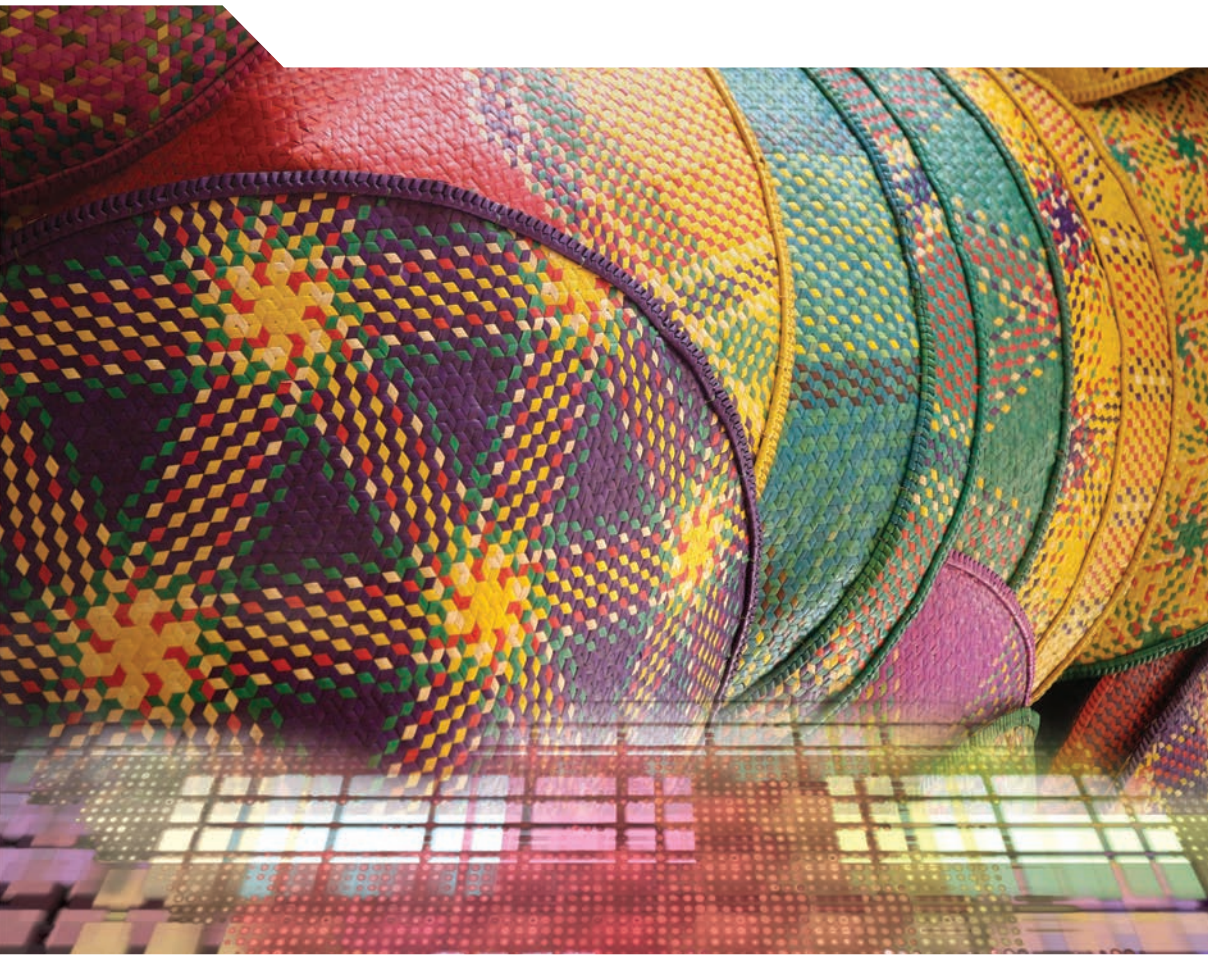
Boosting Malaysia's National Intellectual Property System for Innovation



OECD

Boosting Malaysia's National Intellectual Property System for Innovation

Please cite this publication as:
OECD (2015), *Boosting Malaysia's National Intellectual Property System for Innovation*, OECD Publishing, Paris.
http://dx.doi.org/10.1787/9789264239227-en

ISBN: 978-92-64-23724-7 (print)
ISBN: 978-92-64-23922-7 (PDF)

Foreword

*The national intellectual property (IP) system provides a critical policy toolkit to foster innovation performance and knowledge diffusion. This report is part of a series of country reviews aimed at identifying how national IP systems can better serve these objectives (*http://oe.cd/ip-studies*). The publication* National Intellectual Property Systems, Innovation and Economic Development *presents the analytical framework used for these country reviews. The framework analyses the key mechanisms that enable IP systems to support countries' innovation and development objectives. This allows identifying strengths and weaknesses in the IP system's contributions to national innovation performance.*

This report presents an in-depth analysis of the Malaysian IP system with regards to its support of the country's innovation performance. On the basis of the analysis, specific policy recommendations on where improvements can be made are formulated. The IP review contributes to the perspectives on IP policy in the forthcoming publication OECD Review of Innovation Policy: Malaysia. *The project also contributes to the OECD Innovation for Inclusive Growth Project (*http://oe.cd/inclusive*).*

Acknowledgements

This study was prepared under the guidance of Caroline Paunov. The report was drafted by Catalina Martinez (CSIC Institute of Public Goods and Policies, Spain) and Caroline Paunov. Masashi Inoue conducted background research and provided statistical support to the publication. Masashi Inoue, Isabel Vogler and Maximilian Zillner were involved in finalising the publication. Dominique Guellec gave substantial advice during the course of the project. The review also draws on findings from the OECD's Southeast Asia innovation review and the OECD innovation review of Malaysia; Dominique Guellec, Philippe Larrue and Gernot Hutschenreiter provided comments and suggestions. Alison Brimelow, Martin Brassel, Tony Clayton and Christine Greenhalgh and participants from the United Kingdom Intellectual Property Office (UK IPO) at a peer review workshop held on 18 March 2015 provided useful comments and suggestions. Anisah Lightwalla organised the workshop and provided project feedback from UK IPO. The project is based on a framework that has been developed in co-operation with UK IPO and the development of which would not have been possible without funds granted by the UK Prosperity Fund. Project support by Marney Crainey is gratefully acknowledged. The Steering Committee of this intellectual property review, chaired by Dr Ir Lee Yee Cheong, provided invaluable comments and suggestions over the course of the project; their engagement is gratefully acknowledged. The project has been conducted with the Malaysian Industry-Government Group for High Technology (MIGHT), which provided both the Malaysia logistics and content support. The logistics was ably organised by Anusha Magendram, Ahmad Razif Mohamad, Rozita Abdul Rahim, and Nik Sufini Nik Mohamed; content support was provided by Mohd Nasir Md Ibrahim and Dr Nurhizam Safie. The MIGHT team also accompanied the country mission and played a critical role in organising feedback from the stakeholders who took part in the interviews, including from the committee members.

The OECD team would like also to acknowledge the following for their participation in the interview process: Mr. Mohd Arif Simeh, Mr. Norizam Ahmad, Mr. Zarina Ridzwan and Ms. Suraya Muhamad from the Malaysian Palm Oil Board; Dr. Othman Omar, Mr. Muhammad Aziph Dato' Mustapha and Mr. Arjunaidi Jamaludin from the Malaysia Foundation for Innovation; Dato' Prof. Dr. Asma Ismail and Prof. Madya Dr. Arham Abdullah from the Ministry

of Education; Mr. Naser Jaafar and Mr. Robest Yong from the Malaysia Innovation Agency (AIM); Tan Sri Datuk Dr. Ahmad Tajuddin Ali from UEM Group Berhad; Datuk Dr. Mohd Yusoff Sulaiman, Dr. Raslan Ahmad, Mr. Rushdi Abdul Rahim and Dr. Anne-Claire Brehaut from Malaysian-Industry Government Group for High Technology (MIGHT); Ms. Ng Wan Peng and Ir. Dr. Karl Ng Kah Hou from Multimedia Development Corporation (MDeC); Mr. Nik Rizal Kamil and Mr. Mohd Ridzwan Nordin from Khazanah Nasional Berhad; Dr. Shahnaz Murad from the Ministry of Health; Mr. Nizar Ali and Ms. Nurul Amira from First Floor Capital Sdn. Bhd.; Dato' Hj Ahamad Sabki Mahmod from the Ministry of Agriculture and Agro-Based Industry Malaysia (MOA); Datuk Dr. Salmiah Ahmad and Dr. Amir Hashim Md. Yatim from Malaysian Rubber Board; Prof. Dato' Dr. Syed Mohamed Aljunid from the United Nations University-International Institute for Global Health; Dato' Teo Tien Hiong from Sarawak Information Systems Sdn. Bhd. (SAINS); Dato' Grunsin Ayom, Mr. Philip Gaweng, Mr. Zehnder Jarroop, Mr. Lau Ee Ting and Ms. Kho Pei Ee from the Malaysian Pepper Board; Prof. Dr. Kopli Bujang and Prof. Dr. Fasihuddin Badruddin Ahmad from the Universiti Malaysia Sarawak(UNIMAS); Mr. William Patrick Nyigor from the Sarawak State Planning Unit, Information and Communication Technology Unit (ICTU); Mr. Jaffri Ibrahim, Ms. Chin Fung Wei and Dr. Khoh Soo Beng from Collaborative Research in Engineering, Science and Technology (CREST); Prof. Rahmat Awang and Mr. Khairul Anuar Che Azmi from the Universiti Sains Malaysia (USM); Datuk J. Jayasiri, Ms. Harjit Kaur and Ms. Melissa Mokhtar from the Ministry of International Trade and Industry (MITI); Dato' Basaruddin Sadali from the Ministry of Domestic Trade, Cooperative and Consumerism (KPDNKK); Ms. Shamsiah Kamaruddin, Ms. Siti Eishah Mohamad and Ms. Mazian Mat Tahir from the Intellectual Property Corporation of Malaysia (MyIPO); Dr. Chandran Elamvazuthi from MIMOS Berhad; Prof. Dr. Juhana Salim from the National University of Malaysia(UKM); Dr. Zahira Mohd Ishan, Ms. Suzalina Akma Awing and Ms. Ashida Othman from the Universiti Putra Malaysia (UPM); Prof. Dr. Awg Bulgiba Awg Mahmud, Prof. Dr. Noorsaadah Abdul Rahman, Prof. Dr. Shaliza Ibrahim, Prof. Dr. Rofina Yasmin Othman and Prof. Dr. Loo Chu Kiong from Universiti Malaya (UM); Prof. Ir Dr. Mohd Azraai Kassim from Universiti Teknologi Malaysia(UTM); Mr. Mohd Hakimi Ahmad Zainudin from National Defence University of Malaysia (UPNM); Prof. Madya Dr. Mohd Zamri Bin Ibrahim from the Universiti Malaysia Terengganu (UMT); Assoc. Prof. Ir Dr Lariyah Bte. Mohd Sidek and Dr. Normy Norfiza Abdul Razak from the Universiti Tenaga Nasional (UNITEN); Prof. Dr. Abdul Razak Saleh from the Universiti Utara Malaysia (UUM); Prof. Ir. Dr. Mohd Jailani Mohd Nor from Universiti Teknikal Malaysia Melaka (UTeM); Professor Mohamed Ridza Wahiddin, Assoc. Prof. Dr. Ahmad Fadzil Ismail, Prof. Dr. Ida Madieha Abdul Ghani Azmi, Ms. Siti Thuraiya Abdul Rahman and Ms. Asnili Marniwati Ahmad from the International Islamic University Malaysia

(IIUM); Prof. Madya Dr. Mohd Najib Mohd Salleh from the Universiti Tun Hussein Onn Malaysia (UTHM); Ms. Nor Ilma Mustafa Kamal from the Universiti Malaysia Pahang (UMP); Prof. Madya Dr. Awangku Abdul Rahman Hj and Awangku Yusuff from the Universiti Sains Islam Malaysia (USIM); Prof. Graham Kendall and Dr Angelina Yee from the University of Nottingham Malaysian Campus; Mr. Chua Khong Wai from Monash University Malaysia; Prof. Ir Dr. Hj Abdul Rahman Omar from the Universiti Teknologi Mara (UiTM); Mr. Benjamin Thompson, Mr. Ong Boo Seng, Ms. Lee Lin Li, Mr. Peter Desmond Wee Tian Peng, Mdm. Norunuha Datuk Hj Nawawi, Dr. Chris Hemingway, Ms. Eugene Roy Joseph and Mr. Dennis Tan Boon Leng from the Malaysian Intellectual Property Association (MIPA); Datuk Fadilah Baharin from the Department of Standards Malaysia; Ms. Karunajothi Kandasamy from the SME Corporation Malaysia; Datuk Md. Zubir Ansori Yahaya and Mr Mohd Sharizal Mustapah Kamil from Malaysian Debt Ventures Berhad (MDV); Dr. Viraj Perera from PlaTCOM Ventures; Dato' Ir. Andy K.H.Seo from the Federation of Malaysian Manufacturing (FMM); Ms. Marina Mahpudz from the Ministry of Science, Technology and Innovation (MOSTI); Dato' Sri Hj. Alias Hj. Ahmad from the Ministry of Domestic Trade, Co-Operatives and Consumerism (KPDNKK); Mr. Mohan K from the Malaysian Association of Innovation & Creativity (MACRI); Ms. Liew Siew Lee from the Economic Planning Unit; Dr. Zahira Mohd Ihsan from Putra Science Park [Universiti Putra Malaysia(UPM)]; Mr. Yeoh Suat Gaik from Petroliam Nasional Berhad (PETRONAS); Mr. Ramlee Ab. Ghani and Ms. Deneswari a/p Sivaguru from Malaysia Science and Technology Information Centre (MASTIC).

Table of contents

Tables

Figures

Acronyms and abbreviations

AIM	Malaysia Innovation Agency (*Agensi Inovasi Malaysia*)
APEX	Accelerated Programme for Excellence
ASEAN	Association of Southeast Asian Nations
AWGIPC	ASEAN Working Group on Intellectual Property Cooperation
CREST	Collaborative Research in Engineering, Science and Technology
CIPI	Colombia's Intersectoral Commission for Intellectual Property (*Comisión Intersectorial de Propiedad Intelectual*)
CRC	Clinical Research Centres
E&E	Electrical and electronics
EPO	European Patent Office
FDI	Foreign direct investment
GDP	Gross domestic product
GERD	Gross domestic expenditure on research and development
GI	Geographical indication
GLC	Government-linked corporation
IBO	Innovation Business Opportunities
ICT	Information and communication technologies
IHBR	Institute for Health Behavioural Research
IHM	Institute for Health Management
IHSR	Institute for Health Systems Research
IMR	Institute for Medical Research
INOVA	Brazil's Innovation Agency
IP	Intellectual property
IPFS	Intellectual property financing scheme
IPH	Institute for Public Health
IPOS	Intellectual Property Office (Singapore)
IPVM	National Intellectual Property Valuation Model
IRPA	Intensification of Research in Priority Areas Programme
ISO	International Standards Organisation
KRSTE.my	Knowledge Resources for Science and Technology Excellence Malaysia
MAABI	Ministry of Agriculture and Agro-based Industry
MASTIC	Malaysian Science and Technology Information Centre
MDTCC	Ministry of Domestic Trade, Co-operatives and Consumerism

MDV	Malaysia Debt Ventures
MIDA	Malaysian Industrial Development Authority
MIGHT	Malaysian Industry Government Group for High Technology
MITI	Ministry of International Trade and Industry
MNC	Multinational corporation
MOE	Ministry of Education
MOF	Ministry of Finance
MOH	Ministry of Health
MOSTI	Ministry of Science, Technology and Innovation
MPB	Malaysian Pepper Board
MPOB	Malaysian Palm Oil Board
MRB	Malaysian Rubber Board
MTDC	Malaysian Technology Development Corporation
MyCHM	Malaysia Clearing House Mechanism
MyIPO	Intellectual Property Corporation of Malaysia
NIPP	National Intellectual Property Policy
NSRC	National Science and Research Council
NSTIP	National Science, Technology and Innovation Policy
PCT	Patent Cooperation Treaty
PIKOM	National ICT Association of Malaysia
PPH	Patent Prosecution Highway
PPP	Purchasing power parity
PPRN	Public-Private Research Network
PRI	Public research institution
R&D	Research and development
SaBc	Sabah Biodiversity Centre
SIRIM	Standards and Industrial Research Institute of Malaysia
SME Corp.	SME Corporation
SME	Small and medium-sized enterprise
STI	Science, technology and innovation
TCE	Traditional cultural expressions
TK	Traditional knowledge
TKDL	Traditional Knowledge Digital Library
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
TTO	Technology transfer offices
UIAM	Universiti Islam Antarabangsa Malaysia
UiTM	Universiti Teknologi Mara
UK IPO	United Kingdom Intellectual Property Office
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
UNICAMP	University of Campinas in Brazil

UPM	Universiti Putra Malaysia
USM	Universiti Sains Malaysia
USPTO	US Patent and Trademark Office
WIPO	World Intellectual Property Organization
WTO	World Trade Organization
YIM	Malaysian Foundation for Innovation (*Yayasan Inovasi Malaysia*)

Executive summary

Malaysia has set for itself the goal of becoming a high-income economy by 2020. This objective can only be realised with the aid of more innovation-driven growth. Malaysia's national intellectual property (IP) system can contribute meaningfully to supporting innovation, and various policy measures are available to the government to help strengthen these contributions.

Socio-economic constraints in the Malaysian IP system

Malaysia's economy is diversified. Malaysia's industrial development has been based on foreign direct investment and export-led manufacturing, creating a manufacturing and services base, notably in the electrical and electronics (E&E) sector. Natural resource-based sectors (palm oil, pepper, etc.) are also important. In addition, Malaysia's business sector includes firms of many sizes, from large corporations and government-linked businesses to the very large number of SMEs. The needs of these sectors and entities differ and public policy will affect these firms' performance in different ways. Given this diversity, it is critical that policy affecting IP takes into consideration the priorities and needs of different economic actors and different economic sectors, including those related to traditional knowledge.

Innovation sits at the top of the government's policy agenda, and consequently atop the overall context of governmental decision-making, which provides policy makers with opportunities to create initiatives that support innovation, including measures to enhance the performance of the national intellectual property system. The framework conditions for innovation in Malaysia – i.e. product market competitiveness, a positive policy environment and good information and communications technology access – are favourable, but developing better methods of financing innovation is imperative. In addition, performance-evaluation programmes in research institutions and universities have produced useful changes. Starting in 2015, Malaysia's public universities must provide 25% of their own operating budgets. This creates incentives for universities to commercialise their research findings. However, policy makers must also take into consideration the possible negative effects of these commercialisation efforts. In particular, skills shortage poses a major challenge for Malaysia: encouraging universities to focus on revenue-generating activities rather than on teaching may aggravate this situation if universities focus less on skills development.

Assessment of Malaysia's national IP system

Malaysia's national IP system has matured in the past decades, notably in its legal and operational aspects. Several reforms of IP laws have brought Malaysia's policies into line with international standards. The processing of IP titles is very efficient by international standards. Application fees compare favourably with international fees, although smaller entities perceive maintenance fees as expensive. IP rights enforcement has been improved, and in 2007 a new system of IP High Courts was introduced.

The national IP system is best characterised as one of multiple institutions that implement separate policies aimed at incentivising the adoption and use of IP. The National Intellectual Property Policy Action Council and the National IP Steering and Monitoring Committees, the co-ordination bodies for IP policy under the auspices of the Ministry of International Trade and Industry, focus on legal and international dimensions of IP policy rather than on stimulating the innovation agenda.

Malaysia is a net importer of intellectual property rights, paying USD 1.4 billion in royalties and receiving USD 101 million in royalties in 2013. This reflects the fact that Malaysia is a "catching up" economy that is actively engaged in efforts to capture foreign technologies. The use of the IP system by residents has increased compared to Malaysia's regional peers, including for trademarks, industrial design rights and geographical indications. However, utility models, which are simpler and less expensive than patents, are little used. Public research institutions, public universities and government-owned companies are the most frequent users of the IP system; by contrast, most local businesses in Malaysia are not active users.

The commercialisation of publicly funded IP research, either through university start-ups or by providing firms with research results, has proven difficult. University-industry linkages are weak, which hinders the industrial adoption of innovative research results. Capitalising on public research is a challenge many countries have faced, including some of the leading OECD economies. Multiple online platforms have been created to inform industry about available IP created by Malaysian public research institutes, universities and others and facilitate matching inventors with potential users. However, no single platform has been maintained over time. This has impeded both users – who have had to search different platforms – and inventors – who have had to provide details about their IP to different platforms with different requirements and different formats. There have been recent attempts to spur the creation of a market for IP and to introduce financing programmes in which IP serves as collateral for more loans to finance innovation.

Main policy recommendations

Malaysia can improve the contributions of its IP system to innovation in the following ways:

Connect IP policies to innovation policies

- Build the governance structure and establish a comprehensive policy mix to ensure that the various programmes to support the uptake of IP in Malaysia are co-ordinated to avoid unnecessary duplication, especially where such duplication weakens a programme's impact.
- Create a powerful body dedicated to co-ordinating and moving forward the "IP for innovation" agenda, with a dedicated unit at the Intellectual Property Corporation of Malaysia (MyIPO) in charge of supporting the agenda.

Improve legal and administrative conditions

- Reduce the costs of IP filings for smaller firms and research institutions, conditional on these entities attempting to commercialise their inventions.
- Promote the use of utility models, which are less expensive and less complicated to file.

Adapt the IP system to users: Universities and public research institutions

- Implement policies to support these institutions' commercialisation efforts, encouraging them to focus on creating high-quality products or processes without deterring them from conducting high-quality research and providing high-quality education.
- Set more realistic revenue targets for public research institutions, which are expected to generate 25% of their own operating budget in 2015, a figure that rises to 75% in 2025.

Adapt the IP system to users: Industry, small and medium sized enterprises (SMEs) and the informal sector

- Promote the development of geographic indications to foster different types of non-technological, inclusive, innovations.
- Broaden IP support policies to encourage industry, including SMEs, to seek IP protection for their inventions. Such support also requires promoting the use of trademarks, design rights and utility models as these are often easier and more affordable to obtain than patents.

Promote markets, standards and diffusion

- Consolidate and maintain existing platforms for IP commercialisation.
- Improve collaboration between industry and universities, in particular through industry-specific organisations.

