partnership (TPP) is also likely to have an impact, as
the requirements will be compliant with the Madrid Proto-
col. Hence, while the Madrid Protocol will provide a
path to a more integrated economic region, innovators
and companies will also look towards international trea-
ties and agreements for protection.

Recommendations and conclusions

Considering potential policy lessons coming out from
our results, it seems evident that much still needs to be
done to remove non-tariff barriers to trade and conti-
ue to create a competitive and productive region.
We claim that a Southeast Asian knowledge market with
strong domestic innovation capacity will only develop
when regional cooperation and IP standards are in place.
Economic integration and innovation frame-
work conditions alone will not suffice to move South-
east Asian knowledge producers’ focus from a reliance
on non-ASEAN partners towards more intra-regional in-
ventive activity.

Missing out on this supranational level might lead
to further fragmentation. Some countries in the region
may occupy and benefit from a variety of hub func-
tions. Multinational companies might use the region’s
R&D capacities, creating limited knowledge spill-over.
It might also be more difficult to regulate transfer price-
ing (as a way of tax improvement) and defensive filing
practices of multinational companies engaged in R&D
in Southeast Asia. Based on the study results, we recom-
mend that

1. ASEAN generates better framework conditions for
innovation on the back of the AEC by means of pro-
grammes and incentives for institutional coopera-
tion, including work conditions alone will not suffice to move South-
east Asian knowledge producers’ focus from a reliance
on non-ASEAN partners towards more intra-regional in-
ventive activity.

2. ASEAN builds upon the many initiatives to devel-
\ up European IP standards and to promote IP in research and
inovation should be incentivised to build linkages and cooperative arrangements.

3. ASEAN offers. With such diverse systems, harmonisation of IP sys-
\ es will stretch over a long time. However, there is growing cooperation between the Eu-
ropean Patent Office and ASEAN in patenting. This in-
\udes a number of activities, such as training of patent examiners, data exchange, search tools and exchange
of best practices. Many of the ASEAN countries are lin-
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on non-ASEAN partners towards more intra-regional in-
ventive activity.
Introduction

2.1 Background and objectives

By the end of 2015, ASEAN, the community of Southeast Asian countries, had reached the key milestone of finalising a process leading up to the formal launch of the ASEAN Economic Community (AEC). Among many initiatives involved in developing ASEAN, the AEC stands out as the approach chosen for a comprehensive attempt to integrate the member countries economically. It also represents a concerted effort to modernise the economies of the region and to “climb up the value chain” in order to better benefit from the production of higher-value goods and services and to be better integrated in global value chains.

Economic integration is a crucial element in the shaping of the framework conditions for innovation. The basic argument is that through more open flows of goods, services, capital, and people, competition will intensify, resources will be better allocated, and economic growth will improve. The beneficial relationship between economic integration and framework conditions for innovation is well known from the European case. Integrating economies undergo restructuring, firms innovate more, and welfare increases. The Single Market Programme in Europe has, over the years, helped shape the economic landscape of the region, supported by a supra-national governance system that has developed through treaty changes and institutional adaptations. Different from the EU, ASEAN’s chosen path of integration is a system of inter-governmental cooperation. The AEC is therefore likely to be different from the EU Single Market.

The SEA-EU-NET project, funded by the European Commission through the framework programme 7 (FP7), has, since 2009, been actively engaged in providing support to cooperation in science, technology, and innovation (STI). The project team has organised workshops and has carried out studies and other activities. In the last part of this project, in the context of a greater focus on innovation in FP7 and now in Horizon 2020, the project has also paid more attention to how the cooperative activities are quite different from research and development as such. After all, the ASEAN-EU cooperation spans areas that are much broader than STI. To this end, several studies and workshops have been conducted on innovation-related themes, including on the framework conditions for innovation (e.g., Dörschlag & Et al. 2014; Remé & Et al. 2015).

The preparation and launch of the AEC is expected to have an impact on the framework conditions for innovation, as economic integration has had in Europe, both directly and indirectly. Hence, this study is intended to explore the AEC and the possible impact it may have on these framework conditions. Further, while the framework conditions for innovation may be an elusive concept, some of the specific conditions for innovation stand out. Among them are policies, systems and practices related to the protection of intellectual property (IP). Both for investments across borders and for cooperative activities in innovation, intellectual property rights (IPR) are receiving much attention. In many countries in ASEAN, as well as among the European partners, innovation and IP take centre stage in policy development. Therefore, it is also important to address the possible obstacles and challenges for cooperation related to these issues. In addition, Europe has come a long way in the Single Market Programme and the subsequent institutional and cooperative initiatives. As ASEAN still has some way to go, it may also learn from the European experience or develop itself new options relevant for the European context.

Hence, this study has several integrated objectives: First, we explore the development of the AEC and the associated framework conditions for innovation in ASEAN. Second, we analyse the current playing field for the generation and protection of IP in ASEAN as a specific set of framework conditions. Third, we contrast the ASEAN development in these areas with the European Union’s experience (namely the Single Market Programme as the key policy for economic integration, as well as the main experiences and lessons in the corresponding fields of IP) to provide a platform for exchange and learning that, in itself, may support cooperation between the two regions and their stakeholders.

The first objective is mainly to set the stage and provide a relevant basis for the next two objectives. Economic integration is seen as the basic and necessary platform for other integrative elements to take shape. It creates a structural impulse for shaping the innovation systems in the regions, a key element of which is IPR systems.

The second objective has a role by itself. IP stands out as a vital component in innovation processes. It is a field which is directly linked to economic integration and related institutional change. It is at the same time a critical component in innovation systems. IP in the ASEAN context has not been studied yet, which is why we regard the focus on understanding IP-related issues as an objective in its own right.

With the latter objective of contrasting ASEAN and EU developments, we do not intend to conduct a strict comparative study. We rather aim at contrasting two regions and develop our argumentation along the following question: How do framework conditions for innovation develop on the basis of a project for economic integration? We try to show that internal markets and trade liberalisation are not enough and that the regional capability to develop and implement viable cooperative processes and institutions is decisive. In this sense, “knowledge markets” become crucial to the innovative capacity of a more or less economically integrated region. Hence, we explore the role of cooperative programmes that have developed in the context of economic integration. In the interplay between public sector support and private investments in international cooperation, IP makes up an increasingly important area, both for intraregional invention and innovation and for trade relationships and foreign direct investments. The links from economic integration to innovation via cooperative arrangements are therefore vital.

2.2 Methodology

The methodology, which provides the empirical basis for the present report, comprises a core set of qualitative methods and quantitative methods making up complementary information. The report builds on a document analysis of national and regional innovation policies (e.g., IP action plans) and a series of studies on the ASEAN Economic Community. This document analysis also confirmed that the present report is the first to systematically analyse both ASEAN’s economic integration and its innovation systems.

Building on the results from the document analysis, between May and November 2015, we carried out semi-structured interviews and workshops with around 40 experts in six Southeast Asian countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam). The expert interviews and workshops served to collect information and opinions from key stakeholders engaged in shaping the innovation framework conditions in the region, and they provide the core data for the report chapters focusing on Southeast Asia. The interviewees came from ministries and funding agencies, public and private intermediary institutions, IP offices, as well as from universities and private research organisations. They provided us with information on current policy concerns, as well as approaches to the innovation framework conditions. Moreover, we were able to extract the innovation framework condition-related concerns and expectations. These, in combination with other interviews and material, allow us to discuss the challenges and opportunities for innovation in the region in general and in light of economic integration in particular.
3 Framework conditions for innovation

3.1 Defining the framework conditions

The innovation activities and performance of a country are influenced by a great number of factors. In this report, the framework conditions are understood to be all of the economic, institutional, and social factors that impact firms’ innovation behaviour. Hence, the framework conditions may be constituted of the general macro-economic conditions, the quality of infrastructure, the education levels, the product and labour market regulations, the tax systems, and others. In sum, they make up country’s system of incentives and constraints for innovation. OECD (2014) refers to some key reasons why the framework conditions are important for innovation:

- Weaknesses in the framework conditions result in distorted incentives;
- Innovation activity, not least R&D-based innovation, requires a medium- or long-term horizon and a sufficiently stable environment in which to carry it out;
- The regulatory framework is of crucial importance for the generation and protection of intellectual property (IP).

We term these as part of the dedicated framework conditions for innovation. As mentioned earlier, “framework conditions” are an elusive concept, and some scholars would argue that IP and related systems for generation and protection are not framework conditions but rather inherent components of innovation systems as such. This is a valid point, and we therefore explicitly refer to the qualification of “dedicated” framework conditions as specific arrangements defined by policy to support and influence the process of innovation. Through these policies and systems, intellectual property rights (IPR) may be granted to inventors for certain periods of time. This will be further expanded upon below. Other examples of such dedicated framework conditions are the system of material transfer agreements (MTAs), which ensure an institutional or contractual basis for sharing or transferring biological material, and public procurement for innovation (PPI), which creates market conditions for innovation that would otherwise not exist.

In this report, we focus specifically on IP and IPR and see them as key dedicated framework conditions that are typically also highly important in the context of economic integration, as well as the increasing globalisation and open innovation processes that are taking place across the countries and regions of the world. This is also the aim of this report: What are the likely impacts of the AEC on the framework conditions for innovation in the ASEAN region, and what are the impacts specifically on the IP systems in the region? And with the emerging cooperation and linkages between ASEAN and the EU in mind, what lessons can be learned for each region?

3.2 Economic integration and the framework conditions for innovation

As ASEAN is moving through a process of economic integration, expectations are rising that this will have a positive impact on innovation through better and more conducive framework conditions. We look at the AEC in the light of another economic integration process that has taken place in Europe, the Single Market Programme. While the AEC is not necessarily comparable with the Single Market Programme (see figure below and the discussion in chapter 4), certain similar impacts on innovation framework conditions can be expected.

This study will cast light on some of the implications the economic integration programmes have for the framework conditions for innovation and, more concretely, for the role policies and practices related to IP. Three broad perspectives arise from the above:

First, the obvious possible impact will be on competition through the reduction or removal of trade barriers. Competition is a key ingredient for innovation, as it pushes firms to increase productivity through new technology, new production processes and new products. The competitive situation may improve in the different markets in the region, depending on the harmonisation of product regulation and protective measures taken through standards. Capital may flow more easily across borders with fewer restrictions on domestic ownership and investment. Likewise, human resources, including those related to R&D, might move more easily in an economically more integrated region. Thus, in general terms, economic integration is likely to improve the framework conditions for innovation through a more level playing field and competitive pressures.

Second, economic integration may lead to subsequent adaptations and processes in the innovation landscape. More integrated economic environments are expected to improve with deal flows spanning region in question as the ultimate possible objective, but with more harmonisation and easier procedures as the likely second bests.

The integration process in the two regions is, as said, very different. Adding that to the likewise very different framework conditions at the outset, a point-to-point comparative analysis is not necessary or even fruitful. Rather, this study will, across these three broad categories of framework conditions for innovation, highlight the developments and impacts in ASEAN with a contrasting view on Europe. Our intention is to provide innovators and stakeholders in the two regions with insights into the framework conditions as they evolve, with possible mutual benefits for the innovation actors’ cooperation, investments, and innovation.
framework conditions and dynamics in Southeast Asia and Europe, we shall give a more detailed overview of the current discussion on the role of IP in innovation.

3.3 The role of IP in innovation

3.3.1 Intellectual property rights

Any creation by the human intellect resulting from ingenuity in the context of this report, we will mainly focus on several types of IP that can have a role in innovation.

- Patents: a right granted for an invention
- Copyrights: right of creators over their artistic work
- Industrial designs: aesthetic aspects of an article

When we speak about intellectual property and innovation, it can take various forms:

- Trade marks: signs distinguishing certain products and services
- Inventions: designs: aesthetic aspects of an article (including machines)
- Geographical indications: used for goods that have a specific geographic origin and related qualities
- Trade secrets: industrial or commercial secrets provided with enterprises with a competitive edge, sometimes dealt with as a separate form of IP

According to innovation, several of these IPRs can gain importance depending on the stage of the innovation process:

- Patents: a right granted for an invention
- Copyrights: right of creators over their artistic work
- Trademarks: signs distinguishing certain products and services
- Industrial designs: aesthetic aspects of an article

With regard to innovation, several of these IPRs can gain importance depending on the stage of the innovative process:

3.3.2 The evolution of the global patent system

The history of the patent system goes back to 13th century Venice, when the city-state issued the first formal patent code (Granström 2006, p. 267). During the 16th century, the practice of granting patents spread in England and France as part of mercantile policies. Since then, patents have consistently and controversially been linked to trade policies. These mercantilist policies and related monopoly privileges led to a strong anti-patent movement in 19th century Europe (especially in Germany, the Netherlands, and Switzerland). However, emerging economies and nations with a strong patent tradition created pro-patent lobbying groups. The depression of the 1870s also revived protectionism.

In 1883, a conference in London signed the Paris Convention for the Protection of Industrial Property, which was reorganised in 1967 as the World Intellectual Property Organization (WIPO, a UN agency since 1974). As of 2014, 176 countries have signed the Paris Convention, which is based on two major principles (Granström 2006, p. 270): the same treatment of domestic and foreign patent applications, and the recognition of a priority right granted in one country by all of the others (within a twelve month time window).

The 20th century saw a shift of inventive activity away from the individual inventor towards industrial research and development. The differences between countries regarding their inventive capacities increased, which led to tensions between the so-called developed and the developing world. Nevertheless, the IP system spread internationally. When the WIPO joined the UN system, it came under a stronger influence of developing countries. The WIPO administers IP treaties such as the Paris Convention, but also has become involved in teaching, arbitration, and consultancy. It furthermore processes patent applications within the framework of the Patent Cooperation Treaty (PCT), which was signed in 1970 and has been effective since 1978. It allows for internationalisation of industrial property and provides a legal framework to carry out the invention, thus violating the requirement of sufficiency of disclosure, the Treaty allows for the depositing of the microorganisms involved as the PCT, it is administered by WIPO.

Parallel to the development of these international Treaties, the patent regimes in Europe were also put on different and more harmonized grounds. On the basis of the European Patent Convention, the European Patent Office (EPO) was established in 1977. It offers a cheaper (less translation costs, etc.) and simplified procedure for seeking patent protection in the EPC signatory states. Europe thus opted for a deeper integration and harmonization of its patent regimes. However, as said above, IP in general and patents in particular remain territorially aligned. The WIPO administers IP treaties such as the Paris Convention, but also has become involved in teaching, arbitration, and consultancy. It furthermore processes patent applications within the framework of the Patent Cooperation Treaty (PCT, which was signed in 1970 and has been effective since 1978. It allows for internationalisation of industrial property and provides a legal framework to carry out the invention, thus violating the requirement of sufficiency of disclosure, the Treaty allows for the depositing of the microorganisms involved as the PCT, it is administered by WIPO.

Another interesting example of integration in the global patent regimes is Japan (cf. Granström 2006, p. 271). Before signing the Paris Convention in 1889, it was not possible for foreigners to obtain patents in Japan. After signing the Convention, Japan established a patent system with the goal of facilitating the technocracy. The idea of enabling catch-up has been present in international debates on patent regimes ever since.

In 1994, the US-inspired TRIPS agreement on the trade-related aspects of intellectual property rights was signed. TRIPS was the first major IP-related international legislation that was negotiated and is enforced under the umbrella of the World Trade Organization (and not WIPO). It includes minimum standards with regard

3.4 The patenting process

The following steps are typical in a patenting procedure (the description applies to national filings in countries that signed the Paris Convention): 1. Innovation disclosure: An internal document in companies or universities typically written by the researchers involved in the innovative work and reviewed by a university’s technology transfer office or a company’s patent department.

2. Patent application: Filing of an application at a national IP Office or international bodies like the EPO or the WIPO. If the specific invention is filed for the first time, the date of application is also what is called the ‘priority date’. Within 12 months after this date, an applicant can seek protection (i.e. file the patent application) and which needs protection from being captured and developed by communities over time and which needs protection from being captured by commercial interests outside the specific community.

3. Preliminary search report: The patent examiners at the IP authority receiving the application check whether there is so-called ‘prior art’, i.e. whether the criterion of the novelty of the invention is met. The preliminary search report includes information on existing similar inventions that were published earlier (as a patent, a publication, etc.). The search report often includes a ‘rejection’ on the patentability of the invention.

4. Publication: The publication (together with the search report, as soon as it is available) is published after a so-called ‘priority’ in the application date. From this moment on, it will count as ‘prior art’ against any future applications from other inventors.

5. Substantive examination: The publication of a patent does not automatically mean that a granting of the patent follows. Sometimes, there is prior art, which disallows a granting. Sometimes, the applicant itself might not be interested in paying the fees and pursuing a granted patent (which would allow licensing or selling). She/he might be happy with having the application, thus establishing prior art and blocking others from patenting.

6. Granting: This will occur if patentability is confirmed and fees have been paid. Further steps might follow (in the case of an international patent according to the Patent Cooperation Treaty or of an EPO-filed patent, the patent now must be validated by the national offices in the countries in which protection is sought).

It is important to highlight that this is not what is referred to as a European unitary patent (a patent that would allow for protection in all EU member states and national phases in other countries). The related legal initiative has been negotiated for decades. There is agreement on all major points, but the unitary patent can only become reality when the signatory states also agree on two details that are still debated: one is the official language for the unitary patent (Italy and Spain claim their respective languages to be recognised as well; the second is the Patent Court, which is important for the enforcement of the unitary patent).
The TRIPS agreement exemplifies a new pro-patent era, verse and fragmented. “Despite long-standing efforts
rigths, etc). Its purpose with regard to patents is the
ward global standards in patenting. However, even with -
which started in the late 20th century. Patent portfoli -
ere in a renewed global pro-patent (or, more broadly, pro-
islation. Some of them have pushed for the recognition
regard to the possibility of filing software patents or
ment as foreseen in TRIPS, or have decided to resist in -
ternational law.