Chapter 1

Overall assessment and recommendations

This chapter presents the overall assessment of Malaysia's intellectual property (IP) system and specifies recommendations that can help enhance its contributions to innovation. It provides an overview of the context in which IP policy is made, including the mandates of different government ministries, the composition of Malaysian industry, and the needs, usage, development and attitudes toward IP of different industries and research institutions. Major recommendations include the need to consolidate IP policy making powers within the government, with a strong secretariat providing support; to encourage the use of cheaper and easier-to-access IP rights; to improve collaboration and information sharing between research institutions and industry; and to increase knowledge about, and the use of, IP among smaller businesses and smallholders.

Malaysia has made **substantial economic progress in recent decades** thanks to competitive labour costs, natural resources, capital incentives to attract foreign direct investment (FDI) and significant infrastructure investments, which have helped create an attractive business environment. Government funding to create national champions has had mixed success. As global competition continues to increase and growth based on traditional drivers has declined, Malaysia has stepped up its efforts to build a more innovation-led economy. The 11th Malaysian Plan (2016-20), which was launched in May 2015, is expected to place measures aimed at enhancing innovation at the top of the policy agenda. The plan aims to set the conditions for Malaysia to become a high-income nation by 2020. This is in line with plans since the 1990s, but places even greater emphasis on innovation. However, several recent evaluations and reviews of the Malaysian innovation system have shown that, despite progress, significant efforts are still required to strengthen the foundation for innovation.

- The overall context provides opportunities for initiatives that support innovation, including measures to enhance the performance of the national intellectual property (IP) system. The country needs to boost investment significantly in knowledge-based activities if it is to remain competitive internationally.

Malaysia's innovation **framework conditions** – product market competitiveness, red tape, infrastructure and ICT access – are very favourable by international standards. Malaysia ranks 18th in the World Bank's "Ease of Doing Business" assessment, just ahead of Thailand (19th) and Chinese Taipei (26th), but well behind Singapore, the ranking's leading economy (World Bank, 2014). The conditions for registering property, in particular, can be improved. Moreover, financing constraints are substantial owing to a weak venture capital market that mainly benefits large corporations. Small firms, which constitute the vast majority of businesses, have limited opportunities to access finance.

- In this context, developing financing opportunities based on IP is attractive, including promoting the use of IP as collateral to finance innovations or, alternatively, creating opportunities to sell or license IP-protected inventions to other actors who have access to the investment sources necessary to develop them.

Although the availability of tertiary education has increased in the past decade, as has the number of universities, the **scarcity of adequately skilled**

human capital continues to be a substantial impediment for the economy. This shortcoming points to the importance of universities as providers of the skills that Malaysia's innovation system needs. Public research can also benefit from the innovation system in other ways, for example, by public research institutions becoming directly involved in innovation activities by obtaining and commercialising their own IP. Collaborative research between industry and research organisations' technological services is also an important means in which public research can contribute to innovation. Malaysia's Education Blueprint 2015-25, launched by the Prime Minister on 7 April 2015, sets the emphasis on the tertiary education sector's role in contributing to the skills base for Malaysia's innovation system in addition to their contributions to innovation ecosystems (MOE, 2015).

- The education and research roles of universities and public research institutes have to be taken into consideration when discussing IP policies to support the commercialisation of public research.

Malaysia's economy is diversified. Successful development has reduced the country's dependency on primary commodities (crude oil, rubber, tin and palm oil) that dominated the economy in the 1960s. Malaysia's industrial development has been based on FDI and export-led manufacturing, following the development path of the first wave of "Asian Tigers". It has developed a much stronger manufacturing and services base, and its electrical and electronics (E&E) sector, mainly located in the state of Penang accounted for 34.4% of total exports, equivalent to USD 12.4 billion (MYR 23.3 billion) in 2014 (Department of Statistics Malaysia, 2015). However, natural resource sectors remain important to Malaysia's economy and are major contributors to the gross domestic product (GDP) in Sarawak and Sabah. Natural resources also provide opportunities for innovation, and several research institutes are engaged in activities that could support innovation in these sectors, as well as in fields such as biotechnology, pharmaceutical industries and traditional knowledge (e.g. traditional medicines).

- In view of this diversity, it is critical to consider IP from the perspective of different economic players and conditions, taking into account the innovation opportunities offered by natural resources and traditional knowledge, as well as the opportunities in more advanced high-technology sectors.

National gross expenditure on research and development (R&D) increased to 1.13% of GDP in 2012, the last year for which these statistics are available. This is comparable to investment levels in many southern and eastern European economies (OECD, 2014). Since 2000, the business sector, including large government-linked companies, has been the biggest contributor of investment. Major investors include Proton, an automobile manufacturer that mainly serves

the domestic market, and Petronas, a publicly owned petrol company, which ranked 69th on Fortune's list of the world's largest companies with revenue of USD 100.7 billion in 2014 (Fortune, 2015). Most foreign R&D investment is concentrated in electronics, which is also the primary recipient of national R&D investment. In contrast, most of the country's small and medium-sized enterprises (SMEs) do not engage in innovation. A substantial share of large domestic firms in natural resource-based sectors invest little in innovation activities.

- IP policies need to consider that only a small percentage of firms actively seek to innovate. Complementary innovation policies are required to raise opportunities for IP to support business innovation.

Tight public budgets have led the government to introduce reforms to enhance socio-economic returns from public investments in **research institutions and universities**. The government has also brought in performance-evaluation programmes with quantitative performance measures, which have had some success. For example, according to SCOPUS, which tracks peer-reviewed research publications, Malaysia improved its ranking based on the number of scientific publications, moving from 51st position in 1999 to 23rd in 2013 (SCImago, 2014). In addition, universities have given greater emphasis to engineering in recent years, which offers more opportunities to commercialise public research. However, the impact of Malaysia's research publications remains low: improved research quality, rather than quantity, is needed. The pressure on universities to commercialise research results will be even greater in coming years: starting in 2015, all Malaysian public universities must raise 25% of their own operating budget. This will present a daunting challenge to institutions that were used to receiving all of their funding from public funds. It is only recently that these institutions have had to adopt a more business-oriented way of operating that puts greater emphasis on performance.

- Policies to support universities and public research institutions' commercialisation activities need to be considered within the overall context of the fundamental changes to the way these institutions operate.

Malaysia's **business sector** is characterised by firms of different sizes, including large corporations and government-linked businesses, as well as a large number of small businesses. Small businesses account for 30.2% of gross value-added economic activity and 32.7% of employment (Department of Statistics Malaysia, 2012). The inequalities in size and structure require diversified approaches to IP to meet the different needs of businesses, as well as different approaches to the incentive programmes that are provided because some businesses are more affected by market developments while others are more sensitive to policy changes.

- IP policy will need to reflect these differences to effectively support innovation in Malaysia in all its diversity.

Social inclusion is a challenge in Malaysia. There are a large number of pockets of limited development, including in the country's informal economy. Inequality is also an issue in Malaysia: its Gini index (0.46 in 2012) is higher than that of neighbouring Southeast Asian countries, including the Philippines (0.43 in 2012) and Indonesia (0.38 in 2011).[1]

Natural resources (wood, palm oil, etc.) and **traditional knowledge** are important in Malaysia's economy, particularly in the states of Sarawak and Sabah. However, some of the potential in these areas has not yet been exploited. Both of these areas matter when it comes to involving excluded groups, including economically disadvantaged communities located in remote rural areas. Certain economic activities – e.g. Sarawak's pepper production – engage a large number of smallholders. Whereas a few government institutions, such as the Malaysian Foundation for Innovation (*Yayasan Inovasi Malaysia*, YIM), support innovations from inventors from less advantaged backgrounds, more effort to improve the economic integration of excluded groups is needed. Support for innovation serving lower-income groups is also one of the objectives of Malaysia's SME Masterplan (SME Corp., 2012).

- IP policy can serve the development of innovations based on natural resources and their commercialisation to the benefit of regional development. It can also promote social inclusion, as can IP policy geared towards support of traditional knowledge.

The **governance** of Malaysia's innovation system is complex and involves numerous players with overlapping mandates. These include the Ministry of Science, Technology and Innovation (MOSTI); the Ministry of Education (MOE) and central agencies; other sectoral ministries and special units or agencies; as well as the Malaysia Innovation Agency (*Agensi Inovasi Malaysia*, AIM) and the Malaysian Industry-Government Group for High Technology (MIGHT). AIM is a department within the Prime Minister's Office entrusted with overseeing the commercialisation of research findings from public research institutes and universities. MIGHT falls under the authority of the Science Advisor to the Prime Minister. It provides technology inputs for industry and government and nurtures technology-based enterprises. Industry interacts with government institutions via industry associations and chambers of commerce.

- The complex institutional context of innovation policy poses a challenge for integrating IP policy aimed at ensuring coherence for a stronger policy impact.

1.1. Malaysia's national IP system

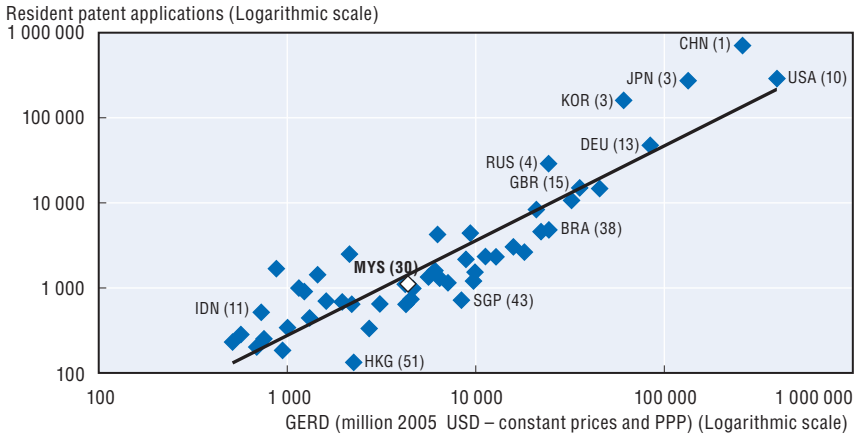
Malaysia's national IP system has matured in the past decades, notably from a legal and operational perspective. Several reforms of IP laws have

brought policies in line with international standards by adopting legislation to implement the Agreement on Trade-Related Intellectual Property Rights (TRIPS). Malaysia has also signed additional IP-related commitments under the Association of Southeast Asian Nations (ASEAN), and other international IP treaties, including the Patent Co-operation Treaty (PCT) system (in 2006). In 2003, the IP office was corporatised, and today, the processing of IP titles is very efficient by international standards. Management reforms and examiner reward programmes for high productivity have contributed to this achievement. Application fees compare favourably with international fees, although smaller entities perceive maintenance fees as expensive. Enforcement has been improved, and in 2007 a new system of IP High Courts was introduced to ensure that IP titles obtained are enforced.

With regard to Malaysia's use of IP, the country is a net importer of intellectual property rights, paying USD 1.4 billion in royalties and receiving USD 101 million in royalties in 2013. In comparison, the United States is a net exporter, paying USD 39.5 billion in 2012 for royalties and receiving USD 125.3 billion. This reflects Malaysia's status as a "catching up" economy that is actively engaged in efforts to capture foreign technologies. Foreign inventions also dominate national patent registrations, while resident patent applications reflect the country's R&D spending (Figure 1.1). However, the use of the IP system by Malaysian residents has increased compared to regional peers, including for trademarks, industrial design rights and geographical indications. On the other hand, utility models are little used in comparison with other middle-income countries such as Thailand, where local SMEs use them more actively. Leading users of the IP system have engaged in filing PCT applications: the most intensive users are public research institutions, such as the Malaysian Palm Oil Board and the Malaysian Rubber Board; public universities, such as Universiti Sains Malaysia, Universiti Teknologi Malaysia and Universiti Putra Malaysia; and government-owned companies, such as MIMOS Berhad (by far the most important PCT applicant) and Petronas. By contrast, most local businesses in Malaysia are not active users of the IP system. This is also the case for firms operating in the E&E sector, as some of them make little effort to innovate and provide only services of lower value-added to multinational corporations.

The active use of IP by Malaysia's universities – the five public research universities contribute substantially to national IP registrations – and research institutions is a result of policies introduced in the past decade. These were aimed at raising the returns on public spending for these institutions. IP has become one of the "private sector" elements introduced into public research. The number of IP titles held by universities is among the quantitative performance measurements used in performance evaluations that influence funding. Such efforts have successfully prompted universities to operate more

Figure 1.1. **Resident patent applications and gross domestic expenditure on R&D**



Note: 1. A resident application is an application filed with an IP office by an applicant residing in the country/region in which that office has jurisdiction. 2. Countries were selected if they had a GERD greater than USD 500 million PPP (in constant prices, 2005) and more than 100 resident patent applications. 3. Resident patent application data are for 2013 and for 2012 for GERD, except for Argentina, Australia, Belarus, Brazil, Egypt, Malaysia, Mexico, New Zealand, Pakistan and Ukraine (2012 and 2011 for GERD); Slovenia (2011 and 2010 for GERD); Hong Kong and Indonesia (2010 and 2009 for GERD); and Thailand (2008 and 2007 for GERD). 4. A ranking of "resident patent applications-per-GERD" out of 51 offices for which data are available is displayed in parentheses.
Source: OECD calculations based on WIPO Statistics (database) *http://ipstats.wipo.int/ipstatv2/*; OECD (2015), *Main Science and Technology Indicators* (database), *http://stats.oecd.org/Index.aspx?QueryId=33210*; and UNESCO UIS.Stat (database), *http://stats.uis.unesco.org*.

efficiently, to tackle the challenges of registering and obtaining IP, and to create incentive programmes that encourage researchers to engage in IP ventures and look for effective partnerships with industry.

However, effectively turning IP into commercial products, either as part of university start-ups or by providing SMEs with knowledge content, has proven difficult. While it is difficult to directly compare Malaysia's rate of return on public R&D with those of other countries, its commercialisation rates are not far behind the global average and the average of OECD member countries. It is well known that the value of IP is skewed: only a few ideas produced in a few institutions become blockbusters. Nevertheless, other challenges that hinder wider success include: i) weak linkages between universities and industry, with little research conducted that explicitly responds to industry requirements; ii) large bureaucratic obstacles to reaching co-operation agreements between research institutions and industry; combined with iii) firms' lack of absorptive capacity to take advantage of public research; iv) lack of awareness of IP protection among firms; v) weak regional and national markets for certain technologies; vii) limited interest on the part of researchers to seek patents and even less to commercialise their findings; and, viii) limited resources to develop prototypes of patented inventions.

The country's biodiversity – particularly in the states of Sarawak and Sabah – and its traditional industries offer opportunities to improve the application of IP in Malaysia. Geographical indications (GIs) have been taken up actively, mostly in Sarawak, but investment in support of industry associations has been limited. These associations are critical to developing quality products and creating a market for them. An example is Sarawak's pepper industry, where the Malaysian Pepper Board provides quality training to the many smallholders and has a test system in place to ensure product quality for exports. However, opportunities to develop higher value-added products from Sarawak pepper that would generate higher revenues for smallholders are limited because the industry does not offer many options for creating such products.

Malaysia's IP policy has recognised that policy measures that were initially useful in establishing universities and public research institutions now need to be replaced by more ambitious and integrated policies to promote the commercialisation of innovations. The policy requiring universities and public research institutes to generate a share of their own revenue creates incentives to increase commercialisation. Researchers are allowed to take a sabbatical if they want to engage in spinoff companies and receive more than 5% of the equity from such an engagement. Awarding a high proportion of royalty returns to researchers has also been implemented to support commercialisation efforts. Creating technology platforms to display patents held by universities and public research institutes is another approach Malaysia has taken with this objective in mind. New initiatives to enhance collaboration between industry and research institutions include the Public-Private Research Network (PPRN) (introduced in 2014), a CEO faculty programme for senior industry or public sector leaders to teach in universities, as well as other industry engagement and cross-fertilisation programmes, including the Collaborative Research in Engineering, Science and Technology (CREST) programme, introduced in 2012 to facilitate industry-public research collaborations, particularly in the E&E sector.

An additional approach consists of finding ways for IP to serve as collateral for loans to finance innovation activities. This policy measure, which is implemented by Malaysia Debt Ventures, a wholly-owned corporation of the Ministry of Finance, is still in its initial phase and is very much a worthwhile experiment by global standards.

However, these policy efforts may fail because industry-science linkages are still weak and all of the legal framework conditions for IP to serve as collateral are not yet in place. For the moment, these efforts are all the initiative of the government, which is creating the technology platforms and subsidising the credit rates for the loans using IP as collateral. For the policy to succeed, however, the private sector must become involved. Government support may be necessary to promote, for example, the initial uptake of the

IP-as-capital idea because Malaysia's private banks have little familiarity with this type of financing programme. However, the policy will succeed only if banks eventually take over the system and it begins to operate internationally.

The main challenge restraining the system from supporting innovation effectively is the division of responsibility in making IP policy. The National Intellectual Property Policy (NIPP) Action Council and the National IP Steering and Monitoring Committees, the co-ordination bodies for IP policy under the auspices of the Ministry of International Trade and Industry (MITI), focus mainly on legal, administrative and enforcement matters, as well as the international dimensions of IP policy. The corporatisation of the Intellectual Property Corporation of Malaysia (MyIPO) in 2003 created the institutional capacity to deal with legal and administrative matters related to IP rights; however, MyIPO does not have the capacity or the mandate to anchor an agenda aimed at strengthening the contributions of IP policy to national innovation performance. The national IP system is still best characterised as one of multiple institutions that implement separate policies aimed at incentivising the uptake and effective use of IP policies (Table 1.1). MyIPO itself

Table 1.1. **Malaysia's intellectual property system: An overview of institutions involved**

Role	Institution
IP co-ordination	• National Intellectual Property Policy (NIPP) Action Council and National IP Steering and Monitoring Committees: organised by Intellectual Property Corporation of Malaysia (MyIPO)
IP policy design	• Ministry of Domestic Trade, Co-operatives and Consumerism (MDTCC) • Malaysian Industry-Government Group for High Technology (MIGHT) • Ministry of Science, Technology and Innovation (MOSTI), Economic Planning Unit • Intellectual Property Corporation of Malaysia (MyIPO) • Ministry of Agriculture and Agro-based Industry (MAABI) for plant variety protection
IP administration	• Intellectual Property Corporation of Malaysia (MyIPO) for industrial property and copyright • Ministry of Agriculture and Agro-based Industry (MAABI) for plant variety protection
Foreign IP policy design	• Ministry of International Trade and Industry (MITI)
IP enforcement	• Ministry of Domestic Trade, Co-operatives and Consumerism (MDTCC), Enforcement Division • IP courts • Ministry of Agriculture and Agro-based Industry (MAABI) for plant variety protection • National Intellectual Property Policy (NIPP) Monitoring Committee
Other entities in charge of supporting the IP system	• Ministries: Ministry of Science, Technology and Innovation (MOSTI), Ministry of International Trade and Industry (MITI), Ministry of Education, Ministry of Health • Malaysia Innovation Agency (AIM), including PlaTCOM Ventures, Innovation Business Opportunities (IBO) • Malaysia Debt Ventures • Malaysian Technology Development Corporation (MTDC) • Sarawak State Planning Unit • Industry related agencies: Collaborative Research in Engineering, Science and Technology (CREST); Steinbeis Foundation Malaysia

implements some, but not all, of these policies. Although the diversity allows for policy experimentation, initiatives can benefit from greater co-ordination. The case of IP platforms illustrates this well. While there is much to be gained from having a joint platform initiative, Malaysia has several initiatives rather than a single, consolidated platform, a suboptimal outcome arising from insufficient co-ordination.

1.2. Recommendations for Malaysia

Malaysia's IP system offers the conditions for empowering its innovation system, with a fully adequate legal structure and an efficient operational system. Further efforts at maintaining its efficiency in processing high-quality IP are under way. Regional offices ensure that potential and actual IP users in other regions are not at a disadvantage compared to those in the capital. Improvements in enforcement have also contributed to raising the value of IP. A few challenges remain, however. First, the cost, duration and evaluation criteria for utility models relative to patents should be reconsidered to create a system that costs applicants less, does without substantive examination and imposes a less stringent novelty threshold (below the threshold required for patents). While utility models can be more accessible than patents and can act as useful stepping stones towards more innovation-intensive production for many Malaysian businesses, they are not often used in Malaysia. Second, providing discounts and support in filing patents and other types of IP rights systematically may be useful, particularly for small entities and public research organisations. They should, however, be linked to commercialisation efforts and socio-economic impacts. Third, Malaysia may consider adopting the "licences of right" system used in other countries, whereby applicants who declare their willingness to license their patents benefit from fee discounts.

Beyond legal and organisational aspects, which come under the auspices of the MITI and, in many cases, MyIPO, there is little coherence in IP policy governance. There is no co-ordinating body that would bring together all policy-making entities and actual and potential users of IP, including private entities. Such co-ordination should extend to those initiatives aimed at increasing the effective use of IP. For example, consolidating recently created technology platforms into a single platform can make it much more successful. Creating a powerful governance structure to regulate IP, and creating the secretarial capacities within MyIPO to provide such initiatives, is essential in order to establish a powerful co-ordinating body. A dedicated research unit could also investigate more widely factors that hold back the use of IP by smaller entities in Malaysia. Industry needs to become much more involved. Such involvement would ensure that industry-specific requirements, including the needs of different industries and users, are reflected in discussions over IP policy. Japan's

IP commission is an example of effective institutional oversight aimed at enhancing IP support to innovation performance.

Public research organisations have been the primary target of IP policies in the context of reforms aimed at increasing returns from public funding. Institutional reforms, which granted these organisations greater autonomy, introduced more performance evaluation programmes and modified the funding provided to leading universities, have changed the way Malaysia's research organisations operate. Many institutions have gained valuable experience in obtaining IP rights. Commercialisation has not been very successful to date, as is the case in many other countries. Public research policy should take a different direction and focus on commercialisation for those institutions with good research capabilities in disciplines that lend themselves to commercialisation. Institutions with an orientation in social sciences have fewer chances to succeed. Those institutions with a primary teaching role should focus more on their education role and incentive schemes should be set accordingly. International experience clearly indicates that successful commercialisation is necessarily limited to select institutions and, within them, select IP. This needs to be reflected adequately in Malaysia's IP policies. Getting the business sector more involved is another objective. The incentives for researchers should be set such that they work with industry on specific IP that has been selected by industry, and which industry consequently will be willing to fund and support in order to realise its full commercialisation.