This competition can be healthy, but it can, on occasion,
additional patented inventions, in particular patent
ments of knowledge that are widely available (e.g., regarding the patentability criteria, the extension
n elations that are unfortunately not the same everywhere. Technology transfer

5 Compulsory licensing has emerged as a solution to balance this: The
TRIPS Agreement allows national governments to issue compulsory licenses of patented drugs in the event of national emergencies. For example, India and Thailand, among others, have introduced such proceedings in specific cases, including orphan drugs and low-cost generic versions.

6 China seems to be a contrasting case of R&D-oriented FDI inflows versus other emerging economies, where the argument made by Hassan et al. (2010) might not hold true.
might opt for trade secrets instead of patenting in order to exploit their ideas. Copyrights are traditionally connected with the arts. However, they play an important role in the knowledge-intensive software development sector (see: http://www.wipo.int/ip_business/utility_models/utility_models.htm). As mentioned already, we see the link between economic integration and innovation as including a set of cooperative measures and institutions, which reinforce the regional innovation systems and processes in general. Economic integration increases the likelihood or capacity to develop such cooperative measures. For both the EU and ASEAN, we therefore include a discussion of the main innovation-relevant arrangements that have developed on the backdrop of integration processes.

4.1 Economic integration in Europe: Some highlights

4.1.1 The policy and framework for European economic integration: The Single Market Programme

As mentioned already, we see the link between economic integration and innovation as including a set of cooperative measures and institutions, which reinforce the regional innovation systems and processes in general. Economic integration increases the likelihood or capacity to develop such cooperative measures. For both the EU and ASEAN, we therefore include a discussion of the main innovation-relevant arrangements that have developed on the backdrop of integration processes.

Economic integration in political unions or economic blocks is normally a difficult and complex process. This has also been the case with economic integration in Europe. It has been a process plagued by diverging interests and set-backs, although it also has made big leaps forward. The early years of the European Community, to use a generic phrase, were indeed much about economic structures. These provisions were directed at social and economic cohesion and were implemented through new structural funds to support economic and social development in lagging countries. But more importantly in this context, the Single European Act also added a commitment to undertake research and technological development and to increase cooperation between countries and research institutions. In fact, the successful series of European framework programmes for research and development were increasingly driven by the Single Market Programme and the Single European Act. The link between economic and technological development became a centrepiece in boosting competitiveness (Guzetti 1995).

The Single Market Programme continued through different initiatives, but aimed primarily to open the European markets for greater competition through ensuring free flows of goods, capital, persons, and services. Deregulation and tariff reductions were key to this process, as were measures to reign in unfair state aid and other non-tariff protective measures. The Single Market Programme has therefore gone through a number of steps over time, including further changes in the European treaties that cannot be discussed here. However,

**References**

7 Most countries allow for the voluntary registration.

8 See also the respective site on the Innovation Policy Platform https://www.innovationpolicyplatform.org/content/trademarks (accessed 4 February 2016).

9 See WIPO’s trademark application statistics at http://stats.wipo.int/prostat/index.htm?tab=trademark


11 See also: https://www.innovationpolicyplatform.org/content/utility_models

12 See later for details.
The Single Market Programme induced significant changes in the framework conditions for innovation. It should also be noted that a key objective behind it was the improvement of Europe’s competitiveness in the global economy, whereby a bigger and more unified market in Europe was seen as a necessary platform or condition for this to happen.

Market integration is, in particular, directed at product market reforms, and in a recent study, the link between product market reform, innovation, and EU macro-economic performance was investigated (Griffith et al., 2006).

An immediate impact of the competition induced by market integration policies is likely to be on the “mark-up”, that is, the price for a product that a company may take above the cost to produce it. Lower mark-ups from increased competition, Griffith et al. argued, lead to greater incentives for innovation and development to boost profitability and competitiveness. This may take place through increased investment in existing markets or to take bets in new ones. Their study was on the manufacturing sector in Europe, a sector in which product market integration has had a great impact and where R&D investment, including patenting, is the most important determinant of its evolution in the direction of a highly competitive one. Their most relevant findings supported the notion that competition leads to more innovative activity:

- The Single Market Programme’s market reforms have led to a reduction in the average mark-up/increased competition in the studied countries and industries; and
- Increased competition has led to increased R&D investment, including patenting.

Competition has increased innovative activity by incumbents, but has tended to decrease incentives for new entrants to enter the innovation process (meaning that entry barriers have increased)

The increasing impact of competition on innovation has been larger in countries that are closer to the technology frontier (as measured by R&D and patents) and R&D and investments have led to faster total factor productivity growth in the manufacturing industries.

Another study by Beldebro et al. (2010) achieved results much in line with the above. With reference to the major structural changes coming from the market integration efforts in Europe through the Single Market Programme, Beldebro et al. traced the changes in firm and industry structure “by focusing on the interrelationships between production strengths, product diversification, multi-nationality and technology strengths of leading firms in EU manufacturing industries” (ibid., p. 2). They included data for the period 2000–2007 for 250 leading firms.

Among the findings, they concluded that producer concentration has increased, which was partly due to increasing tendencies for merger and acquisition activities. They also made a point of the fact that the global dimension has increased through the increasing presence of non-EU firms among the technological leaders. Further, product diversification declined as a consequence of greater competition. Incumbent firms, i.e. firms originally present in Europe, managed to maintain a significantly higher share of production compared to new entrants, which is also in line with the findings above. Then, the study concluded that there was a strong positive relationship between technological and market leadership, and that new entrants need strong technological leadership in order to build a sizable production share in the European market. Increasing competition has led to an increasing importance of R&D, as well as an increasing role of innovation policy. However, as the national level had the necessary financial means and personnel, or could only do so with difficulty, research which could help mitigate economic disparities. The hope was that collaborative research could help mitigate economic disparities. The hope was justified, as an evaluation panel wrote: “The Panel finds that the Framework Programme is contributing substantially to the establishment of an integrated, transnational research community of academic, industry and government researchers. … What has also improved is the level of competitiveness and modernisation which is affecting the RTD system of the Less Favoured Regions, under the influence of participation in the Framework Programme, as well as the stimulative effect provided for the take-up of R&D in these areas” (Camara et al. 1991, p. V).

The Maastricht Treaty of 1992 intensified political cooperation, and in particular, created a more demanding framework for the “Europe of know-how” as originally envisaged by the European Union. The new criteria of the 4th Framework Programme (FP4) helped to set up the new activities within a system that corresponded to the perceived complexity. The Framework Programme (FP) resembled a multidimensional matrix in which all of the single programmes found different linkages with each other and with other Community activities and policies. The importance in the FP lay in the interaction between the programme activities and the aims of Community policy in various sectoral areas (Guzzetti 1995). However, as the national level had the competence in R&D policy, the Community could not set the framework and ensure the necessary financial means and personnel, or could only do so with difficulty.

In an attempt to operationalise the idea of EAV at the European level, the European Commission, in its second Framework Programme (FP2) and Horizon 2020, has been building on the research and innovation landscape.

4.1.3 Impacts on the R&D landscape

The Single Market Programme for economic or market integration in Europe has developed hand-in-hand with new orientations for research and innovation. While the first FP of the 1980s was already a tremendous success, it was the response to the increasing complexity and disorder of the disparate R&D activities to that date. There was, in fact, no Community policy on scientific and technological, and the R&D activities themselves were less than optimally co-ordinated with other Community activities. At that time, there were already increasing doubts as to the relevance of the linear model of the process of technological innovation, and the Commission wanted to set up the new activities within a system that corresponded to the perceived complexity. The Framework Programme (FP) resembled a multidimensional matrix in which all of the single programmes found different linkages with each other and with other Community activities and policies. The importance in the FP lay in the interaction between the programme activities and the aims of Community policy in various sectoral areas (Guzzetti 1995). However, as the national level had the competence in R&D policy, the Community could not set the framework and ensure the necessary financial means and personnel, or could only do so with difficulty.

In an attempt to operationalise the idea of EAV at the European level, the European Commission, in its second Framework Programme (FP2) and Horizon 2020, has been building on the research and innovation landscape. The Maastricht Treaty of 1992 intensified political cooperation, and in particular, created a more demanding framework for the “Europe of know-how” as originally envisaged by the European Union. Furthermore, the treaty brought more policy areas within the competency of the Commission. Economic and social cohesion, on the one hand, and social affairs, on the other. The latter being considered more important before. The principle of subsidiarity was given a key role in setting out a clearer picture of what the European dimension was, including a clearer borderline between Community responsibilities and those of the member states. The Maastricht Treaty affected research in some notable ways. For the first time, policy areas other than science and technology policy became explicitly relevant for the overall R&D policy: “The treaty re-emphasised, at the highest jurisdictional and institutional level, the idea which originally gave rise to the programme framework: the Community’s S&T policy should be, first and foremost, at the service of other Community policies” (Guzzetti 1995, p. 155). Among other things, this gave more legitimacy to research activities that were not directly linked to the Single Market idea of competitiveness. Correspondingly, in the 4th FP, three other activities were introduced in addition to the specific research programmes: cooperation with non-EU countries and international partnerships, the co-funding of innovation-oriented Horizon 2020. Later, two additional criteria were formulated: one on social and economic cohesion in 1987, and one on the mobility of researchers and the co-ordination of national policies (Guzzetti 1995). In these early stages of the FP system, stimulus programmes were developed with the aim of underpinning and enhancing the development of the European scientific potential. Moreover, the mobility of researchers was encouraged to support networking and the development of a European research community. Horizontal activities were put in place to improve the forecasting and evaluation of European scientific efforts. With the Single Market Programme, technological progress was seen as essential in the new economic landscape. The 2nd and 3rd FPs (1987–1994) thus became the engines for a gradual shift to include R&D efforts also in other Community policies, notably in regional policies. The cohesion problem was seen mostly in terms of disparate economic development in various regions in Europe. The hope was that collaborative research could help mitigate economic disparities. The hope was justified, as an evaluation panel wrote: “The Panel finds that the Framework Programme is contributing substantially to the establishment of an integrated, transnational research community of academic, industry and government researchers. … What has also improved is the level of competitiveness and modernisation which is affecting the RTD system of the Less Favoured Regions, under the influence of participation in the Framework Programme, as well as the stimulative effect provided for the take-up of R&D in these areas” (Camara et al. 1991, p. V).
(1996-1999) further increased the emphasis on horizonal themes, including the participation of SMEs, international cooperation beyond Europe and socio-economic research. The concept of EAW was no longer the only justification for Community action in R&D. FP7 also represented a renewed effort to move towards a less technologically driven policy. Social objectives and wid- er Community concerns became even more important. Research policy should serve European society, not only industrial development. The European Commis- sion saw European industry and competitiveness as a rather bleak picture during the 1990s, in particular vis-à-vis Japan and the USA. The focus of the 6th FP on scale and the concentration of research resources is a reaction to this. Until the 2000s, there was no formal innovation pol- icy at the European level. However, there were the com- bined policies of market deregulation and integration through the Single Market Programme, on the one hand, and support for research and technological cooperation through the Framework Programmes, on the other (Gu- zetti 1995). Despite the absence of a formal innovation policy, the focus on collaborative research corresponded well with new insights from innovation research. Co- operation is the key driver behind innovation.

The Framework Programmes continued in this way, staying formally out of innovation policy, but support- ing Community policies, in particular, the Single Market Programme and its variations, as well as other sectori- al policies. New cooperative platforms came into being, such as EUREKA, a pan-European cooperation mainly for small and medium-sized companies, and later, Euro- pean Joint Technology Initiatives, Knowledge and Innovation Communities (KICs), etc. Af- ter the financial crisis in 2008, renewed efforts were fo- cused on a broad Europe 2020 agenda. However, the economic crisis, which led to decreased, and modest coordina- tion, also led to discussions on the lack of coordination of R&D investments in Europe in the context of ever in- creasing economic integration. This led to an attempt to establish the European Research Area (ERA) in 2000, a first formal initiative to initiate a European knowledge market.

14.1 The development of an ERA: A single market for knowledge and innovation

The impact of economic integration on research and development in Europe took shape early in the integra- tion process in Europe. The early form of integration was built upon three “communities”: the Coal and Steel Un- ion, Euratom (the basis for nuclear energy research), and the economic community called EEC. The latter stimu- lated, in particular, research and development in the field of agriculture. However, and not least because of the perceived technological gap with the US, a broader frame work began to be seen by the integration of the three communities into one. The new com- missioner for research, technology, and development, Altiero Spinelli, took office in 1970 and launched a re- search policy for industrial development with a heavy priority towards technological areas deemed impor- tant in the only context of competition with the US and the emerging Single Market. As a federalist, he argued for the Community to spearhead modern industrial devel- opment and advanced technological areas such as ICT, telecommunications, electronics, and transport, and took a clear stance against concerted initiatives by the member states. Hence, while the Single Market was supposed to be the economic platform for the member states in Europe, he saw the EU of that time as the insti- tution of competence for technological and competitive upgrading.

However, the next commissioner, Ralph Dahrend- dorf, took an opposite view, and saw the scientific basis throughout Europe as the main European resource for social development and welfare. He proposed a Europe- an Scientific Area which was supposed to pave the way for stronger coordination between the European mem- ber states to achieve an internal market for knowledge. In particular, he argued, it was important to coordinate the member countries’ research policies. Thus, Dahre- ndorf became the early protagonist for the later Europe- an Research Area (ERA).

The first formal ERA initiative in 2000 had a relative- ly small impact, but a renewed attempt in 2008 generat- ed a more coherent structure for a European basis of knowledge and innovation14; the ERA, often coined ERIA to include the innovation dimension. It included several broad initiatives to tackle perceived bottlenecks for a more comprehensive knowledge infrastructure (ESFRI; Knowledge and Innovation Communities (KICs), etc.) Af- ter the financial crisis in 2008, renewed efforts were fo- cused on a broad Europe 2020 agenda. However, the economic crisis increased, which led to decreased, and modest coordination, also led to discussions on the lack of coordination of R&D investments in Europe in the context of ever in- creasing economic integration. This led to an attempt to establish the European Research Area (ERA) in 2000, a first formal initiative to initiate a European knowledge market.

14.1.5 Innovation patterns in the Single Market

The discussion above was centred on the link between economic integration through the Single Market Pro- gramme and the framework conditions for innovation through the intervening factor of competition. Further, a link between the emerging European knowledge mar- ket and innovation was established, with open research systems (facilitated through European-level research funding and IP regimes) as the intervening variable. It was shown, for instance, that European-level research funding attracts highly innovative companies, pro- duces commercial output and has an added value on the innovative sales of participating organisations (Fisher et al. 2009). Integrated European-level research funding also has a structuring effect on research activities in the EU in general. The significance of geographical distance and country borders within Europe research has decreased (Schernegg, Latz 2015), especially for public, but also for private research (Schnerrnigg, Ba- mer 2011). This points to a connection between integra- tion and innovative activities across Europe. Apart from the European-level research funding, integration meas- ures for researchers, respecting the free movement of people (including mobility support schemes) and capital, etc. have played a facilitating role in these processes.

Of course, it is difficult to establish direct causal links between integration and innovation, and even between open, cross-border research systems has been a steady flow of initiatives to spur coopera- tion and collaboration through a series of Framework Programmes (the current one is termed Horizon 2020) and dedicated platforms and coordination measures for technological development, standards, risk financing, synergies, alignment of policies, etc. As such, it seems clear that economic integration goes hand in hand with more cooperation and interaction, which are the corner- stones of innovation, and that open and excellent re- search systems are strongly correlated with innovation performance.
and innovation. However, it is obvious that the interrelated development of the Single Market Programme and other policies, programmes, and institutions has had a combined impact on innovation that is likely to be significant, even though there are still a number of inconsistent rules and practices within the Single Market that continue to hamper innovation and growth.

In this context, the Europe 2020 strategy was a renewed effort to boost innovation-based growth in Europe in 2010, and the so-called Innovation Union flagship programme was placed at the very heart of the EU Commission and the European Investment Bank (EIB), ensuring that, for every billion Euro spent from the framework programme budget, the EIB will mobilise 12 billion € since 2010 in Joint Technology Initiatives in areas such as the aeronautics, medicine, electronics, transport, and bio-based industries. Further, starting in the former framework programme (FP7), a risk-sharing finance facility was established through a collaboration between the EU Commission and the European Investment Bank (EIB), ensuring that, for every billion Euro spent from the framework programme budget, the EIB will mobilise 12 billion € in loans and more than 30 billion € in final investments in research and innovation. Economic integration spurred collaboration on many levels. The Innovation Union initiative also led to the development of better and more consolidated indicators for monitoring the development in innovation performance. Included in this was the innovation index based on four broad dimensions and a number of selected indicators for each of them. For this report, these indicators serve as a useful basis on which to discuss the overall innovation performance and patterns in Europe (meaning the Single Market). In figure 3, the European innovation performance is depicted, with the vertical line illustrating the consolidated index and the various dimensions with their indicators. The strengths emerging from this figure are intellectual assets (in particular, PCT patents, which are discussed below in this report), economic impacts, in particular, through exports of medium- and high-tech products, as well as human resources. Weaknesses can be found in firm, investments in non-R&D innovation expenditure and the low performance of SMEs in innovation.