Firms in Malaysia engage to different extents in innovation and, consequently, do not have the same needs with regard to the IP system. Most R&D is conducted in a few large businesses, often government-linked corporations, which apply for national and international patents. By contrast, many SMEs engage very little in technology-based innovations and have for that reason limited interest in applying for patents. Other types of IP, including design rights and trademarks, as well as utility models, are more relevant when it comes to supporting SMEs' innovation capacities. Firms' shortcomings in R&D capacity also make efforts aimed at increasing their benefits from public research more important. Different matchmaking agreements, such as that of the Collaborative Research in Engineering, Science and Technology (CREST) programme, if it operated on a much larger scale, are relevant as they can help firms and research institutions find ways of benefitting each other. Starting with opportunities in the E&E sector seems a good approach as this high-technology sector has the greatest potential for innovation.

Malaysia's biodiversity and, more broadly, traditional industries, represent an important part of Malaysia's economy. They are not only important as a source of income but also provide opportunities for more inclusive growth. Creating a GI for Sarawak pepper has been useful in enhancing quality standards and training. It has proved useful for integrating smallholders,

helping them to produce higher quality products with higher rewards. In general, GIs are helpful in creating brands and signalling origin and quality for plants whose properties are well known, such as pepper. Therefore, similar efforts aimed at creating value from other GIs should be made, including investing in creating industry institutions that will promote quality and market these products.

Another way to support traditional industry with different IP requirements is through traditional knowledge (TK). Efforts to protect Malaysia's biodiversity and TK jointly by developing sustainable business models for those natural resources, as in the pharmaceutical sector, can help uncover new sources of income. Such potential should not be neglected even if it lies outside high-technology sectors. Moving forward in uncovering the potential of TK requires conducting basic research aimed at identifying the potential of developing products from Malaysia's TK.

Broader initiatives aimed at using IP to obtain finance and creating markets for IP, where IP titles are sold or licensed, can be conducive to successful commercialisation by universities and small entities. Malaysia has been active in this field and followed international practice in creating technology platforms to showcase inventions. However, dispersed experimentation on multiple platforms has limited their success. This idea of IP-based financing has made Malaysia a frontrunner in this area, and experiments are currently being conducted to find a model that will allow for IP to serve as collateral for innovation activities.

1.3. Detailed recommendations

This section provides a detailed list of recommendations that, if implemented, will help enhance the contributions of Malaysia's IP system to innovation. The different recommendations, which are aimed at supporting IP policy planning, very much complement each other and will have the greatest effect if all are undertaken.

These recommendations can be prioritised in the following order:

- First, create an effective co-ordination body that would ensure coherence among different stakeholder initiatives (Recommendations 1, 2, 3 and 4). Arguably the most difficult recommendation to implement, this is an essential condition to facilitate coherent policies in support of IP for innovation.
- Second, consolidate IP platforms and improve industry-university relations in order to improve research capacities for the purpose of innovation (Recommendations 15 and 17). Such efforts require setting realistic incentive schemes for universities that focus on achieving the highest potential and quality (Recommendations 7 and 8). Existing institutions and projects should be leveraged where possible.

- Third, introduce SMEs, other smaller stakeholders, as well as larger businesses with little experience of IP, to the benefits of IP. Introducing them to how they can, by engaging in innovation, benefit from the IP system can substantially stimulate performance (Recommendations 13 and 14). Such policy priorities should not stop at SMEs but could extend support to smallholders, including by supporting GIs of large potential.

These priorities arise in a current context where framework conditions for IP are already well established, although the improvements available (Recommendation 5) can increase uptake further, specifically with regards to creating an effective and operational utility model system.

A longer-term objective can be to experiment in line with international practice with financing opportunities based on IP (Recommendation 17), and in that context provide information on registration practices that will also serve to know better how IP is used in Malaysia and consequently what policy can do to support such uptake further.

1.3.1. *Connect IP policies to innovation policies*

1. Build the governance structure and establish a comprehensive policy mix to support IP for innovation policy.

IP policies are only one tool among a variety of instruments. Their effects will be largest if implemented jointly with a broader set of innovation policies. For instance, some of the obstacles to the commercialisation of publicly funded research results stem from the lack of science-industry linkages and insufficient support in the final stages of commercialisation, as well as firms' low absorptive capacities and innovativeness. These obstacles are not related to specific challenges that IP policy could address but they affect its results. Complemented by policies that remove these obstacles, IP policy could be more effective in supporting Malaysia's ambitious innovation agenda. To make this happen, a suitable governance structure (see Recommendation 2) must be created, and building innovation policy support capacities at MyIPO is needed (see Recommendation 3). Another priority involves providing continued support for activities promoting innovation. The forthcoming *OECD Review of Innovation Policy: Malaysia* will provide detailed recommendations (OECD, forthcoming).

2. Create a powerful body dedicated to co-ordinating and advancing the "IP for innovation" agenda.

There is no active high-level governance body or council where IP policy as an instrument for innovation is being discussed. The governance bodies for IP policy are the NIPP Action Council and the National IP Steering and Monitoring Committees. The focus of these bodies' activities is on the legal, operational and international IP agenda. Policies aimed at increasing the use

of the IP system by local businesses, universities and public research institutes, or efforts aimed at protecting traditional knowledge, are not discussed by these bodies. Consequently, IP policy aimed at supporting innovation is fragmented and uncoordinated. A more powerful NIPP Steering Committee could be created if MyIPO became the technical secretariat. It should have the capacity to prepare an agenda on "IP for innovation" issues (see Recommendation 3). The committee would also benefit from high-level effective governance, at prime ministerial level, and the capacity to take and enforce decisions. For the committee to provide relevant advice, both business and public sector IP users need to participate in gatherings. An example of such a body is Japan's IP Commission. At present the business sector is not sufficiently involved in the governance of IP and innovation policy in Malaysia.

3. Provide MyIPO with resources to create a unit dedicated to helping the IP council move beyond legal aspects to consider strategic "IP for innovation" issues.

MyIPO has become a reliable institution for the efficient processing of IP applications and in providing legal support for users and the government. Improvements are partly a result of the autonomy it gained in 2003, which has helped introducing measures to improve the efficiency of its services. A shortcoming is that MyIPO mainly concentrates its analysis of IP use on forecasting demand for IP rights titles for internal budgetary purposes; it does not have the capacity to consider more broadly how the IP system can provide greater incentives to the country's innovation system. A unit within MyIPO that adopts a more strategic perspective on IP and innovation, combining economic, legal and technical expertise, could support a more innovation-geared NIPP Action Council and National IP Steering Committee and co-ordinate an IP for innovation agenda. In order for MyIPO to gather leading-edge knowledge about the IP needs of different Malaysian users, it is important that MyIPO engage with external professionals in the field. Such exchanges would ideally extend also to IP examiners to improve their knowledge, including about international regulations.

4. Ensure that the implementation of programmes aiming to support local uptake of IP are co-ordinated to avoid unnecessary duplication, especially where such duplication weakens a programme's impact.

A number of public institutions provide programmes that support local use of the IP system and the effective commercialisation of IP rights. These programmes have allowed trying and testing different approaches to addressing challenges. However, fragmentation across institutions and a lack of continuity in support of such programmes have reduced these programmes' success. This is the case of Malaysia's IP platforms (see Recommendation 15). This co-ordination can be achieved by giving a committee in charge of

governing IP policy the responsibility to oversee programmes across institutions. Some programmes might usefully be implemented by more than one institution and have a shared budget (to effectively develop joint efforts) (see Recommendation 2).

1.3.2. Improve legal and administrative conditions

5. Reduce the costs of IP filings for smaller firms and research institutions, conditional on commercialisation efforts, and unleash the potential of utility models.

The pricing structure for IP registration is uniform across all entities and inventors in Malaysia. Tax rebates also apply to everyone in the same way. This differs from the case in other emerging economies, such as Colombia or Indonesia, which provide fee reductions for small entities. While the application fees are not deemed too high and are not likely to pose a major challenge, public research entities consider the costs related to renewal fees to be high. With increasingly tight budgets for public research institutions, these IP rights costs might become more of an obstacle. In these cases, subsidies could be awarded and extended to support the preparation of national and international applications. Currently no systematic discounts are provided, although institutions such as PlatCOM Ventures provide support to selected entities. To ensure that lower patenting costs do not lead to the hoarding of limited-value IP, fee discounts and subsidies could be made conditional on commercialisation efforts (see Recommendation 7). Costs and conditions for access to utility models should also be revised. These are hardly used even though they are more accessible to local firms than patents and could serve as a stepping stone for a more effective use of IP as part of these firms' innovation efforts, particularly if the novelty threshold is adequately set and if substantive examination requirements and costs do not make them as equally complex to obtain as patents.

6. Provide free access to, and enhance the analysis of, information about IP to create better-adjusted IP use policies.

There are no studies on the impact of different policies and pricing on the use of IP in Malaysia. Neither does MyIPO publish statistics on changes of pendency (the time between a request for examination and the granting of an IP protection) over the years. Moreover, user statistics and further information are not available on the Internet but can be requested from MyIPO at a cost. MyIPO could improve its annual reporting system and offer more detailed statistics about types of applicants, technological fields, etc., as well as the identities of major local applicants. This would raise MyIPO's capacity to adopt a "strategic perspective" on IP matters (see Recommendation 3). This could help provide greater understanding of what is holding back different types of

potential and actual users from applying for IP protection. It would also be useful to provide free access to MyIPO's information to analysts and researchers. Moreover, a system where ownership changes and licensing operations are systematically registered would facilitate IP markets, including financing schemes. The lack of such an information system has effectively contributed to slowing down opportunities to develop IP finance in Europe. Adopting such a registration system as IP market activities develop in Malaysia gives the country the opportunity to leapfrog other countries' efforts.

1.3.3. Adapt the IP system to users: Universities and public research institutions

7. Implement procedures that support the commercialisation efforts of the most relevant institutions and prioritise quality without deterring research institutions from conducting high-quality research and providing high-quality education.

Incentive programmes need to focus increasingly on quality if they aim to result in successful commercialisation. The public research sector has undergone substantial reforms in recent years. Universities in particular have been subject to a new performance-based regime. A performance-evaluation process that emphasises quantitative performance criteria – notably publications and patents – has had positive effects on public research output. Universities have not only increased their number of publications but also engaged in efforts to explore commercialisation. While the commercialisation experience has often been unsuccessful (as is the case for many countries internationally), the initial phase has been extremely useful in helping identify good practice in dealing with industry, establishing first contacts with relevant partners where previously hardly any relationship existed, and setting up a base of researchers engaged in IP-gathering activities. The incentive programme, therefore, served its purpose well. However, it is now time to adjust incentive programmes to focus more on commercialisation. Success will require an emphasis on quality in IP rather than on quantity. The value of IP rights is highly skewed: only a few IP rights bring high commercial returns, while many others will produce only limited revenues. It will be critical to ensure that incentive programmes focus on producing IP with the potential for successful commercialisation and socio-economic impacts. These programmes should take into account the different strengths of the country's research institutions. For instance, institutions specialised in vocational training have more to contribute in addressing shortcomings in human capital. Their opportunities to commercialise IP are rather limited, as are those of institutions with a strong emphasis on social sciences. In both cases, it is difficult to require that they focus on greater commercialisation. A more differentiated incentive programme would recognise the indirect contributions of these institutions to

innovation. In addition, institutions should adopt a broad definition of knowledge transfer, one that includes providing expert services and that relies on different forms of IP, trademarks among them, rather than narrowly focussing on technology transfer and patents.

8. Set more realistic and quality-based revenue targets for public research institutions.

With greater autonomy provided to public research institutions, they are also expected to raise 25% of their own operating budgets beginning in 2015, a share that will increase to 75% by 2025. This is a very sharp increase given that until recently public funds covered all costs. Such requirements can play a useful role in creating commercialisation incentives to help raise some revenue. It might, however, divert attention away from knowledge-transfer activities, which are not based on IP rights but might serve a useful purpose in building industry-university relations. These are critical for the future success of commercialisation efforts. The commercialisation of research results is only one possible source of revenue. Universities will seek commercialisation opportunities if real possibilities exist; however, other countries' experiences have shown that this is often only the case for a small number of the best universities. More modest commercialisation targets would be appropriate, and performance should not be evaluated based primarily on quantity. Moreover, as was noted above, only a small number of IP-protected inventions generate the large majority of revenues, while most IP titles generate little if any revenue. This needs to be taken into consideration by the government: universities should not be encouraged to keep a large pool of IP that will be costly to maintain (due to ongoing fees); instead, they should focus on developing only those innovations with the greatest potential to produce revenue.

9. Universities and public research organisations should remove cumbersome bureaucratic obstacles where they still exist.

Universities have gained substantial flexibility and are less restricted by bureaucratic constraints than in the past. The creation of wholly-owned corporate subsidiaries to handle commercialisation has helped substantially to improve the process of engaging with industry. These subsidiaries can operate like private entities, and freedom from regulatory constraints has allowed them to handle IP licensing agreements and spin-offs. Importantly, researchers can create and decide to work for spin-offs. However, bureaucratic obstacles do still exist, particularly in some public research institutions. For instance, approval cycles can be very long because licensing agreements must be approved by university management at the highest levels. Management processes should also be reconsidered and streamlined to create more cost- and time-effective decision-making. Simplified signature requirements from high-level officials can ease the process.

10. Introduce attractive incentives for researchers that allow research institutions to cover overall costs.

Royalty revenue-sharing programmes tend to favour the researcher (80:20 shares for royalties in some cases). Yet among researchers, tenure-track positions and wider rewards relative to publishing efforts have had limited success in changing the dynamics whereby researchers have limited interest to aim for commercialising inventions. This applies particularly if a short-term perspective is adopted, so that the long-time involvement necessary to profit from IP becomes largely unattractive to researchers. Funding for the last stages of R&D projects should also be provided to facilitate the development of inventions that can more easily be adopted by industry, but not to the detriment of funding for the first, more exploratory stages. Currently such late-stage funding is often missing. Funding for research projects must take account of the full budget: research, development, proof of concept, prototypes, IP protection (filing, international extensions and renewals) and commercialisation (exhibitions, IP markets, etc.). At the same time, the share that remains for institution as overheads is not always sufficient; it may challenge the quality of services their technology transfer offices (TTOs) provide. Thinking of alternative reward programmes for researchers – where IP and commercialisation efforts receive greater rewards – may be a more suitable objective than having higher revenue-sharing programmes. At the same time, improving the efficiency of universities' support services, e.g. by creating an association of TTOs to pool support efforts, may be an easily achievable improvement.

11. Support initiatives and structures that aim to enhance knowledge-sharing among Malaysian technology transfer managers.

TTOs tend to have limited budgets and a research-based perspective, with a reduced ability to reach out to industry, particularly in areas of marketing and commercialisation. Staff rotation is an issue in some instances, as is the limited expertise in helping with commercialisation. Experienced staff should be hired, and, if necessary, regional or state-level TTOs that achieve critical mass by serving several universities could be helpful. One of the problems in the Malaysian innovation context is a lack of technology transfer experts. The Ministry of Education (MOE) created the Innovation and Technology Managers Association as a platform to discuss ways of advancing their institutions' innovations and technologies so as to improve capabilities of managing IP by means of exchanging experiences. Efforts to help these types of institutions will be particularly valuable in improving support for commercialisation. Moreover, only if greater importance is given to the position will IP managers at universities be able to effectively support IP commercialisation.

1.3.4. Adapt the IP system to users: Industry, SMEs and the informal sector

12. Support relevant GIs to foster different types of non-technological, inclusive innovations.

Malaysia's state of Sarawak has actively engaged in identifying potential GIs and registering them. In this phase, quantity has been favoured over a comprehensive strategy to "develop" some of these products, which would require building associations capable of ensuring product quality and marketing GIs. These steps are critical to generate value from GIs. Sarawak's Pepper Board is a well-functioning model to be followed by other products. Another example of a successful GI is Colombia's Juan Valdez coffee, whose success is built around a powerful industry association in charge of marketing and quality control.

13. Enhance companies' capacity to take advantage of IP to support their innovation performance.

Efforts to improve SMEs' absorptive capacities to foster their uptake of public research will be valuable. The Malaysian Technology Development Corporation (MTDC) is engaged in such efforts. Further support policies have been implemented under the aegis of different ministries, including as part of the measures to realise the objectives of the SME Masterplan. PlaTCOM Ventures supports firms with advice on how to obtain IP for their inventions and how to source IP developed elsewhere, as well as how to commercialise their own IP. Such broad-scale initiatives targeted specifically at SMEs would be valuable in today's context. The enterprise's current capacity, which in its first months had only supported 16 companies, will do little.

14. Broaden IP support policies beyond patents to make IP rights more accessible to SMEs.

It will be critical to focus IP policies on promoting the use of more "accessible" types of IP such as utility models, trademarks and design rights. Many of Malaysia's SMEs do not have the R&D capacity needed to obtain patents, particularly the large number of SMEs operating in the services sector. In many activities, trademarks, design rights and utility models can be more relevant. However, much of the support is focused on pursuing patents, while little has been done to raise the uptake of utility models. Moreover, there is no large-scale programme aimed at supporting SMEs to manage and obtain other IP titles beyond patents. This should be changed by introducing projects such as the *Propiedad Intelectual* project in Colombia (see Box 5.5).

1.3.5. *Promote markets, standards and diffusion*

15. Consolidate and maintain existing platforms for IP commercialisation.

Government policy has supported the development of platforms that allow inventors to connect with those interested in commercialisation, effectively helping universities but with the potential to help individual or small-scale inventors. Malaysia currently has two initiatives, PlaTCOM Ventures and MyIPO, which aim to give research institutions the opportunity to display their technologies to potential licensors or purchasers. It is worth finding synergies among platforms to increase opportunities for these platforms to succeed. Having more technologies on display matters, as does having contributions from Malaysia's best research institutions. Moreover, the different approaches adopted by these platforms are usefully considered in a combined way: the approach adopted by PlaTCOM aims to provide information in simple terms; this can be combined with the more technical information provided by MyIPO. A joint effort can help raise interest among IP owners to feature their technologies on these platforms. Currently, users are increasingly reluctant to contribute as they have received multiple requests to provide information in different formats. This increases the workload for those in charge of commercialisation activities. There is also some fatigue because past contributions had not paid off: platforms were discontinued a few years after their creation. A credible effort needs to be made to create a single platform to increase users' interest in contributing to the platform and in teaching potential licensors and buyers how such a platform can help their innovation activities.

16. Make all necessary legal adjustments to enable the IP financing initiative, set realistic objectives and track developments to build success.

Malaysia has been in the vanguard of countries introducing an IP financing model whereby IP would serve as collateral for business loans. The model is in its infancy and much fine-tuning will be needed. Consequently, tracking success in uptake among different stakeholders, including banks, will be important. An immediate step that needs to be taken for Malaysia to develop its financing model is to ensure the adoption of legal adjustments that would allow patents to function as collateral. Efforts towards the development of IP-based technology markets are also important. This can be done by joining efforts with other countries in the region to create a harmonised legal framework for IP financing and, what is more, a regional market for IP.

17. Improve the conditions of industry and universities to create collaborative IP, in particular through industry-specific organisations.

Collaborative Research in Engineering, Science & Technology (CREST) is an excellent example of good practice in support of industry-led collaborative research. The organisation provides collaborative research funding for the E&E

industry, with projects involving multinationals, local SMEs and academia. Projects, which are conceived and funded in private-public partnerships, follow a very strict selection process. The model could produce greater benefits if applied to other sectors that also feature large local firms and public research institutes. Shift 7 (Innovation Ecosystem) of the Malaysia Education Blueprint 2015-25 also involves the creation of the Public-Private Research Network (PPRN) to enhance collaboration between academia and industry, notably to enhance the contributions of public research to Malaysian businesses, including SMEs (MOE, 2015). One way of increasing support for such public-private collaboration is via the provision of standard collaboration agreements, such as the United Kingdom's Lambert toolkit, which provides model research collaboration agreements to facilitate negotiations and agreements (UK IPO, 2015). Another way could consist of adopting policy measures to encourage the country's largest firms to use publicly funded research results in innovative projects. These companies are relevant stakeholders as they have financial resources and higher absorptive capacities than small firms.

18. Extend the use of standards as a way to diffuse national intellectual property.

Standards offer another method of transferring intellectual property created by researchers and firms internationally to others, including in sectors that are not based on high technology. In the case of Malaysia this includes, for instance, standards in Islamic banking practices or halal food production. Standards can promote the diffusion of Malaysian IP. Standards are already used in this way in regard to halal food and logistics products, supporting Malaysia's position as a leading producer. Malaysia is also strongly involved in international standard-setting committees in relation to products derived from natural resources (e.g. rubber) and sustainability. These efforts can often complement IP rights because standards can support groups of national firms, particularly as they seek to enter foreign markets.

Note

1. The Gini coefficient is a standard measure of inequality, where "0" means everybody has the same income and "1" means the richest person has all the income. Gini coefficients are provided by the World Bank's World Development Indicators.

References

Department of Statistics Malaysia (2015), "Malaysia External Trade Statistics December 2014", Statistics Malaysia (press release), *www.statistics.gov.my/index.php?r=column/pdfPrev&id=eFEzSHN5bXF0ZjFGZFZ2Vm1GY05zUT09*.

Department of Statistics Malaysia (2012), "Profile of Small and Medium Enterprise", *Economic Census 2011*, Statistics Malaysia, Putrajaya.

Fortune (2015), "Global 500 Ranking 2014, Petronas", *http://fortune.com/global500* (accessed on 13 February 2015).

MOE (2015), Malaysia Education Blueprint, 2015-2015, *http://hes.moe.gov.my/event/*.

OECD (forthcoming), *OECD Review of Innovation Policy: Malaysia*, OECD Publishing, Paris.

OECD (2014), "Country Profile: Malaysia", *OECD Science, Technology and Industry Outlook 2014*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/sti_outlook-2014-en*.

OECD (2015), *Main Science and Technology Indicators* (database), *http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB* (accessed on 31 January 2015).

SCImago (2014), "Institution Rankings", *www.scimagoir.com*, (accessed on 17 November 2014).

SME Corp. (2012), "SME Masterplan 2012-2020", *www.smecorp.gov.my/vn2/node/190*.

UK IPO (2015), Lambert Toolkit, *www.gov.uk/lambert-toolkit*.

UNESCO (2015), *UIS.Stat* (database), *http://stats.uis.unesco.org* (accessed on 22 February 2015).

WIPO (2015), *WIPO IP Statistics Data Center* (database), *http://ipstats.wipo.int/ipstatv2/* (accessed on 22 February 2015).

World Bank (2014), *Doing Business Indicators* (database), *www.doingbusiness.org/rankings* (accessed on 23 February 2015).

Chapter 2

Malaysia's socio-economic and innovation context

The chapter describes Malaysia's socio-economic development, its industry and trade structure, and the existing framework conditions for innovation activities, covering human capital, finance and infrastructure. It goes on to provide an overview of the national innovation system and the policy and governance of innovation policy in Malaysia.

Intellectual property can be a powerful support to the national innovation system. Its effects will, however, critically depend on the context in which it operates, including the intensity of innovation investments, the variety of firms and research organisations in a country, and the framework conditions and socio-economic challenges and opportunities a country faces. The policy governance context also shapes opportunities. It is from this perspective that this chapter describes Malaysia's socio-economic and innovation context.

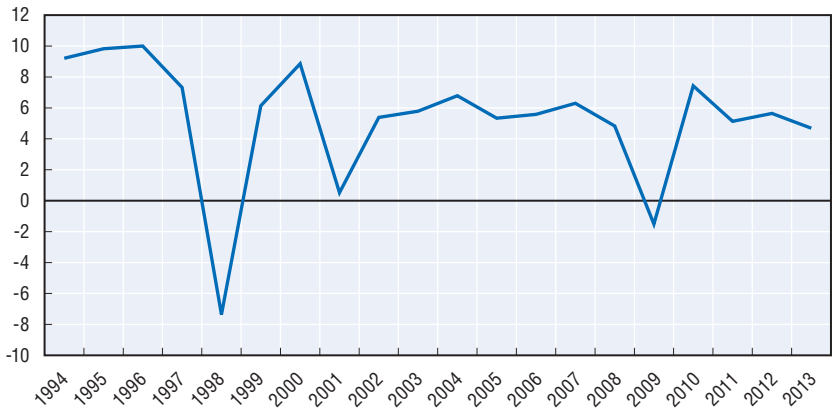
2.1. Malaysia's socio-economic development

With per capita gross national income of USD 10 400 in 2013, Malaysia is classified by the World Bank as an upper middle-income country. It ranks third among ASEAN countries behind Singapore (USD 54 040) and Brunei Darussalam (USD 31 590), and ahead of Thailand (USD 5 340), Indonesia (USD 3 580), the Philippines (USD 3 270) and Viet Nam (USD 1 740). The country's GDP was USD 312.4 billion in 2013, placing it 35th in the world. In 2013 the population was 29.72 million, placing it sixth among the ten ASEAN countries. Its current economic status has been the result of substantial economic growth, having achieved one of the best economic records in Asia, with more than 6.5% growth in GDP per year since 1957, the date of Malaysia's independence from Britain. During the period 1994–2014 specifically, Malaysia's GDP average growth rate has been 5.3%, well above the average of OECD member countries (2.1%) and of countries in Latin America (3.1%). During the same period, Malaysia experienced three downturns: the first in 1998 following the 1997 Asian financial crisis; the second in 2001 when the dot-com bubble burst; and the third in 2009 as a result of the global financial crisis of 2007-08 (Figure 2.1).

The share of households below the poverty threshold has been significantly reduced in the past decade, from 8.5% in 1999 to 1.7% in 2012 (14.8% and 3.4% respectively in rural areas) (Economic Planning Unit, 2013a). However, Malaysia's high growth rates, together with changes in industry structure in the manufacturing sector, created imbalances in the distribution of wealth. Among ASEAN countries, Malaysia is the most unequal country in terms of its GINI coefficient (Figure 2.2). Malaysia's GINI coefficient has decreased moderately from 0.49 in 1997 to 0.46 in 2009.

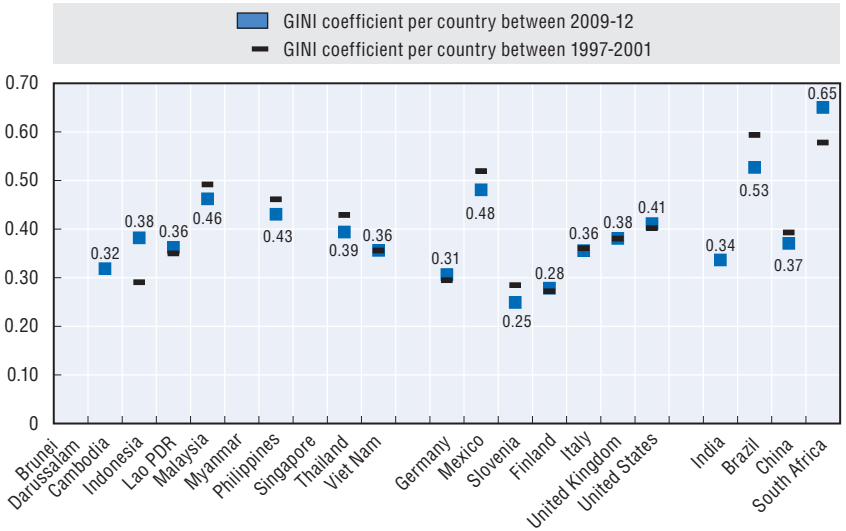
Economic development is also unevenly distributed among Malaysia's states, with strong inequalities in terms of innovation and, more generally,

Figure 2.1. **GDP growth in Malaysia, 1994-2013**



Source: World Bank (2015), *World Development Indicators* (accessed on 23 February 2015).

Figure 2.2. **Gini coefficients per country in 2012 (or most recent year) and 10 years earlier**

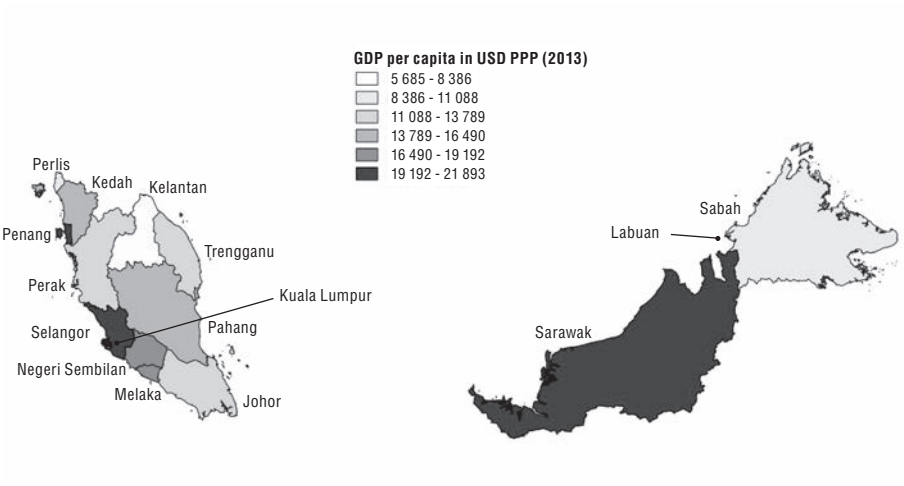


Note: The data on Gini coefficients is not provided on a yearly basis, therefore, a comparison between two periods is made. Gini coefficients are retrieved from the following years: Malaysia (2009); Finland, Germany, Italy, Thailand, United Kingdom and United States (2010); Cambodia, China, Indonesia, Slovenia and South Africa (2011); Brazil, India, Lao PDR, Mexico (2012).
Source: World Bank (2015), *World Development Indicators* (accessed on 23 February 2015).

production capabilities. The more industrialised western part of Malaysia, which comprises the states of Selangor, Johor, Perak, Kedah, Penang, Kelantan, Pahang, Terengganu, Negeri Sembilan, Melaka and Perlis, as well as the federal territories of Kuala Lumpur and Putrajaya, is home to more than 80% of the

population. In particular, Penang and Selangor are highly industrialised, hosting the manufacturing and assembly plants of several electrical and electronics (E&E) multinationals. The two eastern states, Sarawak and Sabah, separated from the western territories by the South China Sea, rely mostly on agriculture and natural resources such as timber, palm oil, rubber and pepper. Both states have considerable natural resources and contribute substantially to making Malaysia one of the most bio-diverse countries in the world. The four states with the highest GDP per capita are Kuala Lumpur, Penang, Selangor – which are part of the industrialised western part of Malaysia – and Sarawak, a state with rich natural resources in crude oil, gas and timber, and with an export-oriented palm oil industry. The joint revenue of these four states is three times higher than that of the poorest states of Sabah, Perlis, Kedah and Kelantan, with Sabah and the western state of Kelantan having the highest poverty rates, at 7.8% and 2.7% respectively in 2012 (Economic Planning Unit, 2013).

Figure 2.3. **GDP per capital of Malaysia's states and federal territories**



Note: This graphic is based on GDP per capita in USD purchasing power parity data: Kuala Lumpur (includes Putrajaya) (42 466), Labuan (23 348), Sarawak (21 893), Penang (20 424), Selangor (20 155), Melaka (18 162), Negeri Sembilan (17 589), Pahang (14 249), Johor (13 473), Terengganu (12 399), Perak (11 262), Sabah (9 906), Perlis (9 861), Kedah (8 688), Kelantan (5 685).
Source: Department of Statistics Malaysia (2014a).

2.2. Industry structure, trade patterns and foreign direct investment

Malaysia's economy is characterised by the importance of the services sector, which represented 55% of GDP in 2013. Manufacturing accounts for 25% of GDP; 16% comes from primary sectors such as agriculture, forestry, fishing and mining; and the remaining 4% comes from construction. Within the services sector, wholesale and retail trade, accommodation, and restaurants

accounts for 30.7% of activity; real estate services and finance and insurance account for 27.0%; government services for 14.6%; transport, storage and communications for 13.9%; and electricity, gas and water for 4.6% (Economic Planning Unit, 2014). Malaysia is the third-largest Islamic banking and financial centre in the world. Tourism is the country's third-largest source of foreign exchange income (OECD 2013a). This differs from the situation in 1970, when industry represented 14% of GDP while agriculture and mining accounted jointly for 43% (OECD 2013a).

A variety of businesses contribute to Malaysia's innovation system. These include government-linked companies, micro and small businesses, as well as informal firms. Major conglomerates and government-linked companies (Box 2.1) are important players in Malaysia's economic landscape (Thiruchelvam et al., 2011). Micro and small businesses are important both in their absolute number and in their contributions to GDP and employment (Box 2.2). Moreover, informal firms' contributions to non-agricultural sectors of the economy were 9.7% of GDP in 2013 (Department of Statistics Malaysia, 2013).

Box 2.1. **Government-linked companies in Malaysia**

Government-linked companies (GLCs) are companies that have primarily commercial objectives and of which the Malaysian government owns at least a 20% interest. Many GLCs are former wholly-owned public companies which were partly privatised. The government also has ownership rights in many companies, directly or indirectly, through its investment holding companies, such as the Ministry of Finance Incorporation (MOF Incorporation) and Khazanah Nasional Berhad. Examples include Sime Darby Berhad in agriculture and forestry, Telekom Malaysia Berhad in telecommunications, Maybank in banking, Petronas in energy, and Proton Holdings Berhad in automobiles.

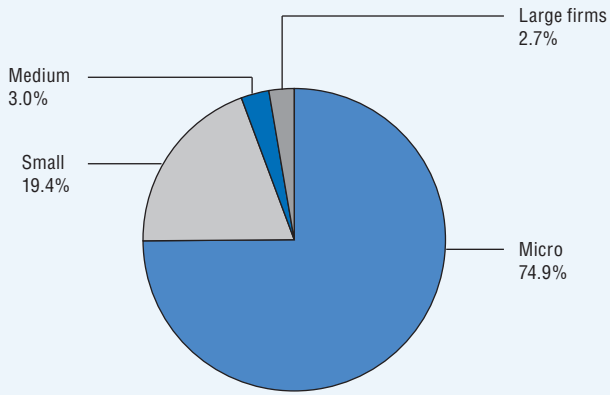
In 2004, the government launched the GLC Transformation Programme to improve the performance of GLCs, including introducing key performance indicators and management changes. The 2012 annual report of the Economic Transformation Programme announced the completion of 15 GLC divestments of 33 that had been identified under the Strategic Reform Initiative introduced in July 2011 to separate the government's role in regulatory and business functions in order to: i) avoid crowding out the private sector; ii) raise liquidity in the capital market; and iii) improve the government's fiscal position. Nevertheless, some estimates indicate that the combined GLC holdings in Malaysian equities still represented at least 35% of the top 100 market cap stocks in 2014. State governments were also expected to divest their respective GLCs, but the majority of these GLCs are not listed in the stock market.

Source: Khazanah Nasional (2014).

Box 2.2. **Small and medium-sized enterprises in Malaysia**

Small and medium-sized enterprises (SMEs) are important in the Malaysian economy. The bulk of SMEs (90%) are engaged in the services sector, while another 6% and 3% respectively are in the manufacturing and construction sectors. In terms of size, three-quarters are microenterprises with fewer than five workers (Figure 2.4). Microenterprises are found mainly in the services sector (78.1% of all enterprises in the sector) and the manufacturing sector (54.5%). The agriculture sector has a higher proportion of large enterprises (24% of all enterprises in the sector).

Figure 2.4. **Distribution of firms by size (2013)**



Note: There were 496 458 micro-sized firms, 128 787 small-sized firms, 19 891 medium-sized firms and 17 803 large firms in Malaysia in 2013.

Most SMEs are concentrated in the Klang Valley: 35.7% of all SMEs are found in Selangor and Federal Territory, followed by Johor (10.3%), Perak (8.0%) and Kedah (6.8%). A key issue among SMEs is their low productivity rate compared to large companies (SME Corp., 2012).

Source: Department of Statistics Malaysia (2013).

A nationwide pilot survey in 2006 that preceded the official survey (which began in 2010) found that 708 000 people were employed in informal sector enterprises; the highest percentage of these were craft and related trade workers (41.7%), followed by service, shop and market sale workers (20.5%) (Baharudin et al., 2011). A 2013 survey reported that the highest concentration of informal workers were found in the construction sector (19.6% of the total), followed by wholesale and retail trade, repair of motor vehicles and motorcycles (17.6%), and manufacturing (16.2%) (Department of Statistics Malaysia, 2013).

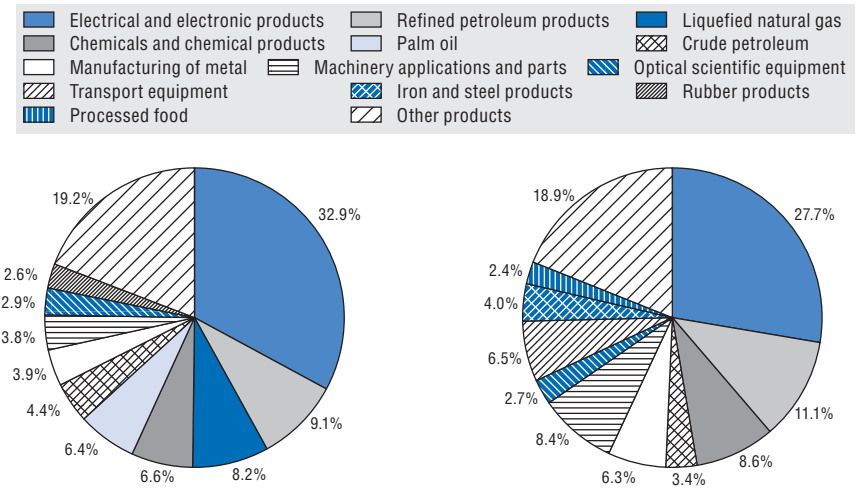
As is the case in Indonesia, Thailand and the Philippines, Malaysia used foreign direct investment (FDI) and export-led manufacturing to emulate the success of the East Asian Tigers, i.e. Hong Kong, Singapore, Korea and Chinese Taipei (OECD 2013a). The manufacturing sector is the largest recipient of FDI inflows in Malaysia, receiving USD 7 759 million (MYR 14 572 million) in 2013 of a total FDI of USD 20 646 million (MYR 38 774 million). A large share of investments went into the E&E sector (MITI, 2014).

The importance of E&E reflects the role of the country as an assembly hub for many multinational corporations (MNCs) in Southeast Asia. MNCs in the E&E sector started bringing their operations to the Penang harbour area – a free trade zone – in the 1970s to take advantage of generous government incentives, such as tax relief and subsidised investment loans (Thiruchelvam et al., 2011). The E&E industry, in which more than 300 MNCs currently operate, progressively changed its production profile from labour intensive, low-technology products and low value-added operations to more capital-intensive, knowledge-based technology products. The challenge now facing the sector is to move into higher value-added innovative product development and to include local companies in research and development (R&D)-intensive activities. Even though the E&E industry has become the principle driver of innovation in Malaysia, it remains driven by MNCs: approximately three-quarters of patents generated in the Penang industrial cluster are owned by MNCs in the electronics sector (OECD, 2011). Making this transition will be critical to successfully competing with rivals in Bangalore and Singapore, as well as to counter competition arising from dynamic developments in Viet Nam.

Malaysia has progressively opened its economy to trade and FDI. It is a founding member of the World Trade Organization (WTO) and has established bilateral free trade agreements with Australia, Chile, India, Japan, Pakistan and New Zealand. As a founding member of ASEAN, Malaysia participates in the ASEAN Free Trade Area.

Malaysia's trade basket has changed over the past four decades as a result of the structural changes reported above. E&E products represented 33% of exports and 28% of imports in 2013 (Figure 2.5). Until the 1980s, the country was one of the largest producers and exporters of tin, rubber and palm oil in the world. Commodities as a share of total exports declined from approximately 95% in the 1970s to less than 30% in 2013 (OECD 2013a). The United States, Singapore, Japan and, more recently, People's Republic of China (hereafter, "China") are Malaysia's top trading partners, both for imports and exports (OECD 2013a).

Figure 2.5. **Proportions of product types in total exports and imports in 2013**



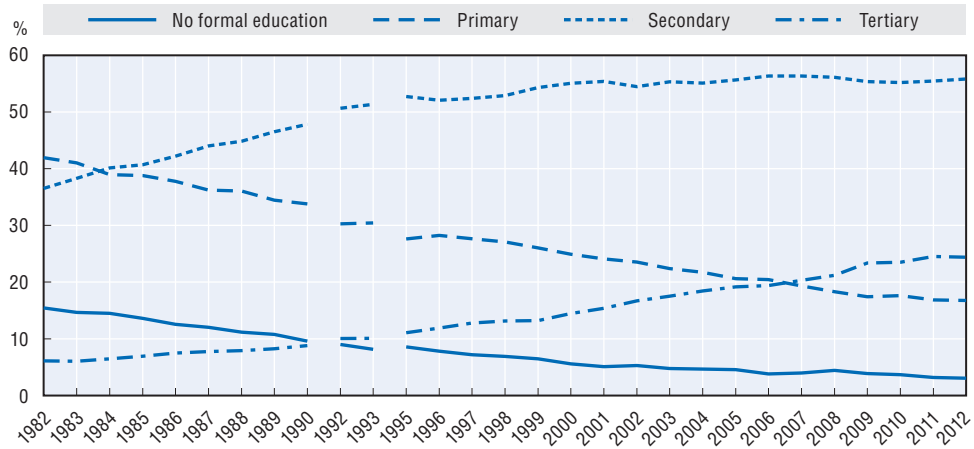
Note: Total exports equalled USD 73.5 billion (MYR 138.0 billion); total imports equalled USD 65.5 billion (MYR 123.0 billion).
Source: Department of Statistics Malaysia (2015).

2.3. Conditions for innovation: Human capital, access to finance and infrastructure

Low human capital in Malaysia is one of the major constraints to innovation (Thiruchelvam et al., 2011). The 10th Malaysia Plan set up by the Economic Planning Unit, which reports to the Prime Minister's Department, includes as a key objective for 2011-15 the need to increase human capital. The increase in the number of public universities from 11 in 2002 to 21 in 2014 has contributed to a higher share of workers with tertiary education (from 6% in 1982 to 24% in 2012) (Figure 2.6). However, further efforts are needed. Teaching quality, syllabus design and, for more applied degrees, interaction with industry are among the shortages in the education system that were identified (OECD, 2013a). The lack of skills is perceived by observers in the E&E industry as a key constraint on further development. They are also a focus of the National ICT Roadmap 2012 (PIKOM, 2012).

Access to finance remains difficult for innovators: SMEs and newly created technology-based firms in particular suffer from an embryonic venture capital sector in Malaysia (OECD, 2013a). The number of venture capital firms and the volume of venture capital in Malaysia increased in the 2000s owing to the introduction of fiscal incentives for private investors. However, the number of deals did not rise at the same rate; much of the available capital was channelled to GLCs (OECD, 2013a). Furthermore, interviews with smaller businesses suggest that there is a high degree of risk

Figure 2.6. **Share of total labour force by educational attainment, 1982–2012**



Source: Department of Statistics Malaysia (2015).

aversion among traditional financial institutions, which restrains innovation projects. Steps to remedy this situation include the creation in 2002 of Malaysian Debt Ventures Berhad (MDV), a wholly-owned corporation of the Ministry of Finance that provides loans, particularly to businesses in information and communication technologies (ICT), biotechnology and green technology. Further detail on access to finance for innovators will be discussed in *OECD Review of Innovation Policy: Malaysia* (forthcoming).