In figure 4, the average annual growth rates of these indicators are shown for the period 2007–2014. The innovation performance has been growing annually on an average basis by 1%, but with significant differences. The key element of knowledge markets, open research systems, has been growing with strong contributions from international co-publications. Growth in human resources has also been strong, while finance and related support has seen strong negative growth in the context of the financial crisis. The same picture, for the same reason, is seen for innovators, with considerable problems for SMEs in this period, while the economic effects are still acceptable. The growth in community trademarks (under intellectual assets) and not least the licence and patent revenues from abroad are noticeable.

Summing up this part, human resources and intellectual assets are driving innovation performance, with the overall economic impacts remaining positive, while innovation among SMEs is still a weak spot. Further, the Single Market’s “organizational and institutional surplus”, that is, the cooperative layers stemming from programmes and initiatives in Europe over the years, seems

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The Association of Southeast Asian Nations (ASEAN) was established in 1967 with the underlying objective of regional peace and security. It has a market of over 600 million people. This exceeds the population size of the countries of the North American Free Trade Agreement (NAFTA, established in 1994) and the EU. 

The ASEAN countries, however, represent only a fraction of the economic size of these other regional free trade and integration areas. ASEAN’s combined nominal GDP amounted to $2.4 trillion in 2015, which would make it the seventh largest economy worldwide. NAFTA has a combined nominal GDP of $19.9 trillion (2015) and the EU $18.3 trillion (2014). 

As early as 1977, the ASEAN member countries sought economic cooperation to spur economic growth by establishing the ASEAN Preferential Trade Agreement (PTA). Individual ASEAN member states and their economies were considered too small and needed to cooperate to enhance their economic competitiveness and to improve their position in the global economy.

Economic integration was expected to improve market efficiency and innovation. This included an enlarged market with economies of scale and scope, improved resource allocation across the member countries, and improved resource pools with an inflow of capital and labour. ASEAN responded to the European Single Market with serious efforts at economic integration in 1992 through initiatives such as the ASEAN Free Trade Area (AFTA), the ASEAN Investment Area (AIA), and the ASEAN Framework Agreement on Services (AFAS).

The pressure to keep a competitive edge has always been a major driving force to foster a deeper regional economic integration amongst the ASEAN economies. They have also developed in the context of the wider Asian development, with the early inclusion in the international economy of the Asian Tigers (Korea, Taiwan, and Singapore), and later, with fierce competition from low-cost China. As China has lost some of its low-cost advantage and its market has grown, many countries have re-gained some of their competitive edge and have been more integrated in global value chains. Bilateral and regional trade agreements in East Asia, to some extent against ASEAN, have created still competition for ASEAN’s export markets and sources of foreign direct investment. 

The region is still one of the largest recipients of foreign direct investment. The ASEAN countries received 11% of global FDI inflows in 2014 (its share in global GDP is 5%). Global FDI inflows decreased in 2014. In ASEAN, they rose by 3% compared to 2013 (to $135 billion; see the UNCTAD). According to UNCTAD (2015, p. 4), ASEAN’s major trade and investment partners, are the key issues. ASEAN’s pace in building an economic community (AEC) has been significantly slowed down. Unlike the EU, where the European Commission coordinates a supra-national policy, ASEAN is devoid of a single regulatory body to develop and implement policies to adapt to changes within the region itself and to the external global environment, or to harmonise national policies and regulatory systems (Brennan 2015). The AEC’s way of doing things involves meetings at all levels involving heads of governments, ministers, committees, policy-makers, CEOs of companies, scientists, and so on. There was a perceived need to establish an institutional framework for building and supporting the much-coveted economic community. The AEC is inter-governmental, rather than supra-national.

The endeavours to remain globally competitive by removing barriers to the free flow of goods, investment, labour, and capital, were stepped up during the ASEAN Summit in 2005. The members of ASEAN resolved to establish an ASEAN Economic Community (AEC) with a target launch date in 2020. This occurred in the wider framework of the Obama Administration’s initiative to establish an integrated Southeast Asian region with equitable economic development and reduced socio-economic disparities. The timetable for completion was thereafter broadened in 2015. Table 1 illustrates that this view is too negative. While the global economy has been significantly slowed down, the ASEAN+6 pillar has emerged as a counter-movement (cf. Chia 2013). ASEAN has entered into ASEAN+1 agreements with China, Japan, South Korea, India, Australia, and New Zealand, into ASEAN+3 (also referred to as the Bali Concord II), the other pillars being the ASEAN Security Community, and the ASEAN Socio-Cultural Community.

Following this declaration, the AEC can be briefly characterised as:

- Single Market and Production Base with a free flow of goods (under AFTA and ATIGA), services (AFAS), investment (AIA), skilled labour, and a free flow of capital, Integration of Priority Sectors, and enhancement of intra-regional trade in goods, food, agriculture, forestry products, and commodities (ASEAN Integrated Food Security Framework). 
- Competitive Economic Region with a fair competition policy, consumer protection, intellectual property rights, infrastructure development, bilateral agreements, and infrastructure for e-commerce. 
- Region of Equitable Economic Development with a blueprint for SME development, an initiative for ASEAN; 
- Region integrated into the Global Economy with a coherent approach towards external economic relations and an enhanced participation in global supply networks.

The AEC blueprint provides the impetus for necessary joint objectives, such as lower transaction costs, the progressive elimination of rules of origin requirements (ROO’s), the free flow of goods in a world-wide value chain, reduced barriers to trade and investment, increased capital, and labour mobility. This would have been next to impossible for the individual members to implement unilaterally.

In addition to the AEC, region-wide agreements, comprehensive economic agreements, and partnerships with countries such as China, Japan, India, Australia, and New Zealand were established, and bilateral and regional free trade agreements (FTAs) are being entered into by a growing number of individual member economies. ASEAN +3 has entered into ASEAN+1 agreements with China, Japan, South Korea, India, Australia, and New Zealand, into ASEAN+3 (also referred to as the Bali Concord II), the other pillars being the ASEAN Security Community, and the ASEAN Socio-Cultural Community.

Although it seems natural to assess the benefits of the AEC in comparison to the EU’s Single Market Programme, this comparison should be hedged in with cautions. The European Single Market Programme provided...
measures that go well beyond those incorporated in the AEC, and the AEC includes steps that were not required in Europe (Petri et al. 2012).

The economic integration in ASEAN has often been subject to the criticism of having failed to live up to expectations. The commitments on paper are impressive, but the devil is in the details, in its exclusions, exceptions, and implementation record. One of the most important potential pitfalls is protectionist sentiment. In Indonesia, ASEAN’s largest and arguably most important economy, and one of the founding members of ASEAN, there is governmental support for economic nationalism, indicating that the stand-off towards economic integration will be an uphill struggle. President Joko Widodo, during the 25th ASEAN Summit in Myanmar in November 2014, declared his support for protectionist policies, particularly in the area of mining, aviation, and the financial service sector, ensuring that no harm comes to Indonesia’s national interest. This stand-off between national and regional interests is, however, not exclusive to Indonesia, and other ASEAN member states show similar protectionist concerns.

These concerns hamper activities even at the level of free trade as the first level of economic integration. According to different reports (a), the often quoted figure that 99% of ASEAN (between the six major ASEAN economies) has been liberalised is misleading. It refers to the share of the number of goods included in the ASEAN Trade in Goods Agreement and has nothing to do with trade volume. Several important commodities with great trade volumes are on temporary exclusion lists (including rice, for instance). Another potential weakness of UNCTAD to generalise the member states’ investment markets in some key sectors. The liberalisation of investment flows has not kept pace with the liberalisation of goods (Dosch 2013, p. 6).

Among some ASEAN members, there is fear that national companies will not be able to adopt a regional strategy and will not be able to compete with companies from ASEAN’s more developed economies, particularly Singapore, Thailand, and Malaysia.

The implementation of the AEC is challenging under the best of circumstances, but in ASEAN, it takes place in the framework of rapidly transforming national policy structures, wide regional gaps in socio-economic development and capacity, and a range of substantial political transformations. The AEC is a highly complex project involving many substantive structural adjustments that will require political commitment to complete, consistently maintained over a longer period. In addition, the ASEAN Secretariat, the main coordinating institution, has to work with a small operating budget (of around US$20 million).19

Overall, a recent study stated that “…ASEAN lacks the institutions and processes that help governments and societies to recognise the benefits that the AEC represents” (Severino, Menon 2015, p. 2). Indicators20 suggest that the AEC formally launched in Malaysia in November 2015, is still a work in progress. This especially applies to the areas of creating a single market and production base (including free trade and investment flows), a competitive economic region, and equitable economic development, and integrating into the global economy. The AEC Blueprint 2025, adopted on the occasion of the AEC launch event in November 2015, among other things, calls for strategic measures to strengthen free trade (through the AEC Trade in Goods Agreement), to eliminate investment restrictions (through the implementation of the AEC Comprehensive Investment Agreement), and the completion of other measures initiated under the AEC Blueprint 2015.

The main reason for the delays in the AEC’s implementation is, as indicated, the various underlying national interests of the various member states. Economic liberalisation agreements will have an effect on economic governance and will have an impact on the redistribution of political power and resources, despite the commitments. Therefore, the picture that most of the coalitions of social and political forces is best seen in the constrained integration of ASEAN’s energy markets and the limited deregulation of skilled labour migration (Jones 2013). This means that even if the AEC countries have low and competitive labour costs, their productivity levels, as illustrated above, are also low. Over many years, these countries have seen high growth rates. But their productivity levels are still low compared to countries with the same level of income. The main weakness is the total factor productivity growth (TFP). This indicator shows modest gains in most countries and stands in sharp contrast to other Asian countries such as China, India, Korea, and Taiwan (Intal et al. 2014). This means that the overall positive development in economic growth is not linked to greater competitive pressure and innovation, but to e.g. population growth and labour productivity growth. With greater competitive pressure and innovation-led growth, including the associated structural changes, one should see a boost in TFP growth. This has not been the case. Indeed, this puts pressure on the ASEAN countries to stimulate structural change, innovation, and knowledge-based growth.

4.2.2 Impacts on competition and growth

With the gradual development of the AEC itself, including measures on the national level that often counteract the AEC, its impact on competition and innovation is likely to be lower than envisaged. At the outset, intra-regional trade has, over the years, remained relatively low, compared to the region’s external trade (Rama et al. 2014). However, bringing the AEC into full life will imply that intra-regional tariffs on trade will be lowered to enhance competition, productivity, and resource allocation. In fact, ASEAN has indeed achieved great strides ahead on this important indicator of economic integration (Intal et al. 2014, see figure 6).

Productivity development in the region is another matter. The figure below illustrates very well the challenges facing Southeast Asia. While labour productivity growth has been quite robust over the years, in particular, in Cambodia and Vietnam, with significant development in Indonesia and the Philippines in the recent period as well, it is still low compared to e.g. China. However, the main weakness is the total factor productivity growth (TFP). This indicator shows modest gains in most countries and stands in sharp contrast to other Asian countries such as China, India, Korea, and Taiwan (Intal et al. 2014). This means that the overall positive development in economic growth is not linked to greater competitive pressure and innovation, but to e.g. population growth and labour productivity growth. With greater competitive pressure and innovation-led growth, including the associated structural changes, one should see a boost in TFP growth. This has not been the case. Indeed, this puts pressure on the ASEAN countries to stimulate structural change, innovation, and knowledge-based growth.

An important point made by the McKinsey Institute (2014) is that the fact that even if the Southeast Asian countries have low and competitive labour costs, their productivity levels, as illustrated above, are also low. Over many years, these countries have seen high growth rates. But their productivity levels are still low compared to countries with the same level of income. The main weakness is the total factor productivity growth (TFP). This indicator shows modest gains in most countries and stands in sharp contrast to other Asian countries such as China, India, Korea, and Taiwan (Intal et al. 2014). This means that the overall positive development in economic growth is not linked to greater competitive pressure and innovation, but to e.g. population growth and labour productivity growth. With greater competitive pressure and innovation-led growth, including the associated structural changes, one should see a boost in TFP growth. This has not been the case. Indeed, this puts pressure on the ASEAN countries to stimulate structural change, innovation, and knowledge-based growth.

In sum, non-tariff barriers to trade (NTBs) dominate the picture, implying that even if the AEC could be able to implement lower or no tariffs (which is, to some extent, the case), these NTBs represent a major impediment to economic integration. In other words, greater competition through integration is not being achieved, and the innovation impacts that may be expected as a result are not taking place.
result of this will not materialise. Austria (2013) stated that NTBs have replaced tariffs as protective measures, a fact that was confirmed in the interviews conducted for the study. As also mentioned in the preceding section, governments take active counter-measures to protect their domestic business communities against competition, a tendency that is also likely to be linked with the high level of corruption in many ASEAN member states. Austria (2013) also pointed out that one particular factor is the difficulty in identifying which among the NTBs are effective barriers to trade.

### Table 1: Barriers to conducting business in other ASEAN countries

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Share</th>
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</thead>
<tbody>
<tr>
<td>Trade barriers</td>
<td>33 %</td>
</tr>
<tr>
<td>Different regulatory standards</td>
<td>41 %</td>
</tr>
<tr>
<td>Discrimination against foreign investors</td>
<td>9 %</td>
</tr>
<tr>
<td>Excessive government regulations and bureaucracy</td>
<td>38 %</td>
</tr>
<tr>
<td>Language barriers</td>
<td>24 %</td>
</tr>
<tr>
<td>Lack of information about the business environment in other ASEAN states</td>
<td>35 %</td>
</tr>
<tr>
<td>Inadequate infrastructure</td>
<td>23 %</td>
</tr>
<tr>
<td>Double taxation</td>
<td>23 %</td>
</tr>
<tr>
<td>Lack of competition policy</td>
<td>16 %</td>
</tr>
<tr>
<td>High IPF</td>
<td>15 %</td>
</tr>
</tbody>
</table>

*Top barriers significantly different from the rest at 1% significance level*

As Nikomborak and Jitdumrong (2013) noted, the complexity of the ASEAN region. The annual meetings of the ASEAN Ministers for STI provide the general policy framework for regional STI cooperation, whereas COST, in its six-monthly meetings, then includes guiding the implementation of the projects and programmes of its subsidiary groups, monitoring and supporting ongoing regional collaborative progress, assessing their impact and effectiveness in terms of enhancing ASEAN’s STI capabilities, and so on. The ASEAN cooperation covers natural, scientific and administrative fields and provides assistance to each other in the form of training and research facilities in the educational, professional technical and administrative spheres.24

### 4.2.3 Impacts on the R&D landscape:

**The new role of science, technology, and innovation**

Developing a single market, or in ASEAN’s case, initiating the process towards it, also typically leads to a series of institutional arrangements as has been demonstrated in the case of the EU above. Economic integration is based on, and stimulates, further cooperative arrangements in areas vital to economic growth and competitiveness. Hence, liberalisation in services is very important in the AEC context. As Nikomborak and Jitdumrong (2013) noted, the commitments under the AEC Blueprint are not sufficient to make any headway, nor do the negotiations under the ASEAN Framework Agreement on Services (AFAS) provide any major steps forward. Hence, the AEC will not have much impact on competition and productivity in services in general in ASEAN.

As the AEC and ASEAN member states are currently only slowly driving liberalisation and competition, productivity development will have to come from other sources of impulses. Innovation is key to this development, and while innovation is often stimulated by competition arising from cross-border liberalisation, but, as mentioned, does not represent a significant stimulus, such stimulus will have to come from national policies, as well as firms and sectors engaging in value chains and technological upgrading. ASEAN countries are increasingly linking into global value chains and knowledge flows, including via recapturing production that has been relocated from China. This in itself will require continuous upgrading in investments, skills, and technologies to sustain the growing importance of the region in the global economy. Further, urbanisation is continuing to be a major factor for restructuring and productivity, but also for innovation and technological development. The skills issue is particularly important and relates to the above discussion on services. Seeing Southeast Asia as a regional innovation system, the mobility and quality of human resources are key to innovation-driven growth. However, in line with the lack of liberalisation in services, there are still considerable restrictions on mobility and recognition of qualifications across the countries in the region. Nikomborak and Jitdumrong (2013) concluded in their study on services that the seven Mutual Recognition Agreements for selected professions are full of loopholes and do not provide much impact on the mobility of highly skilled personnel.

The same can be said about investments. Bhaskaran (2013) held that the AEC itself provides a useful context for increasing investments. But, on the other hand, foreign direct investments (FDI) have been declining over the years since the Asian crisis in the 1990s. Domestic investments have also been shrinking at least up to 2010. Even though the AEC and its investment agreement serves as a constructive platform, national barriers play out with a number of country-specific regulations and other barriers to increasing investment flows. This also confirms the importance of non-tariff barriers in general that the AEC is not sufficiently addressing.

The difficulties in completing the AEC notwithstanding, the region stands to gain a lot from the process. On top of activities such as the removal of tariff and non-tariff barriers, wider-ranging measures such as regional liberalisation and trade with third countries, aligning standards, lowering transactions costs, integration into global markets, creating more efficient production systems, and developing a stronger manufacturing sector, are all worth pursuing in order to become a more attractive partner for trade agreements. It has even been estimated that the full implementation of the AEC will boost the real incomes in the region by some 5.5% over the 2004 baseline and will result in 8% gains in GDP towards 2025, in truth a significant gain, but with significant variations between the countries (Plummer et al. 2014). Such gains should be sufficient incentives for the region’s policy makers to address the barriers to the AEC’s implementation. If ASEAN succeeds in turning the regional AEC integration into a springboard for establishing stronger ties with the global economy, this achievement in today’s global environment would increase the value of the AEC.

COST remains an inter-governmental, cooperative platform for developing the S&T landscape in the ASEAN region. The annual meetings of the ASEAN Ministers for STI provide the general policy framework for regional STI cooperation, whereas COST, in its six-monthly meetings, then includes guiding the implementation of the projects and programmes of its subsidiary groups, monitoring and supporting ongoing regional collaborative progress, assessing their impact and effectiveness in terms of enhancing ASEAN’s STI capabilities, and so on. The ASEAN cooperation covers natural, scientific and administrative fields and provides assistance to each other in the form of training and research facilities in the educational, professional technical and administrative spheres.24

**ASEAN** shall promote active collaboration and mutual assistance on matters of common interest in the economic, social, cultural, technical, scientific and administrative fields and provide assistance to each other in the form of training and research facilities in the educational, professional technical and administrative spheres.24

Inadequate infrastructure, 22%

Discrimination against foreign investors, 9%

Tariff barriers, 33%*

Barriers Share

Still, the AEC is likely to have some impact, albeit different across various industrial sectors. Wöretz et al. (2014) illustrated this in figure 8, showing that, in particular, health care and financial services will be the most impacted, with several typical manufacturing sectors scoring on a medium level.

This last point is underpinned by the growing importance of services both for growth and employment. However, the productivity levels in services are likely to be lower than in e.g. manufacturing. Hence, liberalisation in services is very important in the AEC context. As Nikomborak and Jitdumrong (2013) noted, the commitments under the AEC Blueprint are not sufficient to make any headway, nor do the negotiations under the ASEAN Framework Agreement on Services (AFAS) provide any major steps forward. Hence, the AEC will not have much impact on competition and productivity in services in general in ASEAN.

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For an impact of the AEC in terms of the socio-cultural issues in the economic, social, cultural, technical, scientific and administrative fields and provide assistance to each other in the form of training and research facilities in the educational, professional technical and administrative spheres.24

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• Intensify R&D collaboration and technology commercialisation;
• Develop S&T human resources;
• Network S&T Centres of Excellence and programme;
• Promote S&T awareness and utilisation;
• Strengthen S&T infrastructure and support systems;
• Forge closer cooperation with dialogue partners.

APAST was updated in 2011, with four additional years to run until 2015. In this period, COST also launched a select number of flagship programmes as an approach to prioritise the themes that needed more strategic attention and better allocation of resources, with objectives set for the end of the APAST period:

• Early warning system for disaster risk reduction;
• Biofuels;
• Applications and development of open source systems;
• Functional foods;
• Climate change;
• Health.

To further reinforce a more organised inter-governmental strategy, COST adopted the Krabi Initiative in December 2010. Its rationale was built upon the political visions of ASEAN leaders, a new understanding of the role to be played by STI (now with the ‘I’ meaning a greater awareness of Innovation) and its role in developing competitiveness and human development, as well as the perceived need for re-inventing the ASEAN Scientific Community for a “meaningful delivery” of an STI agenda in ASEAN. The Krabi Initiative was launched in order to (see: Dutta, Lanvin, Wunsch-Vincent 2015). The core of the ASEAN Science Fund, with two sub-indices: the input sub-index and the output sub-index. These are again made up of well-known indicators:

• The input sub-index:
  • Institutions (political, regulatory, and business environment);

4.2.4. Innovation performance in Southeast Asia

Given the challenges for ASEAN related to boosting internal trade, increasing productivity, and upgrading capacities to enhance competitiveness, much will hinge on the innovative capabilities of the region and its member states. A useful attempt to boost the regional approach through an “common pot” mechanism.

In many European countries, it has been found that a national fund that awards grants for scientific research on a competitive basis is the most effective way to encourage the best science. A number of individual ASEAN member states have acknowledged the importance of having an infrastructure in place to allocate and distribute funds to researchers, provide research facilities, or maintain a state budgeting system that would allow the flexibility needed for scientific research. Indonesia is a case in point: The country is in the process of establishing an Indonesian Science Fund (ISF) supported by the World Bank and Australian Aid, to be established under the auspices of the Indonesian Academy of Sciences (Brodie, Greene 2015).

Such national autonomous professional granting agencies, with an independent expert review process to support research grants and development projects, could then also be integrated and supplemented on a regional level. Parallels could be drawn to the process by which the European member states are trying to bring their national granting systems into alignment with the European frameworks programmes.

STI policies contribute to the integration of the economies in the AEC, and vice versa. In general terms, STI policies cluster around certain key elements to deal with increasingly competitive and knowledge-based issues, and they typically involve activities concentrating around research and higher education institutions, the commercialisation of R&D and IP policies, the funding of research, support to SMEs, and the like. However, without supra-governmental institutions and with a weak resource base, STI is likely to play a smaller role in the AEC than foreseen in the plans and strategies.

The development and relevance of these plans and strategies notwithstanding, promoting STI in the region faces several obstacles and challenges. First among these is the lack of resources to implement the foreseen actions in any meaningful way. Most of the ASEAN countries have very small public investments in R&D, with gross expenditures in R&D (GERD) as a share of GDP typically in the range of 0.4% to 0.2%, with Singapore, and to some extent Malaysia as exceptions). Therefore, a true commitment is difficult to achieve. Further, as an intergovernmental approach, COST and the member states lack effective coordination mechanisms, and the ownership among key stakeholders is still too weak. Lastly, even though the thematic priorities are highly relevant, small resources lead to small projects, with a limited impact on the very development of cooperation.

To further integrate STI policies on an intergovernmental level, COST has inaugurated the Advisory Body of the ASEAN Science Fund (now with the ‘I’ meaning a greater awareness of Innovation) and its role in developing competitiveness and human development, as well as the perceived need for re-inventing the ASEAN Scientific Community for a “meaningful delivery” of an STI agenda in ASEAN. The Krabi Initiative was launched several thematic priorities that partly overlapped with the APAST:

• ASEAN innovation for the global market;
• Digital economy, new media and social network;
• Green technology;
• Food security;
• Energy security;
• Water management;
• Biodiversity for health and wealth;
• Science and innovation for life.

Hence, the Krabi Initiative represented a shift in the awareness of the role to be played by STI, with a greater focus on innovation and economic growth, as well as a focus on the need to embed STI in the overall development of the ASEAN countries. As APAST came to an end in 2015, the new APASTI came to life for the period covering 2016–2025, confirming the greater focus on innovation, as well as the need for inclusive economic development, and an acknowledgement of the need to enhance the cooperation between state and non-state players (e.g. through public-private partnerships). More specifically, APASTI will be more aligned with the AEC, while prioritising in strategic thrusts:

• Strengthening and supporting strategic collaboration between academia and the private sector for capacity building, technology transfer, and commercialisation;
• Enhancing talent mobility and people-to-people interaction, especially for women and youth in STI;
• Establishing strong partnerships with dialogue partners to nurture STI enterprises to support micro, small and enterprises;
• Raising public awareness and strengthening STI eculturation to enhance ASEAN science and technology cooperation.
for Singapore, as it indicates a less effective innovation system than could be expected and indirectly confirms the productivity challenge illustrated earlier. Still, as In-tal et al. (2014) also noted, the scores and the rankings reflect the fact that the ASEAN member countries are in different stages of development, with different technological capabilities.

Table 5 below (from the 2013 version of the Global Innovation Index) indicates further that many countries have significant weaknesses in highly skilled human resources, higher education in general, and notably also in the linkages between higher education institutions. The latter is also important in the context of an ASEAN “single market for knowledge”, and these data suggest that ASEAN has not come far in cross-border cooperation between such institutions or in research cooperation, as has been seen in the European case, although a strict comparison here is not warranted. Further, the well-known weakness in R&D funding is visible for all countries except Singapore.

Looking more closely at the pattern of funding, with the role of researchers performing in mind, there is a great difference between the countries in terms of the performance of higher education institutions and research organisations. In the more advanced countries, such as Thailand, Malaysia, and Singapore, higher education institutions play a greater role in the system, compared with the less advanced, where public research organisations are more dominant. This pattern suggests two things: First, that in the former group, human capital and universities are recognised as key to overall performance, and secondly, that higher education-based systems are more open to engagement with business, whereas public research institutes are more closed.

4.2.5 Contrasting single markets

Comparing the two projects for economic integration may not be productive, as they are, in many respects, not comparable. This is also why we have suggested contrasting the two, rather than comparing them according to a more strict approach. A very specific reason for the great difference between the two regions in this respect, is the fact that while the EU, as a tightly knit system with supra-national governance, i.e. a political union, on top of various other integrative measures, ASEAN is basically inter-governmental, supported only by a small ASEAN Secretariat in Jakarta and built upon a number of cooperative institutions and processes in various policy areas. The latter model is time-consuming and much is left to the discretion of the member states.

The stronger institutions in the EU case, including competition policy and enforcement, are not mirrored in ASEAN. Rather, in the latter case, the non-tariff protective measures in many countries run counter to the economic integration project as such. While competition has been seen as contributing to innovation in the European Single Market, the non-tariff measures and other nationally grounded tactics, as well as corruption, still hinder the development of a competitive environment that is capable of triggering innovation in a similar way in Southeast Asia. Of course, there is a great gap in the level of development between the two cases, but the lack of an ASEAN system to deal with the various obstacles to integration, such as a common competition policy and the associated legal institutions, as well as a common way to deal with e.g. non-tariff measures, is a significant drawback for ASEAN.

Even so, the AEC is moving ahead, tariff barriers are being reduced, and several sub-projects and chapters in the AEC programme are being pursued to the extent that capacity allows. But if there is an area where ASEAN could learn more from the EU, it is the subsequent developments of knowledge markets, i.e. institutions and programmes to push research and innovation, as well as cooperation in these areas across borders. In fact, in the EU, the Single Market Programme has spurred a number of initiatives for competitiveness through research, technological development and innovation that have helped to create a more integrated European knowledge market, mostly through networking. In other words, the EU has developed an “institutional thickness” as a regional system of incentives for innovation and research from which ASEAN could learn more. The lack of funding resources and human capital notwithstanding, appropriate institutions and collaborative programmes may create momentum in the direction that ASEAN itself has envisaged.

The limited regional incentives for research and innovation in Southeast Asia affect the ways in which economic integration processes relate to innovation framework conditions. ASEAN’s economic and innovation policy processes are not streamlined at the moment. AEC thus becomes relevant for innovation processes and framework conditions through more indirect ways, e.g., by gradually allowing capital (which might be invested in R&D) or people (which might work in R&D) to move through the region more freely. One aspect where both the economic and innovation policy worlds meet is intellectual property rights. They typically play a major role in free trade agreement discussions and in knowledge exploitation-oriented innovation policy. We introduced IP as a dedicated framework condition for innovation, as it is not merely a phenomenon affecting innovation performance. Innovation policy often also explicitly addresses IP as a crucial element in innovation processes. In the following, we will discuss IP and specifically patent regimes in the EU and ASEAN, considering them as mediating between competitiveness-oriented economic integration and innovation processes.

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<tbody>
<tr>
<td>1</td>
<td>Human capital and research</td>
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<td>Graduates in science and engineering</td>
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<td>2.3.1</td>
<td>Researchers, headcounts/ten pop</td>
<td>685.5</td>
<td>171.0</td>
<td>715.4</td>
<td>129.6</td>
<td>716.4</td>
<td>575</td>
<td>1,353</td>
<td>7,066</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3.2</td>
<td>Gross expenditure on R&amp;D (GERD), % GDP</td>
<td>14.1</td>
<td>0.1</td>
<td>0.6</td>
<td>2.1</td>
<td>2.2</td>
<td>1.8</td>
<td>0.8</td>
<td>3.3</td>
<td>3.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3.3</td>
<td>QS univ. ranking average score of top 3 univ., index</td>
<td>0</td>
<td>0</td>
<td>32.1</td>
<td>44.2</td>
<td>28.5</td>
<td>53.3</td>
<td>38.2</td>
<td>0</td>
<td>74.9</td>
<td>44.8</td>
<td>81.7</td>
<td>73.6</td>
</tr>
<tr>
<td>5.2</td>
<td>Innovation linkages</td>
<td>24.6</td>
<td>36.3</td>
<td>29.5</td>
<td>30.9</td>
<td>21.4</td>
<td>49.8</td>
<td>22.3</td>
<td>27.4</td>
<td>27.9</td>
<td>30.9</td>
<td>42.0</td>
<td>38.0</td>
</tr>
<tr>
<td>5.2.1</td>
<td>University/industry research collaboration, index</td>
<td>47.6</td>
<td>42.0</td>
<td>53.0</td>
<td>64.4</td>
<td>40.9</td>
<td>71.5</td>
<td>50.2</td>
<td>37.3</td>
<td>56.2</td>
<td>47.5</td>
<td>61.7</td>
<td>61.7</td>
</tr>
<tr>
<td>5.2.2</td>
<td>State of cluster development, index</td>
<td>48.9</td>
<td>57.4</td>
<td>54.1</td>
<td>56.1</td>
<td>50.7</td>
<td>52.0</td>
<td>81.9</td>
<td>50.8</td>
<td>54.8</td>
<td>68.0</td>
<td>38.8</td>
<td></td>
</tr>
<tr>
<td>5.2.3</td>
<td>GWR financed by abroad</td>
<td>0.4</td>
<td>0.2</td>
<td>0.2</td>
<td>4.9</td>
<td>18.5</td>
<td>3.3</td>
<td>0.8</td>
<td>0.4</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.4</td>
<td>Joint venture/strategic alliance deals/FMPS GDP</td>
<td>0.1</td>
<td>0.0</td>
<td>0.1</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Country scores on innovation pillars and indicators. Source: Dutt and Lanvin (2015)
Dedicated framework conditions for innovation: The case of intellectual property

5.1 Patent regimes in Europe

5.1.1 Institutional set-up and development

The history of harmonisation and current institutional setup is different in the case of the various forms of IP. As stated earlier, we will focus our discussions on patents. European countries have been at the forefront of the development of patent regimes (see also chapter 3). They were among the earliest to establish national patent offices. Despite their commitment to international cooperation and standards in IP and patent regimes, these national systems are still the core building blocks of European patent-related policies and practices. This particularly concerns enforcement and litigation of patent rights, which is achieved through national courts with nationally educated judges and legal experts. European national patent systems are also diverse with regard to the role of various innovation system agents in the creation of patentable knowledge (various types of ownership of publicly funded research results; different cultures in the private sector) or IP support services.

Europe.Briefings...)

Most important for European harmonisation and for the current institutional set up of a European-level patent regime is the European Patent Convention (EPC), which, among other things, established the European Patent Office in 1977. The EPC regulates what kinds of inventions are patentable in the signatory states:

“European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.” (Article 52.1)

It subsequently describes the patentability criteria (e.g. novelty) in detail and defines the exceptions to the patentability rule: Scientific theories, mathematical models, but also “programs for computers” (i.e. software), plant or animal varieties or methods for medical treatment are not considered patentable under European patent law.

Neither the Paris Convention (which “only” regulates equal treatment of national and foreign patent applicants, as well as priority dates) nor the Patent Cooperation Treaty (which focuses on international filing procedure, examination, and publication standards) define what can be patented. Europe opted for a patent regime that goes further in harmonisation than the international treaties, particularly with regard to the patent application procedure (with one examination leading to a bundle of national rights). To some extent, this situation changed with the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which all ASEAN and EU countries have signed. TRIPS (article 27.1) includes a definition of patents and patentability, which is similar to the one in the EPC (it also defines the criteria of novelty, an inventive step, and the capability of industrial application), but it extends patent protection to “all fields of technology”. The only exceptions relate to public order and morality, “diagnostic, therapeutic and surgical methods”, as well as “plants and animals other than micro-organisms”. This definition has led to much debate about software patents within Europe and internationally. While the European Patent Convention holds that software as such is not patentable (it is covered by copyright law), it is patentable as part of other devices. Currently, the debate has not been resolved, with one side pointing to the patentability of inventions in all fields of technology and the other pointing to the fact that software is sufficiently covered by granting authorship rights (i.e., copyrights, article 10.1 of TRIPS). Similar debates have emerged among the TRIPS signatories around patents for genetic material.

With the EPC, the signatory countries of the EPC also gave themselves a significantly simplified procedure for seeking patent protection. The EPO defined three official languages (English, French, and German) as those in which an application can be filed. The applications are then prosecuted very similarly to national patent applications. A search report is provided, and the application is published 18 months after the filing date. If the applicant decides to follow up, he/she decides in which of the EPC member states the patent should be protected. A substantive examination report is compiled (by three EPO examiners) and granting decision is taken. This results in a bundle of national patents, which must be subsequently validated in each designated EPC member state within a specific time limit (in this case, translations may become necessary).

The specifications of the EPC regulations on application and enforcement show that EPO-filed European patents are characterised by a peculiar combination of harmonisation and national procedures and national regulations. The EPO procedure is thus not to be confused with an actual unitary European patent. Such a unitary patent has been discussed among the EU member states under the title of a “European patent with unitary effect” (EPU, also “unitary patent” or “EU patent”). In such a unitary patent, validation in national phases would not be necessary. There would be a single renewal fee (instead of the EPU and the national renewal fees), a single object of property, single ownership, no national translation requirements, and a single Unified Patent Court. While the legislation necessary for the creation of an EPU is well advanced (with 26 EU member states forming part of the enhanced cooperation for the EPUE), the ratification of the agreement is still pending.