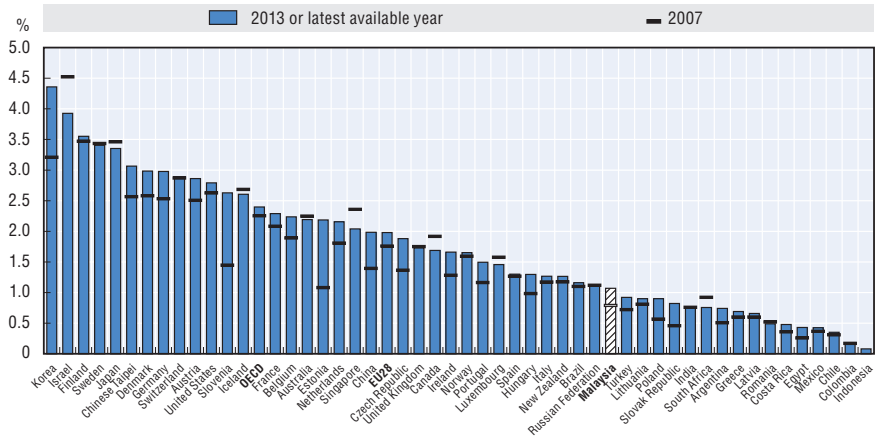
The government has invested heavily in the country's infrastructure, creating 31 ports, 5 international airports and 5 economic corridors between 2006 and 2009.[1] ICT access in Malaysia has also improved significantly over the years, including broadband infrastructure. Fixed broadband penetration has increased significantly, rising from 1.9 subscribers per 100 inhabitants in 2005 to 5.5 in 2009 and 8.2 in 2013. Similarly, wireless broadband subscriptions increased from 3.9 per 100 inhabitants in 2009 to 14.1 in 2013 (ITU, 2014).

2.4. The national innovation system

2.4.1. Research and development investment and personnel

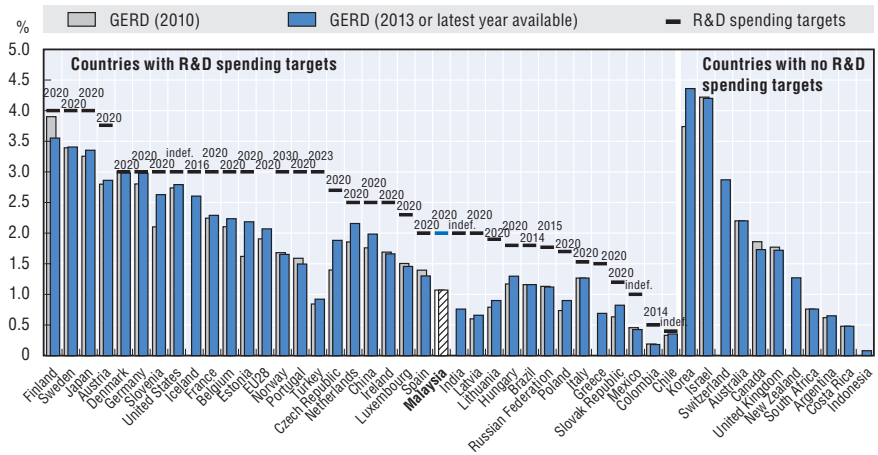
Investment in R&D in Malaysia reached 1.07% of GDP in 2011, the latest year for which statistics are available, rising from 0.5% in 2000 (Figures 2.7 and 2.8). The business sector contributed 57% of total R&D, whereas government agencies and research institutes contributed 14%, and universities contributed 29% (MASTIC, 2013). However, the line between private and public investment is not easy to draw in Malaysia given the large number of GLCs. The geographic distribution of R&D investment within the country is quite skewed, with an

Figure 2.7. **Gross R&D expenditure, 2007 and 2013**
As a percentage of GDP



Note: Data for Austria refer to 2013. Data for Colombia, Costa Rica, Iceland, Malaysia, Mexico, New Zealand and South Africa refer to 2011 instead of 2012; data for Australia and Brazil refer to 2010 instead of 2012; data for Indonesia refer to 2009 instead of 2012; data for Switzerland refer to 2008 instead of 2013; data for Australia, Malaysia and Switzerland refer to 2008 instead of 2007. For Slovenia, a change in methodology in 2011 introduced a break in the series.
Source: OECD *Main Science and Technology Indicators* (database), June 2014, *www.oecd.org/sti/msti*; Eurostat and UNESCO Institute of Statistics, June 2014. Data retrieved from IPP.Stat on 8 July 2014.

Figure 2.8. **National R&D spending targets and gap with current levels of GERD intensity, 2014**



Note: Countries are ranked in descending order of national R&D spending targets and in descending order of gross domestic expenditure on R&D (GERD) intensity in 2013 (or latest available year). For countries that adopted a range of target values, the minimum threshold is used in the chart. For Chile, the national R&D spending target is 0.4-0.8% of GDP; for Luxembourg the target is 2.3-2.6% of GDP by 2020. For Ireland, the national R&D spending target is 2.5% of gross national product by 2013. Argentina, Australia, Austria, Canada, Costa Rica, Korea, Indonesia, Israel, Malaysia, New Zealand, South Africa, Switzerland and the United Kingdom do not have defined R&D spending targets.
Source: Country responses to the OECD STI Outlook policy questionnaires 2012 and 2014; *OECD Science and Technology Indicators* (database); Eurostat and UNESCO Institute for Statistics, June 2014; International Monetary Fund (2014), *World Economic Outlook*. Data retrieved from IPP.Stat on 8 July 2014, *http://stats.oecd.org//Index.aspx?QueryId=57863*.

estimated 86% of total annual R&D spending between 1992 and 2000 occurring in the more-developed states of Kuala Lumpur and Selangor (Chandran and Wong, 2011).

The number of research personnel has increased since 2006. In 2011, the headcount for R&D personnel was equal to 96 961, including researchers (73 752, 45% of them with PhDs), technicians, and support staff. There were about 58.2 researchers per 10 000 workers in 2011, and female participation was quite high at 48.7%[2] (MASTIC, 2013). The proportion of researchers in Malaysia is comparable to the rate in Russia, Hungary and Greece but is well below rates for many OECD countries such as Finland, Israel or Denmark, where the numbers of researchers per 10 000 workers are 159.0, 157.0 and 142.2 respectively (OECD 2015).

2.4.2. Performance of universities and research institutes

In the past ten years, Malaysia has made significant progress in terms of the number of scientific publications it produces, but not in terms of their impact. As noted in Chapter 1, Malaysia improved from 51st position in 1999 in the SCOPUS rankings of countries by number of publications with 1 257 publications to 23rd in 2013 with 23 190 publications (SCImago, 2014). However, the average number of citations received by each of these publications (six) has not increased; it is also slightly below the average citation rate for all Asian countries. The proportion of international collaborations, measured by co-publications with foreign-based authors, has not increased much either, another potential signal of limited improvements in quality (SCImago, 2014).

Publications in the field of engineering accounted for 26% of all Malaysian publications, a share much higher than that of medicine (13%), materials (11%), physics (11%), agriculture (9%), computer science (9%), chemistry (8%) and biochemistry (7%). Engineering has replaced medicine as the predominant discipline over the years. In 1999, engineering accounted for only 14% of Malaysian publications, compared to 34% for medicine. Using 1996-2006 publication data according to a topology of science proposed by Moya-Anegon and Herrero-Solana (2013), Malaysia occupies an intermediate position between the "basic science and engineering cluster" (e.g. China) and the "biomedical cluster" (e.g. the United States). A comparison with China and the United States indicates that Malaysia has followed a trend similar to that of China, giving priority to engineering and increasing its distance from the US model, where the centre of the scientific network is medicine and biochemistry (SCImago, 2014).

2.4.3. Business innovation

There is a significant difference in the innovation performance of the manufacturing and service sectors: 64% of manufacturing firms have developed new-to-the-market products, compared to 27% in the services sectors.

Information from the 2012 Malaysian Innovation Survey indicates that the majority of innovative firms in manufacturing spend more than MYR 500 000 (USD 262 743) per year on research: 42% spend more than USD 525 000 and 15% spend between USD 262 000 and 394 000. In contrast, the majority of innovative firms in services spend less than USD 26 200: 19% spend between USD 13 100 and 26 200; 20% spend between USD 5 255 and 13 100, and 26% spend less than USD 5 255.

2.4.4. Linkages and knowledge flows

Linkages between different actors in Malaysia's innovation system have been characterised as weak (OECD, 2013a). This includes collaboration between universities and industry, which was largely non-existent a few years ago and remains limited, an issue that will be discussed in further detail in Chapter 5. Knowledge flows and technology linkages with E&E multinationals with affiliates in Malaysia have also been judged to be weak (Narayanan and Wah, 2000). Evidence on R&D performance and linkages varies across states and sectors. While spillovers in Penang are numerous, other industrial areas such as Johor do not record a significant number of technological linkages. These differences have been attributed to the diverse types of institutional support provided (i.e. the active role of the state government and other agencies) and the type of MNCs present, as well as the quality of workers, infrastructure and entrepreneurship (Thiruchelvam et al., 2011)

2.5. Policy and governance of science, technology and innovation

2.5.1. Malaysia's development stages and strategic frameworks

Four different stages can be distinguished in Malaysian economic development policy in the past four decades. During the 1970s, the government provided incentives to attract FDI, for instance via the specific fiscal exemptions in free trade zones (OECD, 2013b). This policy was intensified in the 1980s and 1990s, and focussed on putting in place regulations and infrastructure conducive to the (re-)location of multinational enterprises. In the early 1980s, the government also initiated its heavy industrialisation programme, targeting large-scale and capital-intensive projects (steel, machinery and equipment, petrochemicals, cement, and automobile manufacturing). In the 1990s, as FDI inflows slowed, the government increasingly shifted its intervention toward higher added-value investment, supporting specific investments to attract the R&D centres and advanced production and assembly operations of multinationals (OECD, 2013b). Significant investments were made, for instance, in the ICT sector, such as the launch of the Multimedia Super Corridor (MSC) in 1997. According to Thiruchelvam et al. (2011), in the first decade of the 21st century, emphasis was given to developing capabilities in biotechnology and

nanotechnology while building on the country's strengths in manufacturing and expanding the services sector, with the aim to attract investments in Islamic finance, high technology industries, biotechnology and services, notably in the ICT sector.

Each of these phases was supported by economic plans. The first Malaysia Plan, previously called Malaya Plans, covered the period 1966-70 and was followed by a new plan every five years. These plans adopted specific mid- to long-term strategies in key economic areas to create momentum and support the co-ordination of the various actors. In line with the growing interest for these activities as a driver for a new type of growth, science, technology and innovation (STI) activities became increasingly prominent in these plans and strategies as from the mid-1980s. The first National Science and Technology Policy (1986-89) was devised in 1985 and the first Industrial Technology Development Action Plan (1990-2011) in 1990. Although the Second National Science and Technology Policy was launched only later (in 2002), STI has remained a key component of all economic development plans. Another set of plans relevant to STI governs industrial development by the Ministry of International Trade and Industry (MITI): the Industrial Master Plans (IMP). IMP1 (1986-1995) focused on making manufacturing the country's leading growth sector. It was followed by IMP2 (1996-2005), which focused on strengthening linkages and increasing value-added activities. Currently, Malaysia is undertaking IMP3 (2006-2020), which seeks to develop new sources of growth, and to develop innovative, creative and skilled human capital to support growth.

In 2013, the government announced the National Science, Technology and Innovation Policy (NSTIP) (2013-20), which provides strategic guidelines for STI policy and governance to better contribute to Malaysia's goal to become an innovation economy by 2020 as outlined in the Nation's Vision 2020 and New Economic Model (OECD, 2014). This strategy is embedded in a broader strategic framework composed of the 11th Malaysia Plan and the Economic Transformation Programme (ETP). The 11th Malaysia Plan sets concrete priorities for government actions over the period 2015-20, including increased access to private sources of financing, creation of a framework for risk mitigation and management of crowdfunding activities. The 11th Malaysia Plan sets greater emphasis on strengthening innovation activities at the enterprise and societal levels, in addition to national-level initiatives. The ETP, launched in 2010, aims to focus efforts on 12 economic sectors – which the government calls "national key economic areas" – that are considered to have the greatest potential to contribute to knowledge-based growth until 2020. Within each of these high-growth sectors, the government identified "entry point projects" to support the shift to higher added-value activities.

A strategic science transformation programme – Science to Action – under the aegis of the Science Advisor to the Prime Minister was launched in 2013 in parallel with the NSTIP to guide science policy specifically. This strategy aims to "streamline and monitor STI projects, policies and achievements towards sustainable growth beyond 2020" (Office of the Science Advisor, 2013). A dedicated committee is expected to review and endorse the targets and programmes selected.

The SME Masterplan 2012-20 was launched to foster SME development in Malaysia. This strategy includes programmes to foster academia-industry collaboration such as the SME-university internship programme, and programmes to foster innovation among SMEs and entrepreneurs, including the High Impact Programmes aimed at helping SMEs develop innovations through the prototype to commercialisation stages, and 1-InnoCERT, a programme that awards certificates to innovative SMEs that then provide easier access to funding for their innovations (SME Corp., 2014).

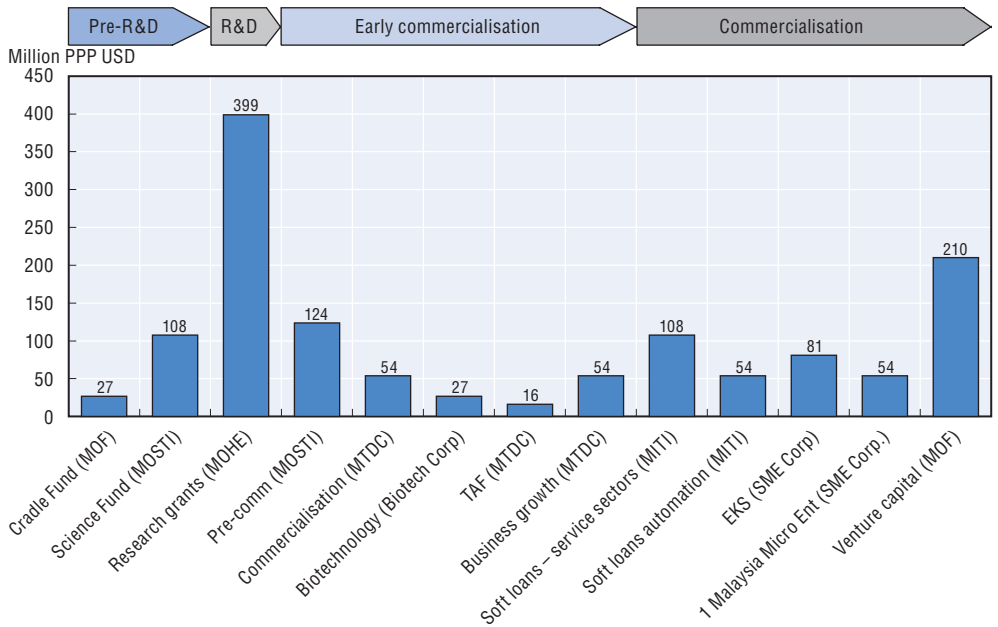
2.5.2. Major STI policy actors

The government's ambition to put in place a new innovation-led growth model has resulted in a significant – and rapidly evolving – portfolio of funding and support schemes covering the different needs of public and private actors that arise at different stages of the innovation process (see Figure 2.9 below and Annex Table 2.A1).

While Malaysia's capabilities in designing and elaborating strategic plans and setting ambitious targets are generally acknowledged, implementation often falls short of expectations. One of the main weaknesses in this context is a lack of policy integration and co-ordination.[3] New strategic frameworks have generally led to the creation of additional institutions, usually new agencies and advisory councils, without thoroughly reforming and trimming the pre-existing governance structure. Over time, this process has resulted in a complex public policy landscape characterised by numerous actors with sometimes overlapping functions and a multitude of intervention schemes, which hinders prioritisation (see Annex Table 2.A3). Priority setting is also made difficult due to the presence of several councils created to support the co-ordination and integration of STI policy (see Annex Table 2.A2).

This STI governance challenge has been addressed in the 10th Malaysia Plan. In order to improve the co-ordination of different ministries' actions, the plan shifts STI policy responsibilities to the Prime Minister's Office. A central innovation agency (the Malaysian Innovation Agency, AIM), has been created under the Prime Minister's Office, In 2011, the Malaysia Industry-Government High Technology Group (MIGHT), a think tank and technology-nurturing platform in charge of supporting the development of high technology

Figure 2.9. **10th Malaysian Plan funding allocations by innovation stage**

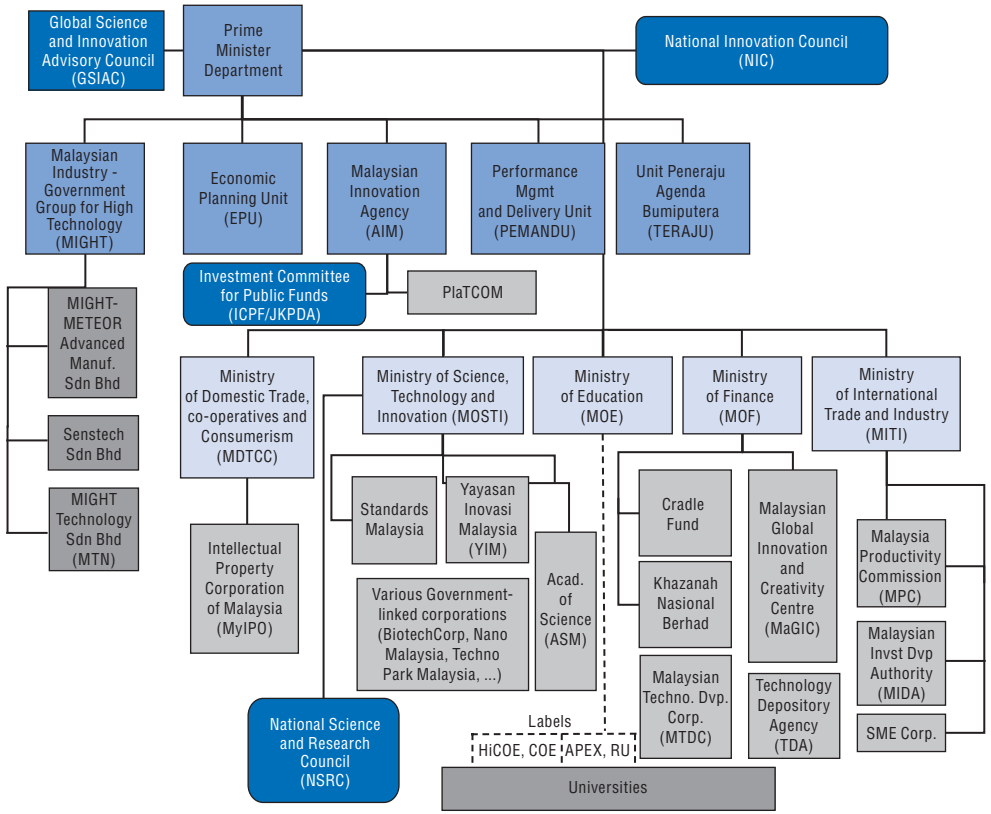


Source: Economic Planning Unit.

industries, was transferred from the Ministry of Science, Technology and Innovation (MOSTI) to the Prime Minister's Office. Also, the government has plans to set up a "research management agency" intended to be the centralised agency tasked with evaluating all R&D applications and with being the custodian of the country's R&D funds.[4] A step in this direction was made with the creation of the Investment Committee for Public Funds, a centralised clearing house to provide recommendations to the Economic Planning Unit in the Prime Minister's Office on all ministries' requests for R&D. Also of note is the 1DANA initiative, a centralised portal providing information on all schemes supporting research and innovation that was launched in October 2014 by AIM to reinforce STI policy integration.[5]

Despite these efforts, most STI support schemes remain in the hands of the different sectoral ministries, in particular MOSTI, the general administrator of STI policy, and MITI, which is in charge of the country's industrial development. The Ministry of Finance is also a key player, not only through its authority over public budget expenditure, but also via specific tax incentives and – less typically – dedicated support schemes provided by the government. The Ministry of Education and, to a lesser extent, the various ministries with public research institutions or GLCs under their jurisdiction are the main actors in science policy. In addition to the ministries listed in Figure 2.10, there

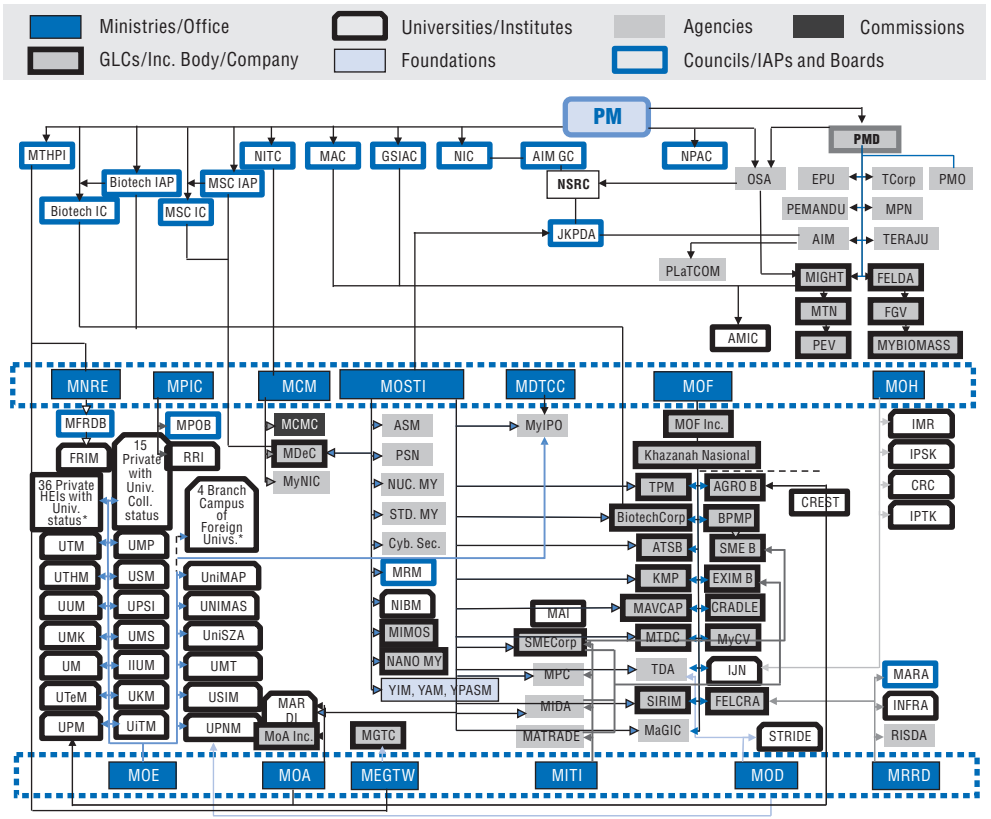
Figure 2.10. **Main actors of the Malaysian STI system as of May 2015**



Source: OECD (forthcoming), *OECD Review of Innovation Policy: Malaysia*, OECD Publishing, Paris.

is also the Ministry of Defence (which is the source of technology offsets); Ministry of Agriculture; Ministry of Energy, Green Technology and Water (which supervises the Malaysian Green Technology Corporation); Ministry of Natural Resources and Environment (to which the Malaysian Palm Oil Board and the Rubber Research Institute report); and Ministry of Communication and Multimedia (responsible for the Multimedia Development Corporation). With regard to SME development specifically, the SME Corporation Malaysia (SME Corp.) was established in 2009 to prepare the SME Masterplan 2012-20 and implement its specific programmes. Figure 2.11 discusses Malaysia's STI ecosystem.