The discourse on European patent regimes has shed light on the peculiar current combination of a harmonised patent application procedure leading to territorial rights enforced via national legislation. The following chapter will introduce some key figures on European patenting activity.

http://ipstats.wipo.int/ipstatv2/keysearch.htm?keyId=221

In order to better assess the relevance of EPO and the EPC filing route, we can compare the filings at EPO with filings at national intellectual property institutes. According to PATSTAT (version 2015 autumn), the German IP office processed 71,500 filings in 2015 (65,000 of which sought protection in Germany), the UK 26,000 (25,000) and France 19,000 (16,000 for protection in FR). These numbers show that the EPO has established itself as a major player in the formalisation of intellectual property rights protection, and that it is by far the most important regional patent office. It receives more PCT applications than the WIPO International Bureau. Only the US and Japan received more PCT applications in 2014.

The patent figures also confirm patent applicants’ interest in Europe as a market (which they want to exploit
with their protected IP. According to the WIPO figures for 2014,15 % of global patent applications (national and PCT applications) were filed to protect inventions in European countries. Almost half of these applications are filed with the EPO (either directly or seeking a European phase through the PCT process). An interesting fact in this context of the study: Patents filed for protection in Asian countries make up 60 % of the world application output. In 2004, this number was at only 49 % (and at 21 % for Europe).

As the figure shows, the last few years have seen a surge in patent filings in patent offices in Asian countries. This reflects the relevance of Asia as a market, as a production site and possibly as a knowledge production centre. However, the higher numbers for Asia are also partially caused by the fact that filing cultures between national systems can differ substantially. For instance, while in Japan, several applications might be filed for the same invention, applications in Europe or the US contain several inventive steps (expressed in claims)32.

In dealing with patent statistics, it is important to distinguish the location of the filing office (the data we dealt with in the figures is focused on this) from the inventor and the applicant. The latter is the owner of the patent that is filed. If we look at the applicant’s origin as an indicator for the geographical ownership patterns of inventive activity, many headquarters of multinational enterprises) is a case in point. Nevertheless, in our understanding of international inventive activity, cross-country networks are interesting regardless of whether they are part of one multinational enterprise or different knowledge producing constellations.

As mentioned, by universities. In Singapore, the business share was slightly over 50 % (with almost 40 % coming from university and public research), and in Malaysia, the business share was 50 % (with over 50 % coming from universities and public research).

In Japan, 96 % of PCT applications in 2014 were owned by businesses, and in the US, 85 %. The share of university ownership in the US is at around 5 %, and 51 % for Singapore.

Given the size of its patent application output, the EU appears as a fairly internationalised innovation environment, similar to the US in regard to the co-inventorship indicator. Indonesia’s share of internationalisation is high, but the evidence is not conclusive because of the low overall number of patents with inventors from Indonesia. Patents with Singapore-based innovators are frequently international, more often than the patents with inventors based in European countries of similar size and R&D expenditure (such as Austria, Denmark, or Finland). Ireland’s internationalisation share is higher than Singapore’s.34

The OECD also presents figures for two Southeast Asian countries’ co-invention shares in PCT patent applications: 54.3 % for Indonesia and 47.1 % for Singapore.

The data presented above illustrates the significant patenting activity in Europe and by European applicants. This (and the history of the patent regime in Europe as outlined above) also suggests a significant and well-developed IP service industry (including private patent agents, lawyers, and consultancies) and related public institutions (IP courts and patent examiner education). The following section will focus on the various research-performing actors behind the patenting activity.

### 5.1.3 Patent applications in the EU

Representative samples of EPO-handled patent applications show that in 2013 and 2014, 6 % of applications came from the universities and public research sector, whereas around 50 % came from SMEs or individuals, and around 65 % from large enterprises.

The WIPO (2015, p. 41) uses a slightly different categorisation, separating PCT applications from businesses, individuals, universities, and government research. Over 80 % of 2014 PCT applications owned by applicants in the major European countries (Germany, France, UK) came from the business sector, in Germany (also the Netherlands, Sweden, and Finland) more than 90 %. France is the only country in Europe where the government research sector plays a major role as a patent owner (around 10 % of PCT applications are owned by government research applicants). University ownership of PCT applications is negligible in many European countries. It is comparatively high, however, in the case of Denmark, the UK, Ireland (with slightly under 10 % held by universities), and Spain, with 20 % owned by universities. Spain is one of the bigger European countries with the lowest share of business in PCT application ownership. Around 50 % of PCT applications in 2014 were owned by businesses, 25 % by individuals, and 20 %, as mentioned, by universities. In Singapore, the business share was slightly over 50 % (with almost 40 % coming from university and public research), and in Malaysia, the business share was 50 % (with over 50 % coming from universities and public research).
Table 4: International co-inventorship

<table>
<thead>
<tr>
<th>Country</th>
<th>Patents (2012) with inventors from abroad</th>
<th>International co-inventors</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>617</td>
<td>25</td>
<td>4.1%</td>
</tr>
<tr>
<td>Singapore</td>
<td>857</td>
<td>364</td>
<td>42.4%</td>
</tr>
<tr>
<td>Austria</td>
<td>1,635</td>
<td>472</td>
<td>28.9%</td>
</tr>
<tr>
<td>Belgium</td>
<td>1,624</td>
<td>734</td>
<td>45.2%</td>
</tr>
<tr>
<td>Croatia</td>
<td>48</td>
<td>7</td>
<td>14.6%</td>
</tr>
<tr>
<td>Cyprus</td>
<td>8</td>
<td>2</td>
<td>25.0%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>266</td>
<td>101</td>
<td>38.0%</td>
</tr>
<tr>
<td>Denmark</td>
<td>1,712</td>
<td>303</td>
<td>17.9%</td>
</tr>
<tr>
<td>Finland</td>
<td>1,878</td>
<td>426</td>
<td>22.8%</td>
</tr>
<tr>
<td>France</td>
<td>8,537</td>
<td>1,634</td>
<td>19.1%</td>
</tr>
<tr>
<td>Germany</td>
<td>15,942</td>
<td>3,115</td>
<td>16.4%</td>
</tr>
<tr>
<td>Greece</td>
<td>134</td>
<td>38</td>
<td>27.9%</td>
</tr>
<tr>
<td>Hungary</td>
<td>280</td>
<td>99</td>
<td>35.4%</td>
</tr>
<tr>
<td>Ireland</td>
<td>37</td>
<td>8</td>
<td>21.6%</td>
</tr>
<tr>
<td>Italy</td>
<td>445</td>
<td>140</td>
<td>31.5%</td>
</tr>
<tr>
<td>Latvia</td>
<td>37</td>
<td>3</td>
<td>9.4%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>70</td>
<td>14</td>
<td>20.5%</td>
</tr>
<tr>
<td>Luxembourgn</td>
<td>94</td>
<td>34</td>
<td>37.4%</td>
</tr>
<tr>
<td>Malta</td>
<td>15</td>
<td>5</td>
<td>33.3%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3,852</td>
<td>719</td>
<td>18.7%</td>
</tr>
<tr>
<td>Norway</td>
<td>799</td>
<td>187</td>
<td>23.4%</td>
</tr>
<tr>
<td>Poland</td>
<td>429</td>
<td>121</td>
<td>28.2%</td>
</tr>
<tr>
<td>Portugal</td>
<td>159</td>
<td>36</td>
<td>22.6%</td>
</tr>
<tr>
<td>Romania</td>
<td>82</td>
<td>39</td>
<td>47.4%</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>87</td>
<td>34</td>
<td>40.2%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>130</td>
<td>78</td>
<td>59.8%</td>
</tr>
<tr>
<td>Spain</td>
<td>1,874</td>
<td>329</td>
<td>17.5%</td>
</tr>
<tr>
<td>Sweden</td>
<td>3,523</td>
<td>836</td>
<td>23.7%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>6,550</td>
<td>1,055</td>
<td>16.0%</td>
</tr>
<tr>
<td>European Union (28)</td>
<td>52,514</td>
<td>6,001</td>
<td>11.4%</td>
</tr>
<tr>
<td>World</td>
<td>194,094</td>
<td>12,874</td>
<td>6.6%</td>
</tr>
<tr>
<td>Australia</td>
<td>1,986</td>
<td>325</td>
<td>16.5%</td>
</tr>
<tr>
<td>Brazil</td>
<td>790</td>
<td>146</td>
<td>18.5%</td>
</tr>
<tr>
<td>Canada</td>
<td>5,655</td>
<td>1,141</td>
<td>20.1%</td>
</tr>
<tr>
<td>China</td>
<td>19,518</td>
<td>1,683</td>
<td>8.6%</td>
</tr>
<tr>
<td>India</td>
<td>2,210</td>
<td>713</td>
<td>32.3%</td>
</tr>
<tr>
<td>Japan</td>
<td>42,570</td>
<td>804</td>
<td>1.9%</td>
</tr>
<tr>
<td>Mexico</td>
<td>279</td>
<td>79</td>
<td>28.8%</td>
</tr>
<tr>
<td>New Zealand</td>
<td>367</td>
<td>89</td>
<td>24.0%</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1,175</td>
<td>249</td>
<td>21.2%</td>
</tr>
<tr>
<td>South Africa</td>
<td>399</td>
<td>56</td>
<td>14.0%</td>
</tr>
<tr>
<td>South Korea</td>
<td>11,404</td>
<td>386</td>
<td>3.4%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>3,271</td>
<td>1,338</td>
<td>40.3%</td>
</tr>
<tr>
<td>Taiwan</td>
<td>872</td>
<td>228</td>
<td>25.9%</td>
</tr>
<tr>
<td>Tahiti</td>
<td>678</td>
<td>74</td>
<td>8.9%</td>
</tr>
<tr>
<td>United States</td>
<td>53,896</td>
<td>6,912</td>
<td>12.8%</td>
</tr>
</tbody>
</table>

thus, it is higher than in most European countries, but lower than in Denmark, the UK, Ireland, or Spain. In terms of absolute numbers, the patent application output of UPs is still above the output in European countries.

The relatively low share of universities in European patent application ownership has been discussed in the literature. It has long been considered that US universities outperform EU universities in patent output, as well as its exploitation (see e.g. Schmehmam, Durvy 2003). This widely held view has been discussed as the ‘European paradox’ of simultaneous excellent research and poor commercial exploitation (cf. European Commission 1995; European Commission 2007). Recent studies have criticised this view in several ways. One line of literature (e.g. Dosi et al. 2006) has argued that Europe is, in fact, not outperforming the US in terms of research excellence. The challenges for Europe lie, thus, not only in commercialisation, but also in academic research. Other studies indicate that the gap between the US and Europe is indeed not so wide if we consider that many university-invented patent applications in Europe are not university, but business-owned. After controlling for this fact, European universities only marginally lag behind their US counterparts (CrÉspi et al. 2010). Nevertheless, a gap in commercialisation is identified: On average, European and US universities TTOs perform similarly in terms of the number of licenses they execute. However, although they put the same emphasis on research and, in particular, European TTOs’ licensing incomes are lower than those of their US counterparts (Conti, Gauze 2011). The authors present no concluding evidence for why this is the case. There also seems to be a lack of clarity about the question on the extent to which the higher share of business-owned university (co-)invented patents is an indicator of either successful or unsuccessful European technology transfer.

A point that is still discussed, in this regard, is the necessity of further (or less) Bayh-Dole-like legislation34 in the European Union member states. Although many European countries have passed laws that facilitate institutional ownership and favouring it over ownership by professors, the situation is still fragmented. Research is not yet conclusive on the impact of Bayh-Dole legislation on patenting and particularly licensing. Evidence from a study on US universities suggests that Bayh-Dole was only one of several factors behind the increasing patenting and licensing activity in the US in the 1980s and 1990s (Mowery et al. 2001). CrÉspi et al. (2010) concluded that no Bayh-Dole legislation is needed in Europe because the market takes care of the uptake of university research. Others have argued in favour of new and strengthened Bayh-Dole-like legislation (BeReuer, HieMerL 2010). Regardless of the outcomes of this debate, practically all research universities and public research organisations35 in Europe have technology transfer offices (cf. Conti, Gauze 2008).

The focus of the technology transfer efforts varies, however, between licensing, start-up generation, contract research, or community engagement. Instead of focusing on holding patents and generating license income, some universities have followed the model of innovation offices, which offer support to researchers to facilitate commercialisation and industry collaboration. This is also the case for some of the universities that are considered the most successful in technology transfer and commercialisation, such as the Karolinska Institute in Sweden. Interestingly enough, Sweden still follows the ‘professor’s privilege model’, which entitles institutions rather than researchers (instead of universities) to patent their inventions and which is contrary to the Bayh-Dole model. Germany abolished the professor’s privilege model in 2002 and is currently consolidating its landscape of newly created technology transfer offices and patent and valorisation agencies.

Despite this strengthening and consolidation of the TTO landscape in Europe, the literature (e.g. LevensDorff, MEyEr 2010) points to a stagnation or even decline in university patenting activity. The authors contended the interpretation that this is due to institutional learning (i.e. universities realising that patenting is costly and not often rewarding), as the institutional lessons were already available in the 1990s. They argued instead that one reason for the decline in university patenting is structural: university rankings, which put an increased emphasis on issues like international co-authorship and less focus on patenting output. Another reported reason is that the relationship between universities and their (economic) environment is less institutional and more functional, with patenting as only one of several possible ways of engaging in technology transfer.

At the European level, the European Commission continues to invest in the protection of exploitable IP. It aims to facilitate technology transfer and research commercialisation eco-systems in Europe. It also aims to strengthen public technology transfer offices (e.g., through the exchange of best practices), and to complement technology transfer funding. Trying to fill the gaps at the (pre-)seed financing stages for the commercialisation of public research, as well as making up for a still underdeveloped European business angel community, the European Commission has, among other things, set up a Technology Transfer Financing Facility Pilot (with an initial budget of €64m for 2015) within the latest Research and Innovation Framework Programme (FP7, HoRizOn 2020) (HiZzo 2020).

At first sight, the discussion on technology transfer and the commercial exploitation of European-level research seems to conflict with the significant European-level focus on open access to research results and on open innovation. However, the European Commission’s understanding is that open access to research results precisely facilitates technology transfer and commercialisation. Intellectual property rights and patents in particular are a central component of the open and excellent research system envisaged and implemented by the European Union.

The European Commission’s view of IP and patents as key to European research becomes clear, for instance,
in the rules and regulations related to H2020. H2020 invites participants to explicitly deal with IP issues at the outset of the collaborative research. Guidelines and templates are available for participants. The approach is not to divide, but to bring, into the collaborative research, (‘foreground’) from IP generated through the collaborative research, (‘background’). The European Commission as the funder of the research does not claim any ownership of the IP. Instead, the collaborator players are invited to find co-ownership and usage agreements. Costs for filing patent applications or paying royalty fees can be claimed as part of the project budget. Another principle is that the combination of these clear IP protection guidelines with the idea of also making research results openly accessible (publishing in open access journals, establishing open data procedures, etc.).

The underlying idea here is that open access and open research systems do not contradict the idea of exploiting research commercially through intellectual property protection. For instance, research results can be published after a patent application is filed. Even if no patent application is filed, authors retain the copyright over their open access published results. The European Commission insists that this combination of IP protection and open access will serve societal goals as well as the economic returns to innovation investments.

Protection is not enough to achieve these societal and economic goals. It has been shown that a substantial share, around 20–40% of patents (depending on firm size, country, etc.), are not commercially valorised (cf. Gambardella et al. 2012). Among the patents that are not commercially used, there are significant differences in their economic impact (Pakes, Griliches 1984; Scherer, Harhoff 2000). The European Commission sees the protection of intellectual property as a necessary condition for the exploitation of project results. Funded participants have a general obligation to protect results (for an appropriate period and with an appropriate territorial coverage) and then also to exploit or commercialise their publicly funded research will remain a challenge, there are promising developments in private sector research and innovation: more and more firms turn to more open forms of innovation.

As far as the private sector is concerned, open innovation is characterised by companies that realise that they cannot afford to rely entirely on their own research. Instead, they collaborate with public research, buy patented processes or inventions from other companies, and, in turn, take internal innovations outside the company through licensing, joint ventures, or spin-offs (Europatent 2013b, p. 100). The open innovation paradigm is, thus, not seen as contradictory to the pro-patent regime in place in Europe. While so far only limited evidence is available, a recent study by Roaute and Oudehessen (2015) found that points to an increase in firm-level licensing activities.

Whether in an open or a closed mode, the commercial exploitation and thus economic relevance of intellectual property in Europe is impressive. At an aggregate level, IP-intensive industries (in sectors where more than 10% of patents are used, note the geographical indications play a role) contributed 58.6% of the EU’s GDP in the period of 2010–2012 (European Patent Office and Office for Harmonization in the Internal Market 2015). Considering patent-intensive industries alone, this figure is 15.9%.

A major driver behind the European Union’s strategy for a single market for intellectual property rights is to ease IP-related procedures for companies in respective industries. This includes the initiative of a unitary patent protection, which would make patent filing with European coverage and the litigation of patent protection much cheaper. The European Commission (2011) also proposed to establish a European framework for online copyright licensing, contributing to the establishment of a digital single market in Europe. It also continues working on the European trademark system. While the trademark systems have been harmonised for around 20 years already, with the Community Trademark existing for around 15 years, there is room to make the system more efficient and effective.

At a more general level, the European Commission works to improve the enforcement of IP, encourages non-European trading partners to strengthen their IP systems and enforces European patents, which did not take advantage of IP (e.g., through the IPR Helpdesk). In spite of these efforts, the European Commission has identified a number of challenges for managing and exploiting IP in the EU.