Figure 2.11. **Representation of Malaysia's STI Ecosystem**



Note: Arrowhead determines governance/chairmanship. All Ministries and agencies interact. Only significant relationships are signified by dotted line. For councils the black dotted line without arrowhead signifies secretariat. Only fund providers that operate as an entity are included. For glossary, see annex.
Source: OECD (forthcoming), *OECD Review of Innovation Policy: Malaysia*, OECD Publishing, Paris.

Notes

1. The first three corridors, the Northern Corridor Economic Region, Iskandar Development Region and the East Coast Economic Region were formulated and adopted during the period 2006-07. The regional development plans for Sabah and Sarawak were finalised and adopted in early 2009.
2. Female researcher participation was lower in 2011 in Denmark (31.9%), Finland (31.4%), Singapore (28.5%), Germany (24.9%), South Korea (16.7%), and Japan (13.6%).
3. See National Science and Research Council (2013); Day and Muhammad (2011); Degelsegger et al. (eds.) (2014); OECD (2013a, 2013c).
4. More information will be provided in OECD (forthcoming).
5. The annex provides an overview of the governance of R&D and innovation policies in Malaysia, as listed in the 1DANA portal.

References

1DANA (2014), *www.1dana.gov.my* (accessed on 3 February 2015).

Baharudin et al. (2011), "Informal employment in informal sector enterprises in Malaysia", *Journal of the Department of Statistics Malaysia*, Vol. 2, pp. 33-45.

Chandran, V.G.R. and C.Y. Wong (2011), "Patenting activities by developing countries: The case of Malaysia", *World Patent Information*, Vol. 33, pp. 51-57.

Day, N. and A. Muhammad (2011), *Malaysia: The Atlas of Islamic-World Science and Innovation*, Country Case Study No. 1, Royal Society of London for Promoting Natural Knowledge, London, *http://hdl.handle.net/10625/48146*.

Department of Statistics Malaysia (2015), *www.statistics.gov.my* (accessed on 27 January 2015).

Department of Statistics Malaysia (2014a), "GDP per state 2005-2013: National accounts", *www.statistics.gov.my* (accessed on 17 December 2014).

Department of Statistics, Malaysia (2014b), "Economic census 2011: Profile of small and medium enterprises", quoted from National SME Development Council (2014), "SME Annual report 2013/14".

Department of Statistics Malaysia (2013), "The informal sector workforce survey report, Malaysia, 2013", *www.statistics.gov.my* (accessed on 17 November 2014).

Degelsegger, A. et al. (eds.) (2014), "Spotlight on: Stimulating innovation in Southeast Asia", *SEA-EU-NET report*, *www.sea-eu.net/object/news/159/attach/SEA-EU-NET_Buch_Web.pdf*.

Economic Planning Unit (2013), "Incidence of poverty by ethnicity, strata and state", *www.epu.gov.my/documents/10124/669145a4-1b34-4f04-9043-31b24d1c3442*.

Economic Planning Unit (2014), "The Malaysian economy in figures 2013", *www.epu.gov.my/documents/10124/1e9cd2e5-67a8-4b6c-b530-b1448a6a1475*.

Khazanah Nasional (2014), *www.khazanah.com* (accessed on 2 February 2015).

International Monetary Fund (2014), "Is the tide rising", *World Economic Outlook*, January 2014, *www.imf.org/external/pubs/ft/weo/2014/update/01/pdf/0114.pdf*.

ITU (2014), *ICT Data and Statistics* (database), *www.itu.int/ITU-D/ict/statistics/explorer/index.html* (accessed on 17 November 2014).

MASTIC (2013), "National Research and Development (R&D) Survey", *www.mastic.gov.my/en/web/guest/statistik-kajian-rnd-kebangsaan* (accessed on 2 February 2015).

MITI (2014), *Weekly Bulletin*, Vol. 280, 4 March 2014, *www.miti.gov.my/cms/document storage/com.tms.cms.document.Document_8fe91317-c0a8156f-4b8f2f00-b41b196b/MITI%20Weekly%20Bulletin%20Volume%20280%20-%204%20March%202014.pdf*.

Narayanan, S. and L.Y. Wah (2000), "Technological maturity and development without research: The challenge for Malaysian manufacturing", *Development and Change*, Vol. 31, pp. 435-457.

Office of the Science Advisor (2013), *Science to Action: Strengthening Science*, November 2013.

OECD (forthcoming), *OECD Review of Innovation Policy: Malaysia*, OECD Publishing, Paris.

OECD (2015), *Main Science and Technology Indicators* (database), *http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB* (accessed on 8 June 2014).

OECD (2014), "Country profile: Malaysia", OECD *Science, Technology and Industry Outlook 2014*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/sti_outlook-2014-en*.

OECD (2013a), *Innovation in Southeast Asia*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264128712-en*.

OECD (2013b), *OECD Investment Policy Reviews: Malaysia 2013*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264194588-en*.

OECD (2013c), "Effectiveness of research and innovation management at policy and institutional levels", Cambodia, Malaysia, Thailand and Vietnam, OECD Publishing, Paris, *www.oecd.org/sti/Effectiveness%20of%20research%20and%20innovation%20management%20at%20policy%20and%20institutional%20levels_Meek%20and%20Olsson.pdf*.

OECD (2011), *Higher Education in Regional and City Development: State of Penang, Malaysia 2011*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264089457-en*.

PIKOM (2012), *ICT Strategic Review 2012/13: Innovation for Digital Opportunities*, *www.pikom.org.my/cms/ICT_Strategic_Review/ICT_Strategic_Review_2012-2013.pdf*.

PlaTCOM Ventures (2015), *www.platcomventures.com/Funding-@-IP_Funds.aspx* (accessed on 31 January 2015).

SCImago (2014), *www.scimagojr.com* (accessed on 17 November 2014).

SME Corp. (2014), *www.smecorp.gov.my/vn2/programmes* (accessed on 3 February 2015).

SME Corp. (2012), "SME Masterplan 2012-2020", *www.smecorp.gov.my/vn2/node/190*.

Thiruchelvam, K. et al. (2011), "Financing innovation: The experience of Malaysia", Towards Effective Policies for Innovation Financing in Asia Project, working paper report for the International Development Research Centre, Canada.

World Bank (2015), *World Development Indicators* (database), *http://data.worldbank.org/data-catalog/world-development-indicators*.

Annex

Table 2.A1. **Funding programmes listed in the 1DANA portal**

Phase	Ministry	Examples of Funds
Basic Research	Ministry of Education	Exploratory Research Grant Scheme (ERGS)
		Fundamental Research Grant Scheme (FRGS)
		Long Term Research Grant Scheme (LRGS)
Applied R&D	Ministry of Communications and Multimedia	Creative Industry Development Fund (CIDF-SKMM)
	Ministry of Health	Research grants
	Ministry of Education	Prototype Development Grant Scheme (PRGS)
	Ministry of Science, Technology and Innovation	Science Fund
Pre-Commercialisation	Ministry of Finance	Cradle Investment Programme Catalyst (CIP Catalyst) - Pre Seed
		Cradle Seed Venture Fund 1 (CF1)
		University-CIP Catalyst (U-CIP Catalyst)
	Ministry of Science, Technology and Innovation	Pre-Commercialisation Fund (InnoFund)
		Pre-Commercialisation Fund (TechnoFund)
	Ministry of Communications and Multimedia	Product Development & Commercialisation (PCF)
Commercialisation	Ministry of Science, Technology and Innovation	Bioeconomy Transformation Programme (BTP)
		Biotechnology Commercialisation Fund (BCF)
		Business Growth Fund (BGF)
		Business Start-Up Fund (BSF)
		Commercialisation of Research & Development Fund (CRDF)
		Technology Acquisition Fund (TAF)
	Ministry of Finance	Cradle Investment Programme Catalyst (CIP 500) - Seed

Source: 1DANA (2014).

Table 2.A2. **Main STI councils and committees (as of May 2015)**

	Function	Secretariat	Membership
Investment Committee for Public Funds (ICPF/JKPDA) Established 2014	Co-ordinate public funds associated with research, development and commercialisation. Manage the 1Dana portal	Joint secretariat by AIM and the National Science and Research Council	Headed by the Minister of MOSTI and the CEO of AIM Fund managers in ministries (MOE, MOSTI, MITI, etc.)
Global Science and Innovation Advisory Council (GSIAC) Established 2010	Provide strategic advice to support Malaysia's development through science and innovation Benchmark Malaysia's ranking and competitiveness in science and innovation against technologically advanced countries	Joint secretariat by MIGHT and the New York Academy of Sciences (NYAS).	Headed by the Prime Minister of Malaysia Joint Secretaries: Science Advisor to the Prime Minister and the President and CEO of the NYAS International experts, industry leaders Relevant ministers (MOE, MOSTI, MITI, etc.)
National Innovation Council (NIC) Established 2004	Provide strategic leadership and support policy decision making	Secretariat by Prime Minister's Office	Headed by the Prime Minister of Malaysia 28 members in 2011
National Science and Research Council (NSRC) Replaced the National Council for Scientific Research and Development [NCSRD] in 2010	Set priorities for R&D investment ("one-stop centre for R&D priority-setting") Encourage interdisciplinary research Ensure integration between government departments and organisations Evaluate R&D programmes and monitor outcomes	Secretariat by Ministry of Science, Technology and Innovation	9 *ex officio* members: heads of Treasury, MOSTI, Academy Sciences Malaysia, EPU, MOE, Protem President of Academy of Social Sciences and Humanities, Council of University Vice-Chancellors, AIM, National Defence Research Council The Council is assisted by 10 expert working groups in R&D focus areas (environmental sciences, advanced material sciences, etc.)

Table 2.A3. **Malaysia's national innovation system: Primary actors and their functions**

Organisation	STI support schemes/instruments	Main functions
Cradle Fund Sdn (Cradle)	Cradle grant schemes (pre-seed fund, University Catalyst, Seed Venture,etc.)	R&D COM/IP SKILLS
	Coach and Grow Programme	ENTP
	Angel Tax Incentive	INV/HT
Collaborative Research in Engineering, Science & Technology (CREST)	CREST R&D Grant	R&D
	Great Lab	SKILLS
	Innovation Design Academy	COM/IP
Economic Planning Unit (EPU)	Various activities, including block grants to PRIs	R&D PUBAW GOVSER
Khazanah Nasional Berhad	Manage the assets held by the government and undertake strategic investments.	INV/HT GOVSER
Intellectual Property Corporation of Malaysia (MyIPO)	Various activities related to IP	COM/IP PUBAW SKILLS
Malaysia Productivity Commission (MPC)	Provide information and training on productivity, quality, competitiveness	SKILLS
Malaysia-Industry High Technology Group (MIGHT)	Technology nurturing activities via MIGHT Technology Sdn Bhd (MTN)	R&D COM/IP SKILLS
	Capacity building via MIGHT-METEOR Advanced Manufacturing Sdn Bhd	SKILLS
	Offset Management Services via TDA	R&D
	Support to commercialisation of RFID applications via Senstech	COM/IP
	Intelligence services, via Malaysian Foresight Institute (myForesight) and others	PUBAW GOVSER
Malaysian Biotechnology Corporation (MBC)	Bioeconomy Transformation Programme (BTP)	R&D
	Biotechnology Commercialisation Fund (BCF)	R&D COM/IP
Malaysian Global Inno. and Creativity Centre (MaGIC)	Various entrepreneurship-related initiatives	ENTP SKILLS
Malaysian Innovation Agency (AIM)	Skills-related initiatives: International Baccalaureate (MYP), i-Think, Genovasi,etc.	PUBAW SKILLS
	Commercialisation-related initiatives: PlaTCOM Ventures and Steinbeis Malaysia Foundation	COM/IP ENTP
	Newco: Equity participation in companies (commercialization and upscaling stages)	INV/HT
	Innovation Accelerator Projects	R&D COM/IP
Malaysian Technology Development Corporation (MTDC)	Management of grant schemes: Acquisition (TAF), Commercialisation (CRDF)	R&D COM/IP
	Management of funds: Business Start-up (BSF), Growth (BGF), Expansion (BEF)	COM/IP ENTP INV/HT
	Technology centres	COM/IP SKILLS
	Graduate Entrepreneurship Programme (Symbiosis)	ENTP SKILLS
Ministry of Communications and Multimedia (KKMM)	Creative Industry Development Fund (CIDF-SKMM)	R&D
Ministry of Finance (MOF)	Tax credits and exemptions: Pioneer status, Investment, Reinvestment	INV/HT
Ministry of Health (MOH)	Ministry of Health (MOH) Research Grant	R&D
Ministry of Higher Education (MOHE)	Management grant schemes: Fundamental (FRGS), Exploratory (ERGS), Long Term (LRGS),Prototype (PRGS), Research Acculturation (RAGS), etc.	R&D
	Block grants to the five designated research universities	R&D
Ministry of Science, Technology and Innovation (MOSTI)	Management of several grant schemes: ScienceFund, TechnoFund, InnoFund	R&D COM/IP
	Flagship Programmes	R&D COM/IP
Multimedia Development Corporation (MDeC)	Multimedia Super Corridor (MSC Malaysia)	INV/HT
	Product Development & Commercialisation (PCF)	R&D COM/IP
	Creative Lifelong Learning Programme (CILL)	SKILLS
Performance Management & Delivery Unit (PEMANDU)	Programme implementation (inc. Transformation Programme)	GOVSER
Yayasan Inovasi Malaysia (YIM, Inno. Foundation)	Various activities to foster creativity and innovation among Malaysian citizens	ENTP PUBAW SKILLS

R&D R&D funding

COM/IP Support to research commercialisation/IP

ENTP Support to entrepreneurship and SMEs

INV/HT Investment/equity in HT companies

PUBAW Stakeholders facilitation and public awareness

GOVSER Government advices and services (priority setting, etc.) , Think tank

SKILLS Innovation skills and capacity-building

Source: OECD (forthcoming), *OECD Review of Innovation Policy: Malaysia*, OECD Publishing, Paris.

Table 2.A4. **Glossary of figure 2.11**

Nos.	Acronym	Name
1	AIM	Agensi Inovasi Malaysia (Malaysian Innovation Agency)
2	AIM GC	AIM Governance Council
3	ASM	Academy of Sciences Malaysia
4	ATSB	Astronautic Technology (M) S/B
5	BiotechCorp	Malaysian Biotechnology Corporation
6	Biotech IAP	Biotechnology International Advisory Council
7	Biotech IC	Biotechnology Implementation Council
8	BPM	Agrobank, formerly known as Bank Pertanian Malaysia,
9	BPMB	Bank Pembangunan Malaysia Berhad
10	CRADLE	Cradle Fund Sdn Bhd (Cradle), an agency under the Ministry of Finance, Malaysia (MOF)
11	CRC	Clinical Research Centres (CRC), one of the six research institutes under the National Institutes of Health
12	CyberSecurity	CyberSecurity Malaysia
13	EPU	Economic Planning Unit; Prime Minister's Department
14	EXIMBank	Export-Import Bank of Malaysia Berhad (EXIM Bank) wholly owned subsidiary of the Minister of Finance Inc.
15	FELCRA	Federal Land Consolidation and Rehabilitation Authority
16	FRIM	Forest Research Institute Malaysia
17	GSIAC	Global Science and Innovation Advisory Council
18	GTFS	Green Technology Financing Scheme
19	ICT IAP	ICT International Advisory Council
20	IJN	Institut Jantung Negara (National Heart Institute)
21	IMR	Institute for Medical Research
22	INFRA	Institute for Rural Advancement
23	IPSK	Institut Penyelidikan Sistem Kesihatan (Institute for Health Systems Research)
24	IPTK	Institute for Health Behavioral Research (IHBR)
25	JKPDA	Jawatankuasa Pelaburan Dana Awam (Public Funds Investment Committee)
26	Khazanah Nasional	Khazanah Nasional is the investment holding arm of the Government
27	KMP	Kumpulan Modal Perdana (Venture Capital company)
28	MAC	Malaysian Aerospace Council
29	MaGIC	Malaysian Global Innovation & Creativity Centre
30	MARA	Majlis Amanah Rakyat (Council of Trust for the Bumiputera)
31	MARDI	Malaysian Agricultural Research and Development Institute
32	MARTRADE	Malaysia External Trade Development Corporation
33	MAVCAP	Malaysia Venture Capital Management Berhad
34	MCM	Ministry of Communication and Multimedia
35	MCMC	Malaysian Communications and Multimedia Commission
36	MDeC	Multimedia Development Corporation
37	MDTCC	Ministry of Domestic Trade, Co-operatives & Consumerism (KPDNKK)
38	MDV	Malaysian Debt Ventures
39	MEGTW	Ministry of Energy, Green Technology & Water (KeTTHA)
40	MFRDB	Malaysian Forestry Research and Development Board
41	MGTC	Malaysian Green Technology Corporation
42	MIDA	Malaysian Investment Development Authority, previously known as Malaysian Industrial Development Authority

Table 2.A4. **Glossary of figure 2.11** *(cont.)*

Nos.	Acronym	Name
43	MIGHT	Malaysian Industry-Government Group for High Technology; Prime Minister's Department
44	MIMOS	National R&D Centre in ICT of Malaysia
45	MINDEF	Ministry of Defence
46	MITI	Ministry of International Trade and Industry
47	MNRE	Ministry of Natural Resources & Environment
48	MOA	Ministry of Agriculture & Agro-Based Industry
49	MOE	Ministry of Education
50	MOF	Ministry of Finance
51	MOF Inc.	Minister of Finance (Incorporated) [MOF (Inc.)] is a corporate body established under the Minister of Finance
52	MOH	Ministry of Health
53	MOSTI	Ministry of Science, Technology and Innovation
54	MPC	Malaysian Productivity Corporation
55	MPIC	Ministry of Plantation Industries and Commodities
56	MPN	Majlis Profesor Negara (State Council of Professors)
57	MPOB	Malaysian Palm Oil Board
58	MRM	Malaysian Design Council
59	MRRD	Ministry of Rural and Regional Development
60	MSC IAP	MSC International Advisory Panel
61	MSC IC	MSC Implementation Council
62	MTDC	Malaysian Technology Development Corporation
63	MTHPI	National Green Technology & Climate Change Council
64	MTN	MIGHT Technology Nurturing
65	MyCreative Ventures	MyCreative is a government investment arm
66	MyIPO	Intellectual Property Corporation of Malaysia
67	MyNIC	Malaysian Network Information Center
68	NanoMalaysia	NanoMalaysia Berhad
69	NIBM	National Biotechnology Institutes Malaysia
70	NIC	National Innovation Council
71	NITC	National IT Council
72	NSRC	National Science and Research Council
73	Nuclear Malaysia	Malaysian Nuclear Agency
74	OSA	Office of Science Advisor
75	PEMANDU	Performance and Delivery Unit; Prime Minister's Department
76	PLaTCOM	National Technology Commercialisation Platform of Malaysia
77	PMD	Prime Minister's Department
78	PMO	Prime Minister's Office
79	PSN	Science Center of Malaysia
80	PEV	Putra Eco Ventures; subsidiary of MTN under MIGHT
81	RISDA	Rubber Industries Smallholders Development Authority
82	RRI	Rubber Research Institute
83	SIRIM	SIRIM Berhad (Wholly-owned company under the Ministry of Finance Incorporated)
84	SMEBank	SME Bank (Wholly-owned subsidiary of Bank Pembangunan Malaysia Berhad)
85	SMECorp	SME Corporation Malaysia
86	Standards Malaysia	Department of Standards Malaysia

Table 2.A4. **Glossary of figure 2.11** *(cont.)*

Nos.	Acronym	Name
87	STRIDE	Science and Technology Research Institute for Defence
88	TCorp	Talent Corp
89	TERAJU	Unit Peneraju Agenda Bumiputera (TERAJU) (Unit in the Prime Minister's Department)
90	TPM	Technology Park Malaysia
91	YAM	Malaysian Astronaut Foundation
92	YIM	Malaysian Innovation Foundation
93	YPASM	Sultan Mizan Antarctica Research Foundation

Chapter 3

Organisation of Malaysia's intellectual property system

This chapter outlines the primary features of Malaysia's intellectual property (IP) system. It provides an overview of Malaysia's IP laws and regulations, followed by a description of the IP system, its main institutions and the operational and procedural aspects of the IP system.

From a legal and operational perspective Malaysia's national intellectual property (IP) system has matured substantially in the recent decades. IP laws have gone through several reforms to fulfil international commitments related to the World Trade Organization (WTO) Agreement on Trade-Related Intellectual Property Rights (TRIPS) and additional IP-related commitments under ASEAN, as well as other international IP treaties, including the Patent Co-operation Treaty (PCT) system that Malaysia joined in 2006. More importantly for the national IP system, the granting of IP titles has improved substantially following the corporatisation of the IP office in 2003. Investments to improve enforcement of IP rights have also been made.

3.1. Overview of IP laws and regulations

This section provides a brief overview of different IP rights used in Malaysia.[1]

3.1.1. Patents

Since 1986, when the Patents Act of 1983 entered into force, patents must be granted nationally to be valid in Malaysia (ASEAN IPR SME Helpdesk, 2014). The Patents Act replaced the Registration of UK Patents Act 1951, whereby obtaining a patent at the UK Patent Office automatically entitled the holder to IP protection for the same invention in Malaysia. Since 2003, the protection term is 20 years from the filing date of the application; it had been 15 years from the grant date. Further changes were made to the law to ensure compliance with TRIPS, including infringement exemptions for the use of products patented by generic drug manufacturers with the aim to obtain regulatory approval (i.e. Bolar-type exemptions). Filings can be submitted either in English or in Bahasa Malaysia, the national language of Malaysia. In 2003, more changes were introduced to comply with the provisions of the PCT to which Malaysia acceded in 2006.

A few specific characteristics of Malaysia's patent law include the following:

- Business methods are not patentable in Malaysia because they are not intended to solve technical problems. This is also the case at the European Patent Office. In the United States, business methods are patentable.
- The Patents Act includes a grace period of one year so that disclosures made by the applicant or inventor within a year before filing do not destroy

novelty. This provision is particularly useful for inventions by small and medium-sized enterprises (SMEs) or universities searching for investors prior to incurring the cost and effort related to the patenting process. Other IP offices, including that of the United Kingdom and the European Patent Office (EPO), do not allow for a grace period.

- A system of modified substantive examination was established in 1995 for patents filed in Australia, the United Kingdom, the United States and the EPO, and was extended to Japan in 2002 and to Korea in 2003 (Lim Heng Gee et al., 2007).
- Amendments to the Patents Act to comply with the Budapest Treaty on micro-organisms and to introduce a requirement to register changes of ownership and use of patents as collateral (see Chapter 6) are under discussion.

3.1.2. *Utility models*

Utility models, or simple patents, do not exist in all countries and, as they are not subject to international regulations, differ in their degree and scope of protection.[2] Malaysia has provided protection for utility models called "utility innovations" since 1983. Utility models differ from patents in that only one claim, i.e. only one element defining the scope of the technical protection sought, is allowed. The initial protection term is 10 years from the date of application, although it can be extended for another two consecutive five-year periods, which may allow for the 20-year protection provided by a patent (ASEAN IPR SME Helpdesk, 2014).

3.1.3. *Industrial designs*

The Industrial Designs Act of 1996, in force since September 1999, allows for the local application and grant of industrial designs. Before this, Malaysia used the "extension" system, wherein registration of a design in the United Kingdom would grant the right in Malaysia (ASEAN IPR SME Helpdesk, 2014). In 2013, several amendments were made to the Industrial Designs Act:

- The notion of worldwide novelty was introduced, to be in line with other countries. The novelty of a design is a basic requirement for protection. Until 2013, only local novelty needed to be satisfied and the priority of designs only related to public disclosures in Malaysia.
- The protection term was extended from three to five consecutive periods of five years, as is the case in the United Kingdom and other European countries (Managing Intellectual Property, 2014).
- The extension of legal provisions to consider industrial rights as any other personal property was introduced in order to facilitate the creation of a market for IP in Malaysia. That is, industrial design can now be assigned and transmitted. The amendment clarifies certain rights of owners and emphasises the eligibility of registered designs to be used as collateral.

The Layout-Designs of Integrated Circuits Act came into force in 2000 in compliance with the TRIPS Agreement: prior to 2000, layout-designs were specifically excluded from the definition of a design that can be registered under the Industrial Designs Act 1996. This change reflected international practice because layout designs do not determine the external appearance of integrated circuits, but rather the physical location, within an integrated circuit, of each element with an electronic function. No formal registration is required; the protection term is 10 years from the date when the layout is first commercially exploited or 15 years after the date of creation.

3.1.4. Other IP rights

Trademarks

The Trademark Act of 1976 governs trademark registrations, which can be used in relation to goods or services for the purpose of indicating a connection in the course of trade between the goods or service and the person providing such goods or service. In line with the TRIPS Agreement, protection has been provided since 1997 for an initial period of 10 years, renewable for further periods of 10 years. Service marks are also allowed in Malaysia as of 1997.

Geographical indications

Geographical indications (GIs) can be granted in Malaysia on natural or agricultural products, or on any product of handicraft or industry, as provided by the Geographical Indications Act 2000, which came into force in August 2001. GIs cannot be contrary to public order or morality; foreign GIs which have ceased to be protected or have fallen into disuse in their territory of origin are not eligible. As with trademarks, protection is indefinite subject to renewal for consecutive periods of 10 years.

Copyrights

Since the Copyright Act of 1987, protection is given to literary works (including computer programmes), musical works, artistic works, films, sound recordings, broadcasts and performances. Three major amendments to the Copyright Act were introduced in 2012: i) copyright voluntary notification regulations to support and assist copyright owners in issues of ownership and to provide prima facie evidence in court to prove ownership; ii) copyright licensing body regulations, whereby the government will monitor the licensing bodies' activities to promote transparency, accountability and good governance; iii) creation of a copyright tribunal to hear cases relating to disputes on equitable remuneration and licensing schemes, appeals by licensing bodies on revocation of declarations, and translation licenses. In line with the TRIPS Agreement, the copyright protection term is equal to the life of

the author plus 50 years thereafter for literary, musical and artistic works, and 50 years after first release, performance or publication for films, sound recordings, broadcasts and performances.

Plant varieties

According to the 2004 Plant Varieties Act, which came into force in 2008, protection will be provided to plant varieties that are new, distinct, uniform and stable.

3.1.5. *International IP agreements*

Malaysia joined the World Intellectual Property Organization (WIPO) in 1989 and has been a member of the WTO since 1 January 1995, when the WTO was established, and in consequence adopted the TRIPS Agreement. Malaysia has also signed seven international IP treaties (Table 3.1). The country is in the process of adopting the Madrid protocol, which will allow for international filings of trademark applications as part of Malaysia's commitments under the ASEAN Economic Community. Major treaties the country is not a signatory to include the Trademark Law Treaty, the Singapore Treaty on the Law of Trademarks, the Hague Agreement Concerning the International Registration of Industrial Designs, and the Lisbon Agreement for the Protection of Appellations of Origin and their International Registration.

Table 3.1. **International IP agreements signed by Malaysia**

Treaty	Signed
Paris Convention for the Protection of Industrial Property	January 1989
Berne Convention for the Protection of Literary and Artistic Works	October 1990
Patent Cooperation Treaty	August 2006
Nice Agreement Concerning the International Classification of Goods and Services	September 2007
Vienna Agreement Establishing an International Classification of the Figurative Elements of Marks	September 2007
WIPO Copyright Treaty	December 2012
WIPO Performances and Phonograms Treaty	December 2012

3.2. Governmental stakeholders and co-ordination mechanisms

The National Intellectual Property Policy (NIPP), launched in 2007 for the period 2007-12, remains in place until a new strategic policy is implemented (MyIPO, 2007). Its vision is to make Malaysia the IP hub in the region. Supported by a USD 2.8 billion (MYR 5 billion) budget in April 2007, its implementation involved the NIPP Action Council (chaired by the Prime Minister), a Steering Committee (chaired by the Minister of Domestic Trade, Co-operatives and Consumerism) and a Monitoring Committee (chaired by the

Secretary General of the Ministry of Domestic Trade, Co-operatives and Consumerism). The main purpose of NIPP was to harness IP as a new engine of growth for improved economic and social prosperity. Its objectives went well beyond a concern over IP protection for the sake of IP protection. Notably, NIPP focuses on the commercial exploitation of IP, developing an infrastructure for IP transactions and promoting foreign investment and technology transfer. NIPP, has not, however, been implemented in a co-ordinated way. Different institutions acting often in isolation undermine the potential effects of well-designed and often very innovative initiatives.

The main institution in charge of granting IP in Malaysia is the Intellectual Property Corporation of Malaysia (MyIPO). MyIPO also aims to safeguard Malaysia's interest in international agreements and conventions. MyIPO is an agency under the Ministry of Domestic Trade, Co-operatives and Consumerism and provides IP rights for copyright, trademarks, GIs, industrial designs, patents and the layout-designs of integrated circuits. The only exception is plant variety protection: the Department of Agriculture under the Ministry of Agriculture and Agro-based Industry is the national registrar of plant varieties.

Beyond its central role in granting intellectual property rights, MyIPO is also the focal point for IP policy matters within the Malaysian government, advising the government on IP matters and playing a key role with regard to updates of IP legislation. It organises the only formal instance of inter-ministerial co-ordination: the National Intellectual Property Policy Committee (established in July 2007). The committee is composed of three sub-committees:

- The Action Council, chaired by the Prime Minister and composed of representatives of relevant ministries and institutions, determines the direction of IP policies.
- The Steering Committee, headed by the Minister of Domestic Trade, Co-operatives and Consumerism (MDTCC) and composed of representatives from several ministries, co-ordinates the development and implementation of NIPP programmes and activities.
- The Monitoring Committee, headed by the Secretary General of MDTCC, proposes programmes and activities to the Steering Committee and monitors the use of funds allocated to conduct IP policy. It meets on a quarterly basis.

After the implementation of NIPP in April 2007, the Committee and sub-committees met at least once a year during the period 2007-12 to discuss the status of the implementation of NIPP. The Action Council gathers representatives from the Ministries of Finance; Science, Technology and Innovation; Agriculture and Agro-Based Industry; Health; Natural Resources and Environment; Plantation Industries and Commodities; Tourism and Culture; Energy, Green Technology and Water; and Education, as well as from the Attorney General's

Chamber, Bank Negara Malaysia, public higher learning institutions, some research institutions and industry. Participation in the Steering and Monitoring Committees is similar. Industry participation in these committees is limited to representation from the Malaysian Intellectual Property Association, Federation of Malaysian Manufacturers and Malaysian Bar Council.

However, the main issues considered by these committees relate to the administration and enforcement of IP rather than to questions of using IP as a tool in support of innovation. Three principal areas have been pursued: i) improving awareness and enforcement capacities (capacity building); ii) enhancing the quality of the IP service delivery system (infrastructure and improvement of IP service delivery); and iii) building markets for IP and financing opportunities, discussed in Chapter 5 (value on creation). Priorities i) and ii) reflect the strong focus on administration and enforcement of IP, which are critical preconditions for IP to serve innovation, but are insufficient by themselves. Priority iii) shows a stronger focus on using IP to support innovation and points to a positive trend towards the adoption of a wider agenda. One item, however, that has not been a priority has been an emphasis on the IP needs of different types of users, such as universities and public research institutes, SMEs, frontier businesses (e.g. multinational companies and Malaysia's large government-linked enterprises), and traditional and informal industries.

In addition to several ministries involved in IP co-ordination (e.g. MDTCC, the Ministry of Science, Technology and Innovation (MOSTI) and the Ministry of International Trade and Industry [MITI]), other government-related agencies (e.g. the Malaysia Innovation Agency [AIM]) and industry-related actors (e.g. Collaborative Research in Engineering, Science and Technology [CREST]) play a role in the Malaysian IP landscape. Table 3.2 provides an overview of major institutions involved in conducting IP policy for innovation. Such wide institutional governance reflects the expertise of different institutions, but at the same time creates co-ordination challenges to avoid the duplication of initiatives. A first approach in this direction, outside of IP policy, has been taken by AIM's 1DANA portal, which proposes to become a one-stop window to display public funding programmes to support research and development and commercialisation in Malaysia. Finally, unlike in some countries such as Japan, where active and potential users of the IP system in both the private and public spheres (including businesses actively engaged in patenting) play critical roles in IP co-ordination bodies, IP users are largely absent from Malaysia's tentative IP co-ordination initiatives.

An example of a country that has introduced an effective IP governance body is Colombia. It created the Intersectoral Commission for Intellectual Property (*Comisión Intersectorial de Propiedad Intelectual* [CIPI]) in 2010. CIPI brings together major stakeholders in the Colombian IP system and involves

Table 3.2. **Malaysia's IP system: An overview of institutions involved**

Institution	Role
IP Co-ordination	• National Intellectual Property Policy (NIPP) Action Council and IP National Committee: organised by Intellectual Property Corporation of Malaysia (MyIPO)
IP Policy Design	• Ministry of Domestic Trade, Co-operatives and Consumerism (MDTCC) • Malaysian Industry-Government Group for High Technology (MIGHT) • Ministry of Science, Technology and Innovation (MOSTI), Economic Planning Unit • Intellectual Property Corporation of Malaysia (MyIPO), Ministry of Agriculture and Agro-based Industry (MAABI) for plant variety protection
IP Administration	• Intellectual Property Corporation of Malaysia (MyIPO) for industrial property and copyright • Ministry of Agriculture and Agro-based Industry (MAABI) for plant variety protection
Foreign IP Policy Design	• Ministry of International Trade and Industry (MITI)
IP Enforcement	• Ministry of Domestic Trade, Co-operatives and Consumerism (MDTCC), Enforcement Division • Intellectual property courts • Ministry of Agriculture and Agro-based Industry (MAABI) for plant variety protection • National Intellectual Property Policy (NIPP) Monitoring Committee
Other Entities in charge of supporting the IP system	• Ministries: Ministry of Science, Technology and Innovation (MOSTI), Ministry of International Trade and Industry (MITI), Ministry of Education, Ministry of Health • Malaysia Innovation Agency (AIM), including PlaTCOM Ventures, Innovation Business Opportunities (IBO), Steinbeis Foundation Malaysia • Malaysia Debt Ventures • Malaysian Technology Development Corporation (MTDC) • Sarawak State Planning Unit • Industry related agencies: Collaborative Research in Engineering, Science and Technology (CREST)

them in policy making. Different governmental stakeholders have stated that CIPI has helped them to co-ordinate effectively with others and to reach consensus on questions of IP in international negotiations. CIPI has provided an increasingly useful forum for discussion of IP-related topics (OECD, 2014). While further efforts are needed to boost the role of CIPI in steering IP policy to support innovation, the substantial progress made in little time points to the possibility that effective co-ordinating structures can be created where they were previously absent.

3.2.1. *International dimensions of Malaysia's IP policy*

As a member of the Association of Southeast Asian Nations (ASEAN),[3] which currently comprises 10 member countries, Malaysia is engaged in the following ASEAN IP activities:

- Member of the ASEAN Working Group on Intellectual Property Cooperation (AWGIPC), established in 1996 pursuant to the 1995 ASEAN Framework Agreement on Intellectual Property Cooperation. The AWGIPC is mandated

to develop, co-ordinate, and implement IP-related regional programmes and activities. With the acceleration of ASEAN economic integration towards 2015, the ASEAN IPR Action Plan 2011-15 aims to support the ASEAN Economic Community (ASEAN, 2011). Under the Action Plan, Malaysia is responsible for overseeing project implementation in the areas of patent administration and promotion of IP and innovation among SMEs. Malaysia is also the project leader for capacity building for patent examiners (World IP Review, 2012).

- The country is also a member of the ASEAN Patent Examination Co-operation programme, which started in 2009 and is the first regional patent co-operation programme. The programme, which involves all ASEAN member countries except Myanmar, aims to share search and examination results between participating offices.

Additional steps to integrate the IP system within ASEAN countries are described in the forthcoming ASEAN IPR Action Plan 2015-20.[4]

3.2.2. Challenges for Malaysia's IP policy

MyIPO has identified a number of issues and challenges that face Malaysia's IP system today. These include a series of issues related to international and national regulations, as well as the institutional question of how to organise MyIPO in order for it to better serve IP to promote Malaysia's socio-economic development (Table 3.3). Some of the challenges have been addressed, while others require further effort, such as limited awareness of IP among various stakeholders.

Table 3.3. **Issues and challenges faced by Malaysia's IP system**

Policy related	Operational	Institutional questions for MyIPO
• Implementing NIPP • Revising various IP Acts, • FTA negotiations (TRIPS Plus) and pending international treaties • Co-ordinating inter-agency planning groups to address cross-cutting IP issues • Resolving issues about potential mechanisms to protect traditional knowledge and genetic resources • Resolving copyright-related policy issues	• Improving service delivery by MyIPO • Promoting greater awareness among many stakeholders • Promoting IP valuation and the IP Marketplace (see Chapter 5) • Collecting data and updating the IP marketplace database • Improving skills and tools of examiners • Modernising / identifying role of ICT • Introducing a paperless environment of IP registrations	• Organising MyIPO to better support the use of IP for Malaysia's socio-economic development • Optimising human resource policies to maintain quality examination services • Developing an external communication strategy and managing the role of the media

Source: Information provided by MyIPO to the OECD, March 2015.

3.3. IP operations and procedures

3.3.1. MyIPO's institutional characteristics and functions

MyIPO was incorporated in 2003 to take over the functions of the Intellectual Property Division of the then-Ministry of Domestic Trade and Consumer Affairs, now the MDTCC. Prior to 1990, the Trademarks and Patents Registration Office under MITI had been in charge of administering Malaysia's IP regime. In 2005, MyIPO became Malaysia's intellectual property office.

The mission of MyIPO is to provide a strong legal infrastructure and an effective administration regime to promote greater creativity and exploitation of IP. Its objectives are to i) establish a strong and effective administration; ii) strengthen intellectual property laws; iii) provide comprehensive and user-friendly information on intellectual property; iv) promote public awareness programmes about the importance of intellectual property; and v) provide advisory services on intellectual property. As mentioned above, its main focus is the legal and procedural aspects of IP, with less emphasis given to promoting IP adoption for innovation.

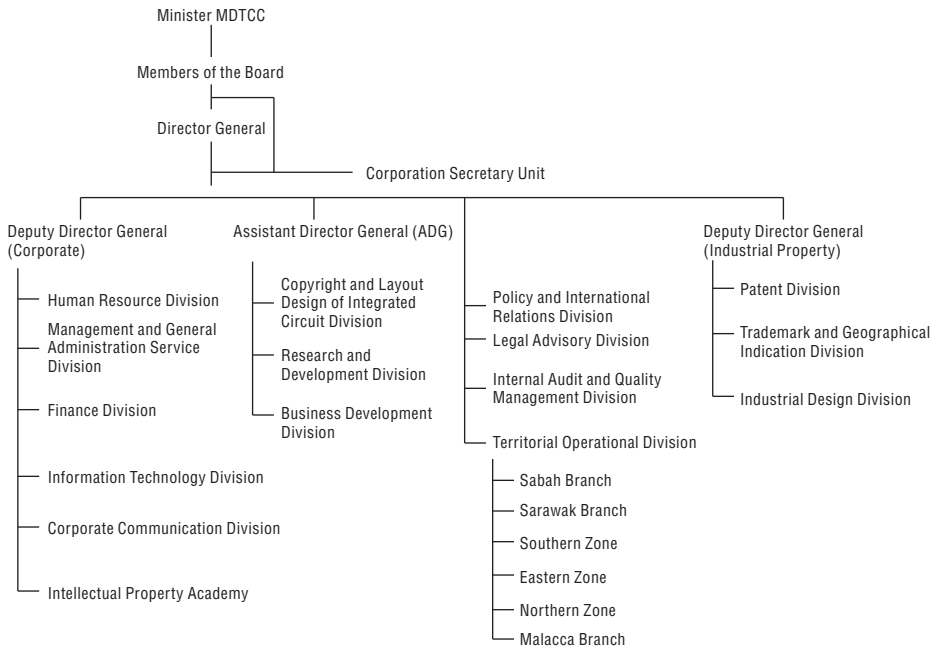
This focus on the legal and procedural aspects of IP is reflected in MyIPO's organisational structure, as shown in Figure 3.1. Most divisions are in charge of IP registration matters. The main function of MyIPO is to promote the registration of IP, and it does so by raising awareness among potential clients, for instance university researchers. Exceptions include the business development division, with a staff of six employees, which provides IP valuation training courses and runs the IP marketplace initiative. In addition, the research and development division deals with the analysis of international treaties, the economic situation in Malaysia and forecasting the number of IP applications (trademarks are very sensitive to economic cycles). MyIPO does not have a specific unit that researches innovation and the economics of IP.

The headquarters is located in Kuala Lumpur and it has several branch offices in Penang (Northern Office), Kuantan (East Coast Office), Johor Bahru (Southern Office), Melaka (Branch Office Melaka), Sarawak (Sarawak Office) and Sabah (Sabah Office). This reflects its efforts to strengthen outreach to all regions in Malaysia to increase use of Malaysia's IP system. This extended outreach is a particularly useful step to promote first use of IP, which online services do not do very well.

3.3.2. Performance of MyIPO

Since its creation in 2003, MyIPO has been autonomous in terms of finance: MyIPO is fully self-funded, with revenues coming from two major sources – IP application fees and IP consultancy fees – where around 40% of revenue comes from its IP rights renewal centralised system. If MyIPO makes a profit, 30% is returned to the government. The money collected by MyIPO from fees is used to

Figure 3.1. **Internal structure of MyIPO**



Source: MyIPO (2014).

fund initiatives in IP awareness, IP training, IP enhancement, etc. Sometimes MyIPO receives additional financial aid from the government for special projects, such as its role in training national IP valuers, valuing IP rights for suitable local SMEs, developing a national IP valuation model and creating an IP market platform for IP rights to be transacted (described in Chapter 6). MyIPO's board, comprising representatives from several government ministries and from the Malaysian Intellectual Property Association, decides budget allocations.

The corporatisation of MyIPO aimed to increase the quality of IP operations and procedures, an objective that has effectively been achieved. This has notably been possible owing to its greater autonomy to recruit, manage and train staff on its own terms and to manage its own finances. Before 2003, it was difficult to recruit and retain engineers willing to work as examiners because wages were much higher in the private sector. MyIPO's increased attractiveness as an employer was achieved not only by paying higher wages, but also by providing additional non-financial incentives, such as permission to work from home sometimes (which is only approved if it results in a 20% increase in productivity). From 20 examiners in 2003, MyIPO had grown to 425 staff in mid-2014, including 82 patent examiners and 53 trademark examiners (Dahalan 2012).

3.3.3. Disclosure of IP information

The MyIPO website offers an online search and filing system for trademarks, patents, industrial designs and geographical indications. The system provides full bibliographic information about patents, industrial designs and geographical indications (title, abstract, filing date, owner name and address, etc.), as well as the legal status (granted, abandoned, etc.); original application documents are not posted online. For patents, only the first page of the patent document is available, but not the description, summary, drawings, etc. Drawings and descriptions for industrial design rights are not available either. Advanced search procedures are available for interested users for a fee to cover related costs. Such limitations may create an undue barrier for companies interested in obtaining specific patent information, particularly in view of the fact that providing more comprehensive information is much easier with the Internet compared to the past, when dissemination offline was costly and more difficult.

The online IP Official Journal platform was introduced in June 2012 to enable users to search for advertisements and notifications related to trademarks, patents, industrial designs and geographical indications. It replaced the previous "offline" *Government Gazette*. Information includes, for instance, updates of IP rights that were recently granted, as well as IP rights for which protection has ended. This information was previously published in the *Government Gazette*.

The MyIPO IP awareness initiatives are "turning IP users into IP owners". Measures to raise IP awareness include National IP Day, awareness programmes at schools, an IP mobile clinic, brochures, etc. The "IP mobile clinic" is a bus that transports experts and documentation about IP to universities and schools. MyIPO is also regularly invited by universities and other institutions to give training courses on how to draft patent applications and on how to conduct patent searches.