5.1.4 Patent portfolios in the EU and emerging issues

Patents are an indicator of inventive activity, and related to innovations of economic potential. What actually happens with patents is, however, difficult to estimate (cf. Pakes and Griliches 1990). In the early 2000s, the European Patent Register was also considered as a potential for patent information. As a second SME-oriented support for technology development and commercialisation as a relevant long-term activity. They advised against encouraging short-term forms of valuation through enforcement or negotiation of a patent or other means, in order to avoid any negative effects on innovation. The authors furthermore pointed to the particular challenges of SMEs due to transaction costs and market failures. It is not easy for SMEs to find potential buyers or sellers of patents, to carry out a valuation, or to negotiate a transfer.

To mitigate the tax consequences, the authors discussed IP Exchange Platforms that could provide seller–acquirer matching, but concluded that existing commercial platforms obtain better results than what a separate public platform could achieve. They recommended supporting SMEs in using these platforms. The EU has proposed a European Patents Pool, which is considered as a potentially key instrument in providing companies with easy access to patent information. As a second SME-oriented support activity, the group proposed consulting and financing to develop technology development (well coordinated with existing support mechanisms and networks such as the Enterprise Europe Network, the PATLIB network, and the national IP offices). Finally, the group discussed whether patent funds would be an option that it is worthwhile to consider at the European level. Patent funds are considered as particularly useful either for short-term enforcement (resulting in the phenomenon of ‘patent trolls’, which are detrimental to and not interested in innovation) or for long-term technological development (through specialisation and economies of scale). The authors reviewed a French proposal for a public patent licensing fund. However, they doubted that such a fund would be able to succeed at the commercialisation stage and saw no added value from the public investment. The authors recommended that the EU might provide limited and targeted support for the creation of patent pools for selected technologies. The issue of patent aggregation and pooling was taken up by a separate expert group on patent aggregation. The group’s report (European Commission 2011b) provided some useful conceptual clarification (e.g. differentiating patent pools and patent funds) and reiterated the previous group’s opinion that the creation of a publicly supported patent fund was not recommended.

Building on the expert group’s work, the Commission established a staff working group (European Commission 2012), which identified four main obstacles for efficient patent valorisation in Europe: low transparency in the patent market, insufficient awareness of business opportunities, lack of understanding of the IP system and difficult access to funding to commercialise patents. The measures proposed to counter these obstacles are listed in the figure 19.

As noted in this expert group report, as well as in other literature, the issue of valuing a patent was identified as a challenge, particularly for SMEs or other actors with little bargaining power. The European Commission also suggested that an expert group establish an expert group to discuss whether patent funds would be an option that it is worthwhile to consider at the European level. However, the group argued in favour of national and European-level efforts to increase the acceptance of IP assets as collateral for commercialisation investments. They also pointed to the fact that investors typically invest in companies, not IP assets as such. It is therefore difficult to establish IP as widely accepted collateral. In terms of policy action, the group recommended the establishment of a database of IP assets and ensuring that they are considered as assets of value, and the creation of an organisation overseeing IP valuation practice; the introduction of risk-sharing schemes for banks to facilitate IP secured lending; and a boost in the transparency of IP value in company accounts.

5 DEDICATED FRAMEWORK CONDITIONS FOR INNOVATION: THE CASE OF INTELECTUAL PROPERTY

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The AEC Blueprint strives towards a more integrated view of the world, is aligned with an increasingly global trade and investment model of ASEAN. Therefore, an EU-type single market is seen as critical to improving related IP systems and framework climate, including making use of international treaties. The problem of harmonizing procedural rules in developing Asia is much more severe than those experienced in Europe and North America, with law in Asia not only from different traditions, but also from different colonial periods, and with a judiciary that is often struggling to free itself from political influence and from a negative image of being corrupt to some degree. (“the problems of harmonizing procedural rules in developing Asia are much more severe than those experienced in Europe and North America, with law in Asia drawn not only from different traditions, but also from different colonial periods, and with a judiciary that is often struggling to free itself from political influence and from a negative image of being corrupt to some degree.” (Antons 2011, p. 2, cited in Lall, McEwin 2013))

Even so, ASEAN has given IP a key role in the AEC Blueprint. The region’s increasingly important role in global value chains and innovation networks also makes a stronger IP regime a must. The assumption is that global growth is increasingly IP-intensive and that access to these capabilities and the IP itself is essential for innovation. The region’s dilemma is how to increase the region’s drive to protect its own IP, thus driving them to improve related IP systems and framework conditions. This view is held by ASEAN’s international and domestic dimension, and it also has broad support among ASEAN member states. Apart from ASEAN’s own regional efforts, which will be addressed below, the international agreements discussed above (TRIPS, etc.) play a relevant role in this regard. They set minimum standards to be implemented on the national level, and hence, serve as a platform on which to develop further harmonisation. TRIPS includes a waiver for developing countries.

Many countries (like Myanmar) will need to improve their IP protection systems with the end of this waiver in sight. This might revive debates between developing and more mature economies on the effects of agreements like TRIPS beyond the facilitation of foreign direct investment. Apart from TRIPS, bilateral or bi-regional free trade agreements (FTAs), with the Trans-Pacific Partnership (TPP), as the most recent and visible example) also include IP provisions affecting a number of ASEAN member states and contributing to harmonisation. Box 2 compares the IP provisions of FTAs with those of free trade agreements.

IP regulations in FTAs: As with other things, their signatories agree to treat legal entities from all partner countries equally in seeking and enforcing IP protection and to allow for patents in all areas of technology. As to the potential negative effects of protection and enforcement, a clause allows for ‘compulsory licenses’, enabling signatories to circumvent patent protection in areas of significant societal relevance (e.g. in order to provide essential drugs). Even so, ASEAN has given IPR a key role in the AEC Blueprint. Its Article 18.37 defines patent protection and to allow for patents in all areas of technology. As to the potential negative effects of protection and enforcement, a clause allows for ‘compulsory licenses’, enabling signatories to circumvent patent protection in areas of significant societal relevance (e.g. in order to provide essential drugs, especially in certain countries).

As with TRIPS, the FTAs focus, first and foremost, on the protection and enforcement of global IP, not so much on the local generation and exploitation of IP. The issue at stake is whether a more consistent protection framework can sustainably inspire economically and socially relevant domestic inventive activity. Meanwhile, regarding the framework conditions for generating and protecting IP, our results suggest that the international agreements beyond ASEAN have a higher impact on IP harmonisation than regional projects like the AEC have. At the same time, IPR law is still mostly national, and the great political and institutional diversity between the member countries makes integration and harmonisation a challenge. The diversity in the region has made integration in a realistic time span unlikely.

When assessing the IP policies and practices in ASEAN, it is therefore useful to be reminded of the implications of the lack of integration so far in the region. Full economic integration would mean integrated IP laws and regulations. As mentioned, ASEAN has not chosen this path. A unitary regional EU IP patent is still being discussed. It is currently not discussed in ASEAN. An alternative is harmonisation towards a level playing field, reaching similar laws and regulations with a certain time span. ASEAN member states have not chosen this model either, for the time being. The next alternative would be mutual recognition, that is, the recognition of the granted patents of another member country and vice versa. This is another path. The diversity in the region has made integration in a realistic time span unlikely.

The diversity in the region has made integration in a realistic time span unlikely. The AEC Blueprint strives towards a more integrated ASEAN economy by 2015. It recognises the fact that a fully integrated single market is hardly conceivable. The supranational type of integration practiced by the EU is not comparable to the more intergovernmental integration model of ASEAN. Therefore, an EU-type single market is not the appropriate benchmark of integration for the AEC. The AEC Blueprint, as has been described above, four pillars, of which the second, enhancing a competitive economic environment, includes policies or strategies for competition and IP, two highly associated areas of policy. This association notwithstanding, the present chapter will be limited to IPR, in particular, as far as it is related to our core area of interest: innovation.

We have seen that innovation policy, in major parts of the world, is aligned with an increasingly global pro-patent regime. At the same time, the link between IPR, on the one hand, and economic growth and FDI, on the other, is still not altogether clear. There is a subtle difference in interests between industrialised and developing countries because of the fact that the latter may be better off with weak IP protection, while the former seek stronger protection of their technology and knowledge (Lall, McEwin 2013). This is also reflected in the different approaches of ASEAN member states to balancing the two fundamental challenges relating to IP: generating IP and managing/protection/ensuring it. The diversity between the ASEAN member states (as regards institutional systems, legal standards, etc.) is also reflected in the variety in the competitiveness-related rankings of the countries as illustrated in table 5.

While several of the ASEAN member states have made efforts to improve their legal framework related to global competitiveness and the foreign direct investment climate, including making use of international treaties, the path is riddled with challenges. One aspect is that many countries (like Myanmar) will need to improve their IP protection systems with the end of this waiver in sight. This might revive debates between developing and more mature economies on the effects of agreements like TRIPS beyond the facilitation of foreign direct investment. Apart from TRIPS, bilateral or bi-regional free trade agreements (FTAs, with the Trans-Pacific Partnership (TPP), as the most recent and visible example) also include IP provisions affecting a number of ASEAN member states and contributing to harmonisation. Box 2 compares the IP provisions of FTAs with those of free trade agreements.

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IP regulations in other international treaties: Apart from specific international IP legislation (like the Patent Cooperation Treaty) and TRIPS, a number of regional free trade agreements also include IP-related regulation. Most of these are oriented towards protection/enforcement in areas of technology. As to the potential negative effects of protection and enforcement, a clause allows for ‘compulsory licenses’, enabling signatories to circumvent patent protection in areas of significant societal relevance (e.g. in order to provide essential drugs).

The recent Trans-Pacific Partnership (TPP), signed by United States and other signatories (four of which are in Southeast Asia: Brunei, Malaysia, Singapore, and Vietnam), features a chapter on intellectual property. Its Article 18.37 defines patentable subject matter in a similar fashion to TRIPS (including possible exceptions from patentability for diagnostic, therapeutic, and surgical methods, as well as animals ‘other than microorganisms’). The signatories at the same time confirmed that ‘new methods of using a known product’ or ‘new methods of using a known product’ are patentable. This has potential implications, especially with regard to the pharma sector. The EU’s FTAs with Singapore and Vietnam also include chapters on intellectual property. Regarding patent protection, both refer to the rules under the Patent Cooperation Treaty and also to TRIPS and its provisions on patents and public health. In the EU-Singapore Agreement, however, an additional article establishes the extension of the protection period for patents on pharmaceutical products. The goal is to account for the delays due to administrative marketing approval processes, which decrease the de facto length of patent protection.

Figure 15: Measures identified. Source: European Commission (2012)

The preceding section aimed at outlining of the some general features of the IP landscape and eco-system in Europe. We will now turn to the situation of economic exchange on valorising pilot projects on valorising accessible forms of patent data more accessible by lowering transaction costs and improving access to funding. Box 2 compares the IP provisions of FTAs with those of free trade agreements.

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enhance the IP-related institutional environment in the region. An important body in this regard has been the ASEAN Working Group on Intellectual Property Cooperation (AWGPC), established in 1996, with a mandate to develop, coordinate, and implement IP-related measures in the region. These activities are then closely associated with the development of ASEAN IPR Action Plans, the last one covering the period of 2011–2015. This plan is designed to meet the goals of the AEC by transforming ASEAN into an innovative and competitive region through the use of IP for their nations and ensuring that the region remains an active player in the international IP community” (ASEAN IPR Action Plan 2011-2015, p. 2).

The ASEAN way, through the cooperative efforts of AWGPC, takes, as a point of departure, the fact that the member states have their own IP-related legislation, rules, and practices, giving the national IP offices a key role:

“Developing the IP system in the region necessitates improving the capacity of AMS and the national IP offices to enable them to build a higher level of confidence in the integrity and transparency of the system. Each national office in ASEAN will provide higher quality, efficient, and cost-effective systems to protect IPRs. Each IP office in the ASEAN will be stakeholder-centric, considering the quality and timeliness of the services they provide.”

(ASEAN IPR Action Plan 2011-2015, p. 5)

This action plan encompasses five strategic goals that illustrate the priorities of the ASEAN IP policy (simplified from ASEAN IPR Action Plan 2011-2015, p. 4):

- A balanced IP system that takes into account the varying levels of development and differences in institutional capacity;
- National and regional legal and policy infrastructure, including access to regional IP cooperation and capacity and competences in each case. This is also ensured by the fact that the AWGPC itself is made up of delegates from each national IP office. Cooperation and coordination are the key processes, rather than multilateral/regional formal agreements. The most vulnerable part of the IP systems may therefore also be enforcement, as this is more related to trade, and more dependent on the state of the art of the regional legal systems, court competences, and in some cases, the degree of corruption.
- As mentioned above, this also hinges on the logic of MRAs, the mutual recognition agreements that are widely used in different policy areas, such as the mutual recognition of professional skills. In 2009, AWGPC established the ASPEC (ASEAN Patent Examination Cooperation), building on the principle of mutual recognition. The objectives of the ASPEC programme are to reduce the work and speed up the turnaround time, as well as to increase the efficiency of search and examination. This is to be achieved by reducing the big challenge of different languages used in the region, a fact that represents a serious bottleneck in the harmonisation of the IP systems in ASEAN.

Through the ASPEC process, patent examination in one country is based on a patent application that has been done in another, reducing the time and effort involved, and creating an easier route to understanding the IP in question. For example, a patent examiner in one country is agreed to look at another application, and if in another may build his/her examination on the documents already produced for the initial application from another jurisdiction. In effect, this is a work and information sharing process, done by moving the work that has already been done, reducing the time and effort involved, and thereby simplifying the process of examination.

This ASPEC process also has its limitations. They are linked to the sometimes weak capacities in the national IP offices, as well as to a lack of overall trust in these capacities and competences. ASEPC is a kind of replacement for a harmonised system, offering simplified procedures: examination reports from one country can be used in another jurisdiction. In practice, it is not so easy, as the level of trust accorded to the IP offices is very different. This is also to the advantage of countries with an existing strong examination system, such as that in Singapore. In this sense, the ASPEC process reinforces examination offices as Singapore’s regional hub. While Cambodia fast-tracks its patent applications and requests for search reports from Singapore, a patent application from Myanmar will not be fast-tracked according to ASPEC rules in Indonesia, as there is a lack of trust. A possible concern with the process related to the ASPEC protocol is that there are different procedures for examination in different areas, as well as government changes or lack of stability. This is also linked to different laws in other areas, such as different laws on drugs.

A major challenge in the region’s patent systems is the sometimes slow filing and granting process for this type of application: it can take up to 12 years to obtain a patent in Thailand. In Singapore, it may take 2-4 years. ASPEC can help in speeding up the granting process. In fact, other countries in Southeast Asia can rely on Singapore’s well-trained examiners to some extent. However, this is the exception. In most of the other countries, the examiners are few, poorly trained, and not well paid. This is the case e.g. in Indonesia, where 82 registered, poorly equipped examiners are in charge of the entire patent application portfolio. Hence, Singapore’s position is reinforced, as inventors and applicants in other countries have more trust in its legal basis, as well as its competence and capacity.

The next ASEAN IPR Action Plan for 2016-2020, launched in 2016, provides further guidance and support for the work ahead within the context of the AEC. It will build on the previous plan, with a continued ASPEC focus, priority on examination guidelines, and accession to international treaties and protocols. The next plan, however, focuses more explicitly on capacity building, and the need to strengthen the administrative support for the work ahead within the context of the AEC.

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(ASEAN IPR Action Plan 2011-2015, p. 5)
Table 6 shows data on the average time expected to register a patent in the respective countries. They are the estimates given by the IP offices. According to Bernard and Wedel (ibid.), only Indonesia and Malaysia did actual calculations on the time operations, whereas the others did estimates. However, the results are different from what could be expected from the above figures. For example, Thailand does not take longer than the others, and Indonesia takes longer than most, despite an acceptable examiner/applications ratio. This points to additional challenges in many of the IP offices, such as the real qualifications, administrative support, and technological systems. For example, the Philippines IPO has been digitising data, and there is now an online database. But only 50-60% of patents have now been uploaded in the data base, and granting patents is slow, with much backlog, which is partly due to the shortage of skilled patent examiners. With the recent increase in patenting from local inventors, which is expected to continue, it is likely that most of the IP offices will remain under pressure, despite concerted efforts to boost their capability and capacity. A key issue is that patent applications in countries such as Thailand and Indonesia need to be translated into the local language. The quality of these translations is often low, leading to a transfer from the patent examiners back to the law firm from where it was filed, and this process may take several rounds of language checks and translations. In Thailand, there is also no obligation in the legal system to publish the applications after a given time, and sometimes, clients even tell the examiners to publish as late as possible to enable them to remain invisible and “below the radar”. In this case, the novelty aspect of the application only counts when it has been published, while in Vietnam, the novelty aspect counts as soon as the patent is filed.

The situation is slightly different in the case of trade marks, where there is even greater diversity in the ratio between applications and examiners than is the case for patents. Thailand and Malaysia are under the most pressure, with 57,000 and 26,000 trademark applications per examiner in 2010, whereas Vietnam has only 500 trademark applications per examiner. Indonesia, with the highest volume of almost 48,000 applications, is reasonably staffed with some 7-800 applications per examiner. Such numbers suggest, of course, a great deal of inefficiency in the volume, often reflecting the foreign companies’ perceived need to protect their trademarks in given countries.

The time to register patents (and trademarks) differs greatly between the ASEAN countries (table 7). This has to do with a variety of factors ranging from the number of trademark applications to the number of IP offices to the degrees of digitalisation, as well as the translation requirements (delaying the process because the documents move back and forth between the IP office, attorneys, and applicants). Thomson innovation is also the expected time of 5 years in China. Further, it should be noted that the major volume of infringements lies with trade marks, with a great deal of petty infringements through counterfeiting, counterfeit goods, etc. These are difficult to tackle due to the shortage of capacity, and among other things, a more complex ecosystem, including customs issues. This is also the reason why many ASEAN countries opt for signing the Madrid Protocol on trademark cooperation: Global treaties are often easier than the still immature ASEAN system.

The IP policy development in ASEAN is taking place in the context of a number of international initiatives and agreements, of which the TRIPS agreements have been discussed above. As argued above, the international systems are especially important for Southeast Asia and ASEAN, as the diversity in language, culture, legal systems, and economic development hinder harmonisation and make the IP management for inventors and investors complex.

While the TRIPS agreement serves as a minimum common denominator, and hence, as a platform for joint minimum standards for national IP systems, sever al other agreements and institutions come into play, offering valuable opportunities for IP holders. All ASEAN member states are PCT members except Cambodia and Myanmar. While the filing of e.g. a patent takes place in the national patent office in question, at the regional offices (like the EPO) or at the WIPO directly, the application covers all of the selected PCT member states and uses one language (English), and there is only one set of fees to be paid. PCT patents are more expensive than national patents, but the flexibility in choosing coverage has advantages, particularly for inventors that applicants aim to exploit on a global market. Hence, the general trend is for inventors and innovators in the region to use this process, with the included services (international search, examination, publication, etc.). The PCT process has helped spur IP applications in many Southeast Asian countries. For example, when Malaysia joined the PCT in 2006, 98% of the patents were foreign. This has changed. Not least through active government policy to stimulate universities to take an active stance on IP, a large increase in domestic patents of up to around 80% can be observed. However, this picture is not clean, as according to the Vietnamese IP office, foreign inventors use PCT more than domestic ones.

The same pattern is taking place for trademarks, and the Madrid Protocol offers similar possibilities for simplified filing and protection. Currently, 95 countries worldwide have signed the Protocol, but only three of them are ASEAN members; however, it is expected that by the end of 2015, seven ASEAN countries will have signed. The Hague Agreement for industrial designs is also available and provides a correspondingly simplified procedure, but it has only one signatory from ASEAN (Brunei).

There is growing awareness of IP in the ASEAN region. This is evident from the governmental awareness of the issue as a part of the broader focus on innovation as a means of promoting greater growth and welfare. This is also reflected, as described above, by the engagement of the national IP offices and the AWGIPC. But what is the situation in the ASEAN member states? What is the patenting pattern of inventors and companies? Table 8 gives a snap shot overview with figures from 2013. The table, derived from statistics elaborated from the national IP offices and the ASEAN secretariat, is divided between the three categories of patenting: invention, utility (incremental improvements in existing technologies), and industrial designs. The table gives a telling illustration of the patenting activity, with some broader indications. First of all, Singapore is the country that stands out. The high level of patenting activity is, in large part, due to non-resident invention patents. This implies that foreign companies take advantage of the status of Singapore as a hub having a legal system and enforcement conditions in place that are on level with Western countries (the role of Singapore is also elaborated in section 5.2.4 on protecting IP in ASEAN). However, several countries enjoy a high level of foreign patenting as well, such as Indonesia, Malaysia, and Thailand. Although increasing, residential invention patenting is still relatively low. The situation is the opposite with utility patents, with numbers that are also much smaller. Utility patenting is done by residential SMEs, mostly, to improve their products or processes, and it is part of their incremental innovation behaviour. The non-residential activity is very low. Thailand and the Philippines are the most active in this regard. IP protection in the form of industrial designs shows a more balanced pattern, with non-residential activities almost double those of residential. In this category, Indonesia and Thailand score high.

5.2.3 Intellectual property in ASEAN: Key statistics

Table 9: Patenting activity in ASEAN 2015 (applicants from ASEAN residents and non-residents at ASEAN IP offices). Source: Calculated from ASEAN IP portal

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<th>Country</th>
<th>Resident</th>
<th>Non-resident</th>
<th>Total</th>
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<tr>
<td>Brunei</td>
<td>20</td>
<td>15</td>
<td>35</td>
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<tr>
<td>Cambodia</td>
<td>1</td>
<td>74</td>
<td>75</td>
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<tr>
<td>Indonesia</td>
<td>663</td>
<td>7,697</td>
<td>7,760</td>
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<td>Malaysia</td>
<td>1,249</td>
<td>6,081</td>
<td>7,329</td>
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<tr>
<td>Philippines</td>
<td>220</td>
<td>3,065</td>
<td>3,285</td>
</tr>
<tr>
<td>Singapore</td>
<td>1,703</td>
<td>5,975</td>
<td>7,678</td>
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<td>Thailand</td>
<td>3,827</td>
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<td>Vietnam</td>
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<td>220</td>
<td>3,065</td>
<td>3,285</td>
</tr>
<tr>
<td>Singapore</td>
<td>1,703</td>
<td>5,975</td>
<td>7,678</td>
</tr>
<tr>
<td>Thailand</td>
<td>3,827</td>
<td>5,772</td>
<td>9,599</td>
</tr>
<tr>
<td>Vietnam</td>
<td>3,841</td>
<td>5,672</td>
<td>9,513</td>
</tr>
</tbody>
</table>
In sum, Singapore enjoys a special status, and the figures confirm its role as a hub for the region as a whole. But the overall pattern also illustrates that Malaysia, Indonesia, and Thailand have high levels of activity, also illustrating the high involvement of foreign companies in those countries.

Even though the residential activity is still low, it is growing. Figure 14 illustrates steady growth, albeit from a low level in many cases. The figure confirms the ordinary status of Singapore for residential patenting, but also shows significant increases for Malaysia and Thailand over the period.

Summing up, the patenting activity in the ASEAN region is dominated by foreigners seeking protection for previously developed technology. This brings Singapore to its role as a hub and entry point, due to its well-developed legal and eco-system for IP. The residential activity is still low, but growing, except for utility patents, for which the residential activity is comparatively high.

Residential activity in ASEAN is not only growing regarding the applicants, i.e. the owners of the IP. There is also an increase in patent applications by inventors from ASEAN countries, indicating increased inventive activity in the region. Table 9 is extracted from a SEA-EU-NET analysis of ASEAN patent application output.44 It shows the developments of PCT patent applications with at least one inventor based in an ASEAN country 2003-2013. The data for the last two years are incomplete (it takes 2-3 years for PATSTAT data to be completely registered in the database).

While we see a continuously low PCT patent application output for some ASEAN countries, others have shown a steady increase over the past decade. As in the case of the European countries (see above), a significant share of the patent applications with inventors based in ASEAN countries are produced in a cooperative fashion, i.e. they involve inventors from other countries. Among the countries with the highest output in the region, the share of international co-inventions is the highest in Thailand, Indonesia, and Vietnam. It is lower in the countries with the highest output, i.e. Singapore and Malaysia.

By far, the highest share of these international co-inventions of ASEAN countries (in PCT patent applications) is developed with either US or Europe-based co-inventors.

Data from our studies show that the shares of international co-inventions are even higher when it comes to nationally filed patent applications (filed in ASEAN countries). In these nationally filed patents, US co-inventors are by far, the most important partners of ASEAN inventors, followed by European co-inventors.

We have discussed residential patenting activity in ASEAN, both regarding ASEAN-based inventors and applicants (i.e. IP owners). With regard to applications at ASEAN offices, additional important data are the shares and patterns of foreign ownership, i.e. of foreign applicants filing patent applications with one or more ASEAN-based inventors – not only in ASEAN offices (see the discussion on residential patenting above regarding this), but in general.

In the literature, foreign ownership of patents is seen as an indicator of knowledge flows (cf. GuElEc, van Pottelsberge de la Potterie 2001). If foreign applicants acquire IP invented locally e.g. in ASEAN, this indicates a knowledge flow out of the region. High foreign ownership of a country’s or region’s invented IP can be interpreted as a lack of innovation activity (with too few ASEAN inventors acquiring IP). However, it also indicates that a region is attractive as a knowledge production hub.

Although it does not go into much detail45, PCT patent application data shows the relevance of both Europe and the US as foreign owners of ASEAN-invented patent applications. While the share of exclusively for-eign-owned ASEAN-invented PCT patent applications in low (below 5 %), the shares are much higher (partly above 50 %) for nationally filed patents. For instance, in around 50 % of nationally filed patent applications with Malaysian inventors, there is no Malaysian applicant involved. In Singapore, this is the case for 50 % of the applications. Among those nationally filed applications, the USPTO, as a filing authority, and US applicants play a dominant role. Taiwan and China also are featured prominently. For China, however, it is only the patent office that is of importance as a receiving office for ASEAN-invented patent applications. This indicates that China is predominantly considered important as a market and is not yet established as a knowledge acquiring player in ASEAN. Within the ASEAN region, Singapore is an important foreign owner of patent applications involving ASEAN inventors, especially from Malaysia, the Philippines, and Thailand.

44 It should be noted that the comparison of nationally filed patent applications is problematic. The different national systems can differ substantially in their understanding of patents and related procedures. However, for the present study, we work under the hypothesis that the national patent regimes in ASEAN countries do not diverge so vastly as, for instance, the Japanese and the European or US system. Most ASEAN countries have a patent system that is inspired in either the UK or the US system. They should thus be comparable to each other and to the situation in European countries.

45 See our SEA-EU-NET patent analysis.
The overall situation in ASEAN is one of great diversity, with partly underdeveloped and immature systems for IP generation. While the individual offices for IP in each country play a key role, and in several cases, arrange training and capacity building, along with the support and help of the WIPO, the situation is complex and challenging. Some issues emerge as critical in this assessment:

- The overall eco-system for commercialisation; science-in-country cooperation;
- Funding of R&D in universities and research institutes;
- The institutional set-up and coordination; Training and human capital.

The eco-system for commercialisation and technology transfer is, in many cases, characterised by a low inclination among university staff to further improve the situation and to generate higher returns to universities as a result of academic entrepreneurship. As such, this problem is not specific to universities in Southeast Asia, but it represents an Achilles heel when seen in connection with other challenges. One typical problem in the eco-system is the lack of trained personnel in universities to support the process, such as in their technology transfer offices (TTOs), in particular, in patent examination and evaluation. Most of the ASEAN countries, the structure itself has emerged, often on the basis of a sound policy framework, but with weak implementation and many challenges related to the enforcement of the legal rules. Hence, there are still too few disclosures, leading to a problem of weak patenting because of the perceived deficiencies in the IP system in general (processes are long, public debate is scarce, and enforcement of the legal rules is a significant lack of coordination and implementation capacity). Further, Malaysia has developed three inter-connected platforms to spur commercialisation and innovation:

- The Public Private Research Network for connecting universities with industrial entities through a bidding system for problem solving;
- A Malaysian Steinbeis-system for improved science-industry relations, based on the German model;
- And most importantly in this context, the PlaTCOM Ventures, the national IP facilitation platform for translation, who make the most out of their innovation by being the first to the market. From the perspective of a developing economy, a weak IP system can be an advantage (allowing informal channels for technological catch up).

In many countries, governments have initiated policies to stimulate the commercialisation of R&D from universities and public research institutions. For example, as is the case in Vietnam, scientists at universities often are not aware of the available support and funding for the commercialisation of research. In Malaysia, the Higher Education Act (HEA) and the PlaTCOM system (the national IP facilitation platform for translation, who make the most out of their innovation by being the first to the market) have been reformed to put much more weight on disclosures and filings of IP. This has also led to a boost in disclosures, but so far, the typical result has been that most of the disclosure of patent applications is large (and expensive) patent portfolios, which are difficult to manage and often insufficiently utilised. Discussions are in progress about how to mitigate this situation.

Malaysia provides a useful illustration, as the country that is developing several policies to stimulate the commercialisation of R&D from universities and public research institutions. For example, as is the case in Vietnam, scientists at universities often are not aware of the available support and funding for the commercialisation of research. In Malaysia, the Higher Education Act (HEA) and the PlaTCOM system (the national IP facilitation platform for translation, who make the most out of their innovation by being the first to the market) have been reformed to put much more weight on disclosures and filings of IP. This has also led to a boost in disclosures, but so far, the typical result has been that most of the disclosure of patent applications is large (and expensive) patent portfolios, which are difficult to manage and often insufficiently utilised. Discussions are in progress about how to mitigate this situation.
they receive 5 points for filing a petty patent. The risk is great that low quality patenting is being promoted as an adaptive behaviour.

As mentioned, the ecosystem for commercialisation is often offshored to Singapore. But the main challenge is the lack of trained expertise. Ideally, patent examiners should have a technical background. This is a problem throughout most of the countries in Southeast Asia. However, training programmes have been initiated, in many cases, by their national IP offices. Further, the WIPO helps to train university staff, as well as final year graduate students in some cases. The WIPO also provides technical assistance, such as documents and manuals. In Vietnam, a distance learning programme by the WIPO was translated into Vietnamese.

As IP policies are being strengthened in many countries, the main universitites are often being advanced to serve as hubs or specific resource centres for academic inventors. Malaysia has already been mentioned. An interesting additional case is the Innovation and Technology Support Office at the University of Santo Tomas in the Philippines. Box 3 highlights the elements of this effort.

Background and History

The concept of Intellectual Property (IP) has already reached the consciousness of the University of Santo Tomas, the University promulgated its IP Policy and established an IP Unit under the Office of the Vice-Rector for Academic Affairs & Research (OVRAA). The task of the unit is to (1) assist faculty members and students in registering any IP that they have developed through the course of their employment or study; (2) inform faculty members, support staff, and students about the IP and training programmes; and (3) be the forerunner in identifying IP for possible commercialisation and exploitation. With the numerous research studies produced by both faculty and students, there is a wealth of technology waiting to be registered and used for public consumption. IP ensures that, as the technologies are being used, the inventors and owners of it are given due recognition by the law.

On 25 November 2010, the University signed a Memorandum of Agreement (MOA) with IP-OPhil to host a patent library called the Innovation and Technology Support Office (ITSO). The ITSO units also function as the ITSO. In 2012, the World Intellectual Property Organization (WIPO), headed by Director General Dr. Francis Gurry, and the Intellectual Property Office of the Philippines (IP-OPhil), headed by Director General Atty. Ricardo Blancador, awarded the University the Official ITSO Glass Emblem, which signifies that the University is now an ITSO. As an ITSO, the University will perform the following:

**IP creation by facilitating access to global science & technology information**
- Serve as a patent search facility and library for patent information
- Provide skills training in patent searching
- Render patent search services
- Organise a community of patent information users

**IP protection by promoting domestic and globally competitive innovations by providing general information on patents and patenting**
- Render IP audit and evaluation services
- Provide licensing support to University Research
- Provide advice on IP management and commercialisation strategies
- Be a depository of patent-related documents, papers, and statistics

Our data and interviews suggest taking a separate look at the case of Singapore with respect to the generation of intellectual property in the ASEAN context. While the diversity among the other countries is also considerable, the Singaporean case is peculiar because of the setup of the country’s innovation system and its position in global knowledge production and value chains.

5.2.5 The special case of Singapore

We have seen above that Singapore is the region’s most active country in terms of patenting activity and in IP generation in general. This has to do with its high and sustained public and private investments in R&D since the 1990s, its role as a traditional foreign direct investment recipient, as well as its financial and legal infrastructure. Inward patenting (foreign patent filings patenting at the Singapore office) of foreign applicants is still the most frequent case for patent applications filed in Singapore.

Beyond the inward patenting of foreign affiliates, throughout the last decades, Singapore’s universities and public research organisations (mostly A*Star) have also had a focus on securing IP protection for knowledge produced in Singapore. This is visible in the high patent application output, combined with the relevance of the university and government research sector in producing this output (see the WIPO data presented above). The almost 50% share of universities and government research in the patenting application output (of Singapore-based applicants) is unique, and in an ASEAN-EU context, it is only comparable with Malaysia. Singapore’s main research universities (particularly NUS and NTU), as well as its large public research organisation (A*Star), have consistently produced considerable patent application output. At the same time, the high relevance of the public sector in domestically owned patent applications at the TTO shows that Singapore-based companies might not be as active in securing and commercialising IP as the Singaporean government would like it to be.

The numbers regarding the shares of publicly-owned patents which are actually commercially used (through licensing, spin-off creation, etc.) have not been disclosed in any case. In any case, there is much debate on the success, prospects, and best ways to commercialise the Singapore-generated IP. As is the case elsewhere, there are challenges within the universities and public research organisations. There is a potential disconnect between the TTO staff and the researchers, and different models are being explored to minimise it. For research emerging from Singapore’s public research sector, the system in place, in which the institutions own (and applying for) the IP, Different rules are in place to compensate researchers/inventors. With respect to licensing or selling patents resulting from public research, various measures are taken depending on the private involvement of firms in the licensing process.

Once the university or PRO internal challenges, as well as institutional set up, are resolved, new public private partnerships (PPP)—public private co-investment equity co-investment schemes; incubator and start-up funding for public research results on their way to the market, and support for the internationalisation of Singaporean research is found.

An agreement has been found with three banks which now accept granted patents as collateral, i.e. as security for publicly backed loans.

Beyond the public research landscape, Singapore’s recent investments in upgrading its IP Office (IPOS) have affected the government’s focus on promoting an IP culture in the public, but also particularly in the private sector. Purely private R&D investments have also increased considerably. In each of the past years, Singapore has attracted approximately half of the entire region’s foreign direct investment inflows, particularly those in the high technology sectors. It is the hub of the region’s young, but also increasingly global, start-ups and venture capital investors. In addition, Singapore is the region’s major financial hub and features a strong financial services sector and a flourishing legal industry.