3.3.4. Application and processing fees

MyIPO fixes the application fees for different types of IP rights, and the pricing differs across IP rights, as shown in Table 3.4. Online filings have been available since 2011 for trademarks and since 2012 for patents. Overall, filings have increased significantly since the system was implemented. Substantial discounts are available for online filings (42% for patents and over 50% for trademarks), reflecting MyIPO's aim to become paperless.

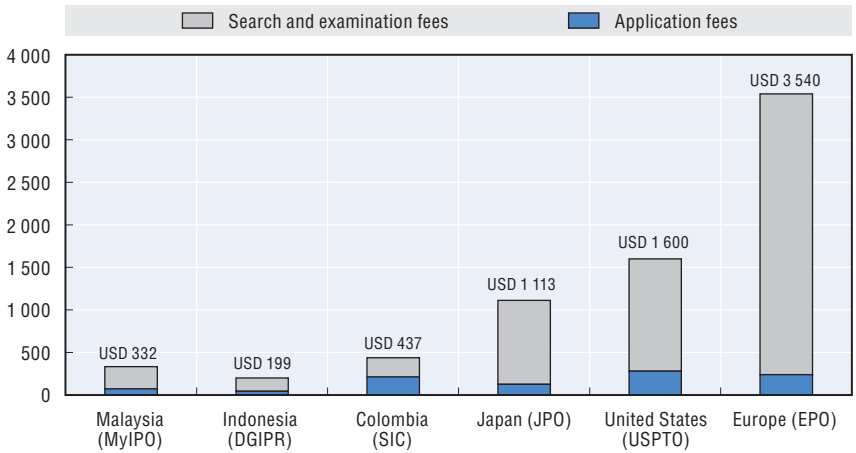
Patent fees for applications, searches and examinations in Malaysia are much lower than in Colombia, Japan, the United States and Europe, but higher than in Indonesia (Figure 3.2). The price of filing patents via the PCT international system at MyIPO is nearly twice that of national patent applications.[5] However,

Table 3.4. **MyIPO application and processing fees, 2014**
(In USD)

		Not online	Online
Patents	Application	154 (MYR 290)	138 (MYR 260)
	Substantive examination	583 (MYR 1 100)	504 (MYR 950)
	Modified substantive examination	339 (MYR 640)	318 (MYR 600)
	Additional claim	11 (MYR 20)	11 (MYR 20)
Utility Models	Application	74 (MYR 140)	69 (MYR 130)
	Substantive examination	583 (MYR 1 100)	504 (MYR 950)
	Modified substantive examination	339 (MYR 640)	318 (MYR 600)
Trademarks	Application	196 (MYR 370)	175 (MYR 330)
Industrial designs	Single and first multiple application	265 (MYR 500)	255 (MYR 480)
	Successive multiple application	265 (MYR 500)	255 (MYR 480)
Geographical indications	Application	133 (MYR 250)	133 (MYR 250)
Copyright	Notification of works	8 (MYR 15)	8 (MYR 15)

Note: The fees are converted to international USD using the PPP conversion rate in 2014.
Source: MyIPO (2015).

Figure 3.2. **Comparisons of patent fees in selected patent offices**



Note: The information is as of February 2015. The fees are calculated based on an application filed online with only one claim. Some fees change depending on the number of claims. The euro/dollar exchange rate is USD 1 = EUR 0.88. The yen-dollar exchange rate is USD 1 = JPY 3.64. The ringgit-dollar exchange rate is USD 1 = MYR 3.64. The Indonesian rupiah-dollar exchange rate is USD 1 = IDR 12 934. The Colombian peso-dollar exchange rate is USD 1 = COP 2 499.
Source: Based on fees provided by IP office websites (February 2015).

Malaysia is one of the countries eligible for the 90% reduction in certain PCT fees for natural persons, i.e. individual inventors. Leaving PCT applications aside, which may be substantial for certain actors in Malaysia's IP system, MyIPO fees are relatively low compared to other countries in the region. This does not apply to the same extent to other IP rights. For instance, the fees for design rights have

increased fourfold since 2011, to USD 265 (MYR 500) for paper applications and USD 255 (MYR 480) for online applications in 2015. The cost of utility models may also be worth examining.

There are tax credits for IP filings for any actors (firms, universities, etc.) filing for trademarks and for patents (World IP Review, 2012), but no discounts for groups of applicants, whether universities or SMEs. However, given MyIPO's relatively competitive rates, most applicants identify the high prices charged by patent agents, rather than MyIPO's fees (except for international filings), as a barrier to filing applications.

3.3.5. Processing of IP applications

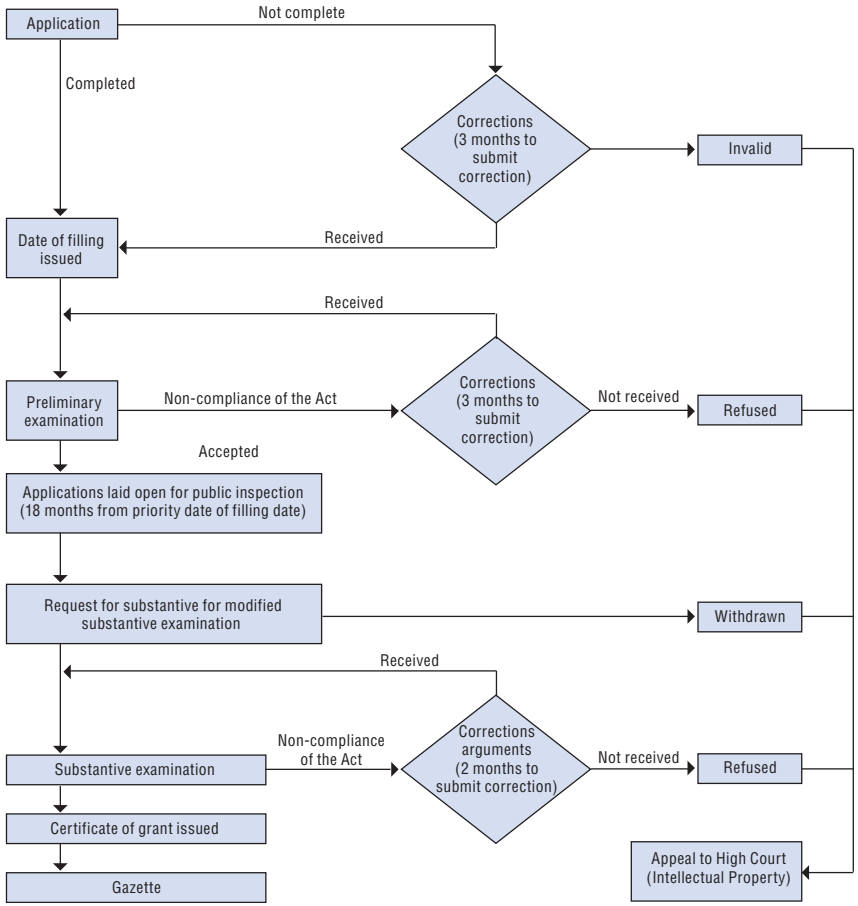
Figures 3.3, 3.4 and 3.5 show the process involved from applying for a patent, trademark or industrial design to the granting of the application. Patents applicants must request one of the following options within 18 months from the date of filing their patent applications: i) substantive examination (i.e. the full examination of the substantive requirements of the patent application: novelty, inventive step and industrial applicability); ii) modified substantive examination; or iii) deferment of substantive examination for up to five years from the date of filing the application (ASEAN IPR SME Helpdesk 2014).

Feedback from interviews suggests that users have seen, in general, an improvement in the speed and efficiency of MyIPO's examination in the past few years. According to MyIPO, the average pendency for granted patents – defined as the number of months that pass between the date of an examination request to the date of the grant of the patent – for normal track applications (as opposed to expedited examinations described below) decreased from 38 months in 2010 to 26 months in 2012; the processing period for a trademark application fell from 18 months to 12 months over the same period (MyIPO, 2012).

Regarding substantial patent examination, information about patents granted (or applied for) for the same or essentially the same invention by the same applicant from the EPO, USPTO, or IP offices of Australia, the United Kingdom, Japan or Korea will help expedite the process, as will search results, bibliographic details or relevant official actions issued by any of the above jurisdictions. Modified substantive examination is a simplified examination whereby the substantive requirements of novelty, inventive step and industrial applicability are considered to have been met, provided the invention in question has already been recognised by one of the above-mentioned IP offices.

With effect from 1 October 2014, MyIPO launched a pilot PPH/PCT-PPH programme with the Japanese Patent Office (MyIPO 2014). The Patent Prosecution Highway (PPH) is a procedure whereby patent offices can make use of relevant work already conducted by another office when conducting the patent

Figure 3.3. **The patent application process in Malaysia**

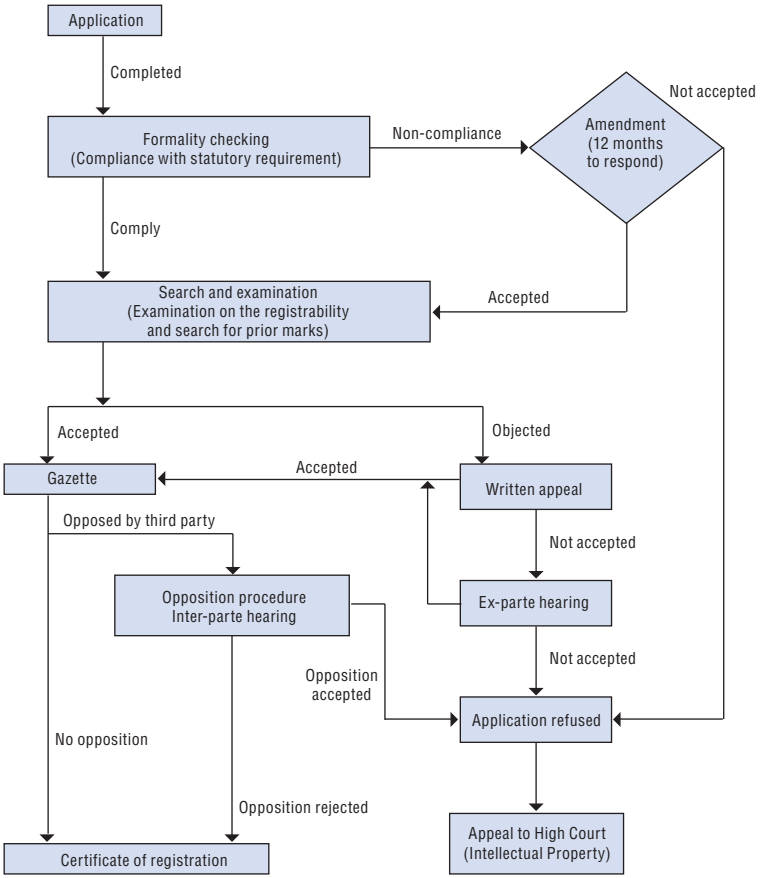


Source: MyIPO (2015).

examination. This initiative reflects further efforts by MyIPO to provide efficient and quick treatment of applications.

In February 2011, MyIPO introduced expedited examinations for patents and trademarks. An expedited examination can be requested if an additional payment is made and if an application fulfils one of the following conditions: i) the application is in the national or public interest; ii) infringement proceedings are taking place; iii) the applicant has already commercialised or plans to commercialise the invention; iv) the invention relates to green technologies; v) the applicant is seeking funds or monetary benefits from the government or recognised institutions; vi) any other reasonable grounds. Patents can be granted within 20 months – and trademarks can be registered within six

Figure 3.4. **The trademark application process in Malaysia**

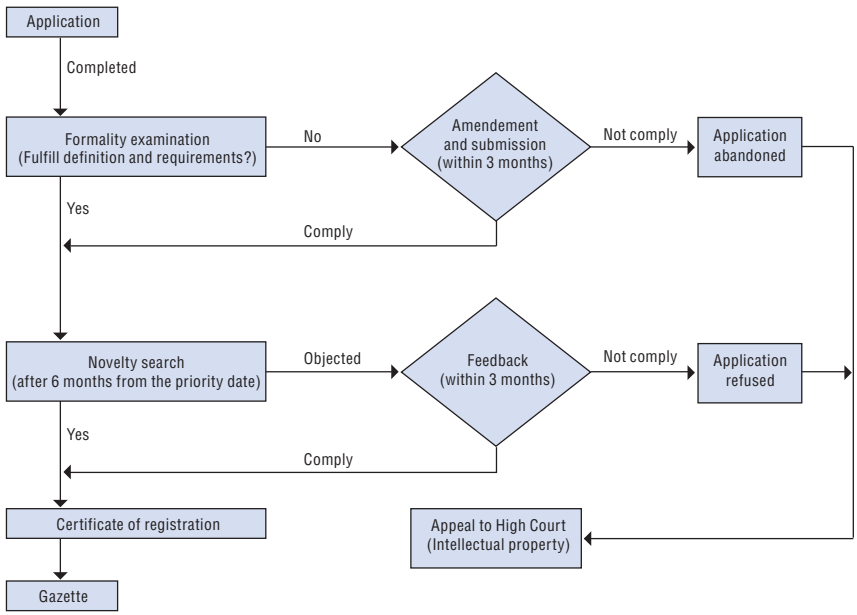


Source: MyIPO (2015).

months and three weeks – for clear-cut cases and for applications that comply with the provisions of the Patents Act 1983 and Trade Marks Act 1976 (MyIPO 2013). These procedures were awarded MS-ISO 9001:2008 Certification in March 2012. Applicants who have requested substantive examination of their applications may ask for an expedited examination once their application has been made available for public inspection.

The expedited examination process has not been taken up by applicants as much as expected. One way of popularising the expedited examination process could be to revise its fee structure so as to make it more attractive to local patent applicants and SMEs that use patent grants as key performance indicators (MOSTI, 2013: 245). Critically, procedures need to ensure that objections to applications do not lead to undue delays. The fees for normal examinations represent one-third of the cost of expedited patent applications and one-half of

Figure 3.5. **The industrial design application process in Malaysia**



Source: MyIPO (2015).

the cost for trademarks. With the increase in the speed of normal processing, the gain in time may no longer be sufficiently attractive to tempt users to use the expedited procedure.

Finally, MyIPO continues to invest substantially in ICT equipment and relevant software to improve the IP processing and registration process. As part of its efforts to increasingly operate an online service, MYIPO introduced the Integrated IP Renewal System, which allows IP holders to renew patents, trademarks, industrial designs and geographical indications in a one-stop centre.

3.3.6. IP enforcement system

Malaysia's IP laws contain provisions for IP owners to commence legal action for infringement of their IP rights in the High Court. In civil IP cases, infringement of IP is pursued personally by the IP owner and remedies available include injunctions (the infringer will have to stop the infringing conduct and get a license from the IP owner), damages (compensation for losses suffered by the IP owner as a result of the infringement), accounts of profits (the IP owner can claim the profits made by the infringer) or delivery up (the IP owner is entitled to keep the infringing goods, rather than having them destroyed). However, for purposes of border measures, an application regarding an objection to the importation for reasons of trademark and copyright shall be made to MyIPO (no

need to go to the High Court). In turn, enforcement of criminal IP cases – which involves piracy and counterfeiting – falls within the jurisdiction of the Enforcement Division of the MDTCC. Criminal sanctions for IP infringement are available under the Copyrights Act 1987 for cases of piracy and under the Trade Descriptions Act 1972 for cases of counterfeiting (Sheikh Khalid, 2011).

Additional efforts have been undertaken to improve enforcement. On 6 June 2007, the Government of Malaysia approved the establishment of 15 Sessions Courts and 6 High Courts for the purpose of hearing only IP cases.[6] These IP Courts were officially established on 17 July 2007. The Sessions Court (IP) hears only criminal IP matters, whereas the High Court (IP) hears civil cases on appeal and criminal IP appeals from the decisions of the Sessions Court (IP). With the establishment of IP Courts in Malaysia, IP cases can now be heard and disposed of expediently (Sheikh Khalid, 2011: 14). There have been very few patent cases since the creation of the IP courts: most cases are about trademarks or design rights.

Over the past decade, Malaysia has also significantly improved its legal framework to combat counterfeiting and IP violations. In cases of piracy, copyright owners can file complaints with the Enforcement Division of the MDTCC, which deals mainly with counterfeit goods: often disputes are about holograms on CDs. With regards to international copyright, a 2003 amendment to the Copyright Act 1987 confers the power to arrest (including without a warrant) to MDTCC enforcement officers for violations of international copyright. A special team of MDTCC officers has been appointed to enforce the act and is empowered to enter premises suspected of having infringing copies and to search and seize infringing copies and contrivances (MDTCC, 2015).

Notes

1. The information provided is based on Sheikh Khalid (2011), ASEAN IPR SME Helpdesk (2014), Lim Heng Gee et al. (2007), Managing Intellectual Property (2013) and WIPO (2008), as well as information given by MyIPO to the OECD team directly.
2. For more information on country differences see *www.wipo.int/sme/en/ip_business/utility_models/utility_models.htm*.
3. ASEAN was established on 8 August 1967 in Bangkok, Thailand, with the signing of the ASEAN Declaration (Bangkok Declaration) by Indonesia, Malaysia, Philippines, Singapore and Thailand. Brunei Darussalam then joined on 7 January 1984, Viet Nam on 28 July 1995, Laos and Myanmar on 23 July 1997, and Cambodia on 30 April 1999.
4. This information was provided by the Singapore IP office at the EU-ASEAN STI conference in Paris on 18 March 2015.
5. MyIPO charges three types of fees as a receiving office for PCT filings: i) a transmittal fee that it keeps, equal to USD 292 (MYR 550) (USD 265/MYR 500 online); ii) an international filing fee that goes to the WIPO International Bureau equal to USD 2 619 (MYR 4 940) (USD 2 028/MYR 3 826 online); and an international search

fee that goes to the international search authority chosen by the applicant, who can decide among Australia (USD 3 486/MYR 6 575), Korean Patent Office (USD 2 627/MYR 4 955), European Patent Office (USD 4 440/MYR 8 375) or Japan Patent Office (USD 1 310/MYR 2 472). Additional fees for excess pages above certain thresholds should also be taken into account. These prices correspond to rates as of January 2015.

6. Malaysia has 15 Sessions Courts, known as "Sessions Court (Intellectual Property)", one in each state and one in Putrajaya. There are also six High Courts "High Court (Intellectual Property)", located in Kuala Lumpur, Selangor, Johor, Perak, Sabah and Sarawak.

References

ASEAN IPR SME Helpdesk (2014), *www.asean-iprhelpdesk.eu/?q=en* (accessed on 23 February 2015).

ASEAN (2011), "ASEAN Intellectual Property Rights Action Plan, 2011-2015", *www.asean.org/archive/documents/ASEAN IPR Action Plan 2011-2015.pdf*.

Dahalan, F.R. (2012), "Utility models protection in Malaysia: Utility innovation", WIPO Regional Seminar on the Legislative Policy Aspects of Utility Models Protection System, 3-4 September 2012, Kuala Lumpur, Malaysia, *www.wipo.int/edocs/mdocs/aspac/en/wipo_ip_kul_12/wipo_ip_kul_12_ref_t3e.pdf*.

Lim Heng Gee et al. (2007), "Country report Malaysia", report contributed to the WIPO-United Nations University's Impact of the Intellectual Property System on Economic Growth Joint Research Project, *www.wipo.int/export/sites/www/about-ip/en/studies/pdf/wipo_unu_07_malaysia.pdf*.

Managing Intellectual Property (2014), "Learning from Malaysian IP cases", *www.managingip.com/Article/3244471/Learning-from-Malaysian-IP-cases.html*.

MDTTCC (2015), Enforcement Division, *www.kpdnkk.gov.my/kpdnkk/index.php?option=com_content&view=article&id=145&Itemid=954&lang=en* (accessed on 23 February 2015).

MOSTI (2013), "Malaysian science, technology & innovation (STI) indicators report 2013", *www.mastic.gov.my/documents/10156/d914d686-7d35-4b8b-bc9e-f3fcb5e93f79*.

MyIPO (2015), *www.myipo.gov.my/home* (accessed on 23 February 2015).

MyIPO (2014), "Patent Prosecution Highway (PPH) and PCT Patent Prosecution Highway (PCT-PPH)", *www.myipo.gov.my/web/guest/patent-prosecution-highway* (accessed on 17 November 2014).

MyIPO (2013), "Interview with Minister of Domestic Trade, Co-operatives and Consumerism YB Dato' Hasan Bin Malek", *MyIP Bulletin*, October 2013, p. 5.

MyIPO (2012), "Malaysia: The status of on-going infrastructure modernisation projects and future prospects of work sharing platform", WIPO ASEAN Sub-regional Workshop, Tokyo, 6-7 September 2012.

MyIPO (2011), "Patent expedited examination procedure", Intellectual Property Corporation of Malaysia, *www.myipo.gov.my/documents/10180/18915/ptexpedited-08022012.pdf*.

MyIPO (2007), "National Intellectual Property Policy", Intellectual Property Corporation of Malaysia *www.myipo.gov.my/documents/10180/21979/ip_policy_eng.pdf*.

OECD (2014), *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264204485-en*.

Sheikh Khalid, R.R. (2011), "IP law and administration in Malaysia", presentation at WIPO Training for Trainers Programme on IP Asset Management by SMEs, 22 February 2011, *www.wipo.int/edocs/mdocs/treaties/en/wipo_smes_kul_11/wipo_smes_kul_11_ref_theme_08_01.pptx*.

WIPO (2008), *Understanding Industrial Property*, Publication No. 895, World Intellectual Property Organization, Geneva, *www.wipo.int/edocs/pubdocs/en/intproperty/895/wipo_pub_895.pdf*.

World IP Review (2012), "The ASEAN team: Promoting and protecting IP", Interview with Director General of MyIPO, *World Intellectual Property Review*, 1 February 2012, *www.worldipreview.com/article/the-asean-team-promoting-and-protecting-ip*.

Chapter 4

Intellectual property use in Malaysia: Statistics

This chapter provides an overview of the available statistical evidence on the use of intellectual property (IP) in Malaysia. It compares Malaysia's performance to that of other economies, including neighbouring member countries of the Association of Southeast Asian Nations (ASEAN). The chapter analyses the uptake of different types of IP in Malaysia and their use: patents, utility models, trademarks, industrial designs, geographical indications and copyrights.

Malaysian