Singaporean innovation policy makers are aware of the unique combination of being a knowledge producer and long-time recipient of foreign direct investment recipient, and an entry point to the regional market, as well as a market with a mature financial and legal infrastructure. The Ministry of Law set up a national IP Steering Committee in 2012, which produced an IP Hub Master Plan for Singapore. It formulates the vision of establishing Singapore as a global IP hub in Asia, particularly for IP transactions and management (where the financial sector plays an important role), for quality IP filings (through an effective intellectual property office), and IP dispute resolution (building on Singapore’s court and legal infrastructure). Our evidence suggests that Singapore already successfully occupies this hub function.

Southeast Asia’s nascent business angels and venture capital landscape are centred in Singapore, with IP portfolio investors being a potential future player in the ecosystem. Southeast Asia investors from the Philippines, for instance, use Singapore as a location for their investments, mergers and acquisitions, and more broadly, as a safe haven for expanding their business activities in the region. Singapore is the financial hub for the region. R&D intensive companies (e.g. in the life science or consumer goods sectors) entering the region often start with a presence in Singapore, which then typically transfers the SouthEast Asia’s potential future expansions. Foreign IP owners consider Singapore to be a safe haven for their IP assets, thus, they file for protection there and rely on its judiciary for dispute settlement. Foreign companies, such as the life sciences and pharmaceutical sector, the automotive sector, petrochemicals, and electronics, foreign companies have a long history of using Singapore as a production base and public IP hub. In the IP landscape are centred in Singapore, with IP services the Southeast Asian market and potential innovation: For instance, Singapore’s IP office explicitly considers the second medical use of drugs as patentable. This makes it more interesting for pharma companies who file for protection in Singapore. Protection is secured, while negotiation is required in countries such as Thailand and the Philippines, which are concerned about big pharma companies benefiting from the second use as a loophole to maintain high prices for drugs (whose protection, in principle, have expired). Beyond these traditional patterns and concerns, an increasing number of international companies are

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54 See Delishchieso et al.  (2014).
55 The data are a part of the “Survey of Patents and Inventors” in the UNCTAD World Investment Report 2015, http://unctad.org/en
57 Often called patent trolls for their use of IP as a means to hinder competitors
58 Depending on the sector, Thailand and Malaysia are other important entry points
59 In terms of software patents, the situation is still unclear in the entire region. While Singapore builds on a US system, which has removed barrier for software patents, so far, a technical aspect is required when filing in Singapore.
looking for ways to open up innovation processes, benefitting not only from Southeast Asian markets and manufacturing labour forces, but also from the expertise and R&D facilities in the region. Multinationals are increasingly looking at the outflows for technologies from outside sources around the world and in Southeast Asia, in particular. The question for them is how to design models of open innovation without losing the IP that they consider a prime asset. One method used by these companies is to simply file their patents in Singapore and then license to partners, subsidiaries, or suppliers in other ASEAN countries. By this means, they can combine regional market access and location advantages, while keeping the risk of losing intellectual property at bay.54 This model is insufficient, however, if actual R&D activities are set up in Southeast Asia and incorporated in the multinationals’ value chains.55

Be aware of the need for the new models of innovation, as well as the need to grow its own start-ups and companies. Singapore has already invested significantly in the implementation of the IP hub vision. Public intermediarv organisations such as IPI work to connect market demand with IP in Singapore and elsewhere. Singapore’s Intellectual Property Office (IPOS) has been upgraded in this field. Legal procedures have been adjusted to international standards (e.g., that only inventions meeting novelty and non-obviousness criteria can be granted). IPOS works to make the processes as efficient and accessible as possible, partly by offering advisory services that are typically performed by patent attorneys. For a couple of years, IPOS has trained and employed its own patent examiners. It has increased its staff numbers (and relatedly, its processing rate), offers orientation and training for potential applicants in the public and private worlds, and has installed an IP valuation lab. Looking beyond Singapore, Singapore has invested into international networks (e.g., by joining the Singapore IP Week and being active in the ASEAN Working Group on IP Cooperation (AWGPC)).

The specific arrangements and related corporate motivations remain to be further investigated, e.g., whether companies file for IP in Singapore to protect their IP as quickly as possible and file later in other ASIAn countries. Further studies are required to clarify whether such arrangements are still in place elsewhere in Southeast Asia and in other regional innovation systems (e.g. China).55

The discussion regarding whether or not, how and why multinationals and national firms have been engaging with the ASEAN market for many years (cf. Fets, Tesu 1999, Zieperts, Gawasen 2009, Lee, Sivath 2003; Cheong, 2005; Cheong 2009, Zieperts, Lumnas 2009 on the role of non-traditional host countries). The traditional model of multinationals is to invest R&D activities at the headquarters. Our evidence suggests that in Singapore, however, some of the large multinationals are currently reconsidering this model.

With such diverse systems and for companies with significant R&D presence, some companies may need to adjust to AEC membership. The more immediate problems relate to trademarks. The problem of counterfeiting goods is huge in the region, and action by governments is often minimal. This is due to the lack of a comprehensive trademark protection in perspective: Non-tariff barriers will reinforce the problems that are already at hand concerning the low protection of trademarks by undermining the competition rules that are so important for an integrated marketplace to be functional and efficient.

**Transfer pricing: An emerging issue**

The traditional way to look at IP management and the protection of IP has been to see multinationals companies (MNCs), normally with a base in the West, as the owners of IP and as transferring IP to subsidiaries in countries where the production or marketing functions are conducted. This view corresponds with the pattern of MNCs retaining the bulk of their R&D-activities in their home countries for the easier protection of know-how and technology. When deploying IP that has been developed at home or in the West e.g. Southeast Asian countries, the subsidiaries using the IP could be charged with a cost contribution or otherwise contribute financial benefits to the company. This has derived benefits from the use of the IP.

There are several dimensions to this: First, there is the interest of the MNC in ensuring that costly development of IP will be rewarded. Intellectual property rights are attributed to the entity that developed the IP. Second, the MNC has an interest in reducing its overall tax bill, so there will be an element of tax planning in seeking to channel the transfer payments so that they are not recorded with the trade mark office until the registration has been completed.

**Managing IP in ASEAN:**

**Key issues and challenges**

**The importance of trademarks**

Much attention in innovation policy has been given to trademarks. However, with respect of IP system in the ASEAN region, the more immediate problems relate to trademarks. The problem of counterfeiting goods is huge in the region, and action by governments is often minimal. This is due to the lack of a comprehensive trademark protection in perspective: Non-tariff barriers will reinforce the problems that are already at hand concerning the low protection of trademarks by undermining the competition rules that are so important for a future marketplace to be functional and efficient.

Some key issues to consider in the current situation in the region:

- It’s important to understand that trademarks (e.g. joint labs) or support for international start-ups, this can lead to misunderstandings by the non-ASEAN, or more generally, foreign parties.
- With an increasingly open and internationally collaborative production of knowledge, the best way to commercially exploit knowledge is to jointly produced in ASEAN, in general, in light of the changing framework conditions and ASEAN-EU cooperation patterns.

5.2.6 Managing IP in ASEAN:

**Box 4: Protecting trademarks**

With increasing globalisation and increasing activities of R&D and innovation in developing and emerging economies, the traditional picture is gradually changing. The world-wide changes in the organisation of production and R&D have led to greater participation from developing and emerging economies. The story about China is, amongst other things, a story of the increasing deployment of R&D centres and greater innovation capacities. As Asia is becoming more integrated in the global value chains and innovation networks, the impacts of IP management on international trade and investment are likely to continue to be crucial. The DECI framework conditions for innovation: the case of intellectual property
in Southeast Asia. This again changes the traditional pattern of the transfer pricing of intangibles: Up to the present, the headquarters of MNCs have charged premiums on their subsidiaries. The regional tax offices have tended to reject such charges to retain the taxable profits in their jurisdictions. MNC subsidiaries may then charge the headquarters for the premium. This development will create new challenges for both the tax offices and the MNCs with deployed IP, as well as IP developed in the region.

In this context, the question circulates around who is entitled to the returns attributable to an intangible such as a patent. The OECD states four criteria for the legal owner to be entitled to all returns:

- It performs and controls all of the important functions related to the development, enhancement, maintenance, and protection of the intangibles;
- It controls other functions outsourced to independent enterprises as associated enterprises and compensates those functions on an arm’s length basis;
- It provides all of the assets necessary to the development, enhancement, maintenance, and protection of the intangibles; and
- It bears and controls all of the risks and costs related to the development, enhancement, maintenance, and protection of the intangibles (OECD 2013b).

Hence, transfer pricing is a complex area, and it raises difficult questions regarding e.g. who owns the IP, who performs which functions relative to the profit-generation capacity of the IP (such as funding, risk-taking, R&D), which methods of valuation of the IP are appropriate (such as cost-based methods, market-based methods, and income-based methods), and whether there are skills and competences available in the tax offices, IP offices, companies, and R&D centres to ensure a legitimate and sound valuation.

We cannot assess the functionality and effectiveness of this initiative. But it addresses a key gap in the innovation system and illustrates the importance of commercialisation, technology transfer, and IP in the Malaysian innovation policy. However, with the greater importance of innovation and IP in the region, Southeast Asian countries will need to pay close attention to how they can support and develop capacity in the valuation of IP. With the typical lack of venture or risk capital in most of these countries, the effective valuation of IP has also been addressed in connection with borrowing banks. Banks are typically risk adverse and demand collateral for lending. A key issue that is still emerging is the extent to which IP, properly and transparently valued, can be used by start-ups as collateral for borrowing from banks. In Singapore and Malaysia, the two countries that are more advanced in this area, the banks normally assume only 10–20% of the risk, and the rest is covered by the government.

We have observed a particular means of protection: As mentioned above, in this report, a critical area of the IP landscape in Southeast Asia is exactly the diversity and the frequent lack of competent personnel and agreed procedures for examination, valuation, and assessment. Therefore, in line with the other findings in this report, the framework conditions related to IP management are still challenging and put great demands on the IP and tax authorities in the countries in the region.

Valuation of IP

There is, as mentioned, a general lack of trained human capital in the national systems for developing and evaluating IP. This is not least the case for evaluating and assessing the economic value of an IP, e.g. a patent. This is important for several reasons, as IP may serve as collateral for borrowing for start-ups, as well as being a necessity for transacting IP and as a basis for transfer pricing and taxation.

Malaysia has attempted to close this gap in setting up PlaTCOM Ventures, a national technology commercialisation platform. It is wholly owned by the Malaysian Innovation Agency (AIM):

Rather than following traditional technology transfer models, PlaTCOM Ventures has designed a model that facilitates any segment of the entire commercialisation process (end-to-end facil- itation) from idea to products and services. The whole approach will be market driven in support- ing industrial innovation and competitiveness. The model is more suited to the innovation envi- ronment in the South East Asia region in provid- ing commercialisation support for the fledgling businesses, innovators and entrepreneurs includ- ing those from academia and public research institutes.58

Patenting activity is often related to the innovation process in global value chains, as well as with the associated global innovation networks. These are diffuse across sectors. A specific challenge relates to the pharmaceutical sector, where many Southeast Asian countries have seen a growing role in clinical trials, as they are very expensive in Western countries. Hence, Western firms are increasingly relying on conducting clinical trials in this region. Due to the very cost factor of such trials, patent protection has become vital, but as the time consumed for a grant patent is often lengthy, even if the patent is valid for up to 20 years, some companies have even risked launching their products without patent protection. This also concerns the development of new medicine more broadly. Regulation of the IP? As noted elsewhere in this report, a critical area of the IP landscape in Southeast Asia is exactly the diversity and the frequent lack of competent personnel and agreed procedures for examination, valuation, and assessment. Therefore, in line with the other findings in this report, the framework conditions related to IP management are still challenging and put great demands on the IP and tax authorities in the countries in the region.

Defensive filing and protection of patents

From the IP statistics above, there is a clear pattern that foreign companies make up the bulk of the patent grants. This is especially so in Singapore, where foreign companies are active in filing for patents, seeing Singapore as the main hub and technological centre in the region.

The patenting pattern signals these companies’ need for protection of their know-how and technology when entering the region. As such, this is the normal picture in a region where the domestic inclination is low, albeit growing. However, there is another angle to this: When foreign firms, like EU and US companies, are patenting

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58 See: http://platcomventures.com/What_is_Platcom_Ventures-Who_We_Are.aspx
These are key concerns in both regions’ innovation processes, due to the intergovernmental approach, is consistent in approaching innovation performance is playing out differently. The analysis casts light on very diverse knowledge markets. We argue that the capacity to develop cooperative institutions and programs across borders is crucial for boosting knowledge-based economic growth in the region. In this regard, ASEAN and the EU are very distinct, a point which reflects the difference in the politically chosen integration models. This difference is noticeable throughout economic integration and innovation dynamics. The EU has developed into a political union with the corresponding supranational governance structures. ASEAN is clearly inter-governmental, with a cooperative institutional base that is relatively weak. The European Union Single Market is unique in its consistent approach towards integrating the economies through supranational decisions and directives, creating, over time, a more unified competitive area in Europe. While there are still issues to be dealt with, this integration programme has been one of the notable successes of the European project. The ASEAN process, due to the intergovernmental approach, is slower and not as comprehensive. In fact, one does ASEAN’s main objective concerning patent ownership (institutions rather than by individual professors or funding agencies), in general, there seems to be a mismatch between the typically low input to the process in terms of R&D funding and the expectations on the output side in terms of valuable patents. This is particularly the case for expectations of the valorisation of public sector research. There is no region-wide cooperative trend between university and PRO-based innovation, leaving unfulfilled potential for institutional cooperation and integration, including the mobility of human resources.

Much attention is often paid to the patent generation process in universities and to the innovation ecosystem that is supposed to bring patent applications to commercial results. With respect to Europe’s cooperative activities in Southeast Asian research, there have been some challenges in finding suitable models for innovation-oriented international cooperation. Transparency and experience will help in resolving the issues related to different expectations and levels of trust. The greatest concern related to bi-regional ASEAN-EU cooperation come from the private sector. European and other foreign companies, on the one hand, see the region’s potential not only as a market, but as a knowledge production site relevant in more open innovation chains. At the same time, they worry about the protection of their trademarks and non-tariff barriers, in addition to the low protection of IP in general. This is among the factors that have contributed to the development of Singapore’s key role in the region, a role as a hub, which is exemplified by its dominant position in hosting (and litigating) foreign IP, especially regarding patents. Singapore may be the entry point for many foreign companies, but the market is elsewhere, leading to licensing practices and other IP management approaches intended to avoid applying for patents in the countries beyond Singapore.

In sum, while the AEC has generated steam and has made significant improvements in trade and integration, and this is likely to continue, ASEAN and the EU could work together to do justice to the importance of institutional and programmatic arrangements that further integrate the Southeast Asian region into a more effective knowledge market for research and innovation. Stronger intra-regional cooperation can help to reap regional benefits from the gradual inclusion of Southeast Asian countries, and this improvement in the patent landscape in ASEAN adds to the value of the region for knowledge producing entities in global innovation networks.
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**Indonesia**
Embassy of the Kingdom of the Netherlands
Embassy of France
Embassy of Italy
Indonesian Institute of Sciences LIPI
Law Office ICN & Associates
SKC Law, Advocates and IP Consultants
Synergyurtco & Co.
University of Indonesia

**Malaysia**
Academy of Sciences Malaysia
EU Delegation Malaysia
EU-Malaysia Chamber of Commerce and Industry
Malaysian Technology Development Cooperation
MIMOS Berhad
Ministry of Science, Technology and Innovation (MOSTI)
MyIPCO
NanoMalaysia
SIRIM Berhad
Stenbras Malaysia Foundation
Universiti Putra Malaysia
University of Malaya

**Philippines**
AMECOS Intellectual Properties Inc.
APEC Engineer Register, National Monitoring Committee
APEX Mining Co., Inc., EVP for Operations, Geology and Exploration
Baranda and Associates
DAP Development Academy of the Philippines
De La Salle University
Dept. of S&T, Calabarzon Region
Dept. of S&T, National Research Council of the Philippines
Dept. of S&T, Technology Application and Promotion Institute
Design Center of the Philippines
Intellectual Property Office of the Philippines
Philippine Technological Council
Trident Electronics Corporation
Universidad ng Pilipinas

**Singapore**
British High Commission Singapore
EU Delegation Singapore and EU Member State S&T Counsellors
EU-ASEAN Business Council
Gateway Law Corporation
IP Intermediary (IPI)
Marks & Clerk
National Research Foundation
National University of Singapore
Singapore Management University
SPRING Singapore
WIPO Singapore office

**Thailand**
EU Delegation Thailand
GSK
National Science and Technology Development Agency
Ruse
Science, Technology and Innovation Policy Office

**Vietnam**
European Chamber of Commerce in Vietnam
Hanoi University of Science and Technology
Hogan Lovells, Hanoi office
Ministry of Science & Technology
UniCredit
Vietnamese-German University
In this **SEA-EU-NET** study, we analyse the interplay of ASEAN’s economic integration project and its innovation policies and framework conditions. In doing so, we also present European approaches and experiences that can be of value.

Concretely, we first explore the ASEAN Economic Community (AEC) and its potential impact on framework conditions for innovation in ASEAN. We contrast this with related developments of economic integration in the EU. We then concentrate on the current environment for generating policies, systems and practices for the protection of intellectual property rights (IPR) as a specific set of dedicated framework condition. Finally, we compare the developments in framework conditions in ASEAN in areas related to IPR to the situation in the European Single Market.

By addressing these questions, we hope to facilitate mutual exchange and learning that supports science, technology and innovation cooperation between Southeast Asia and Europe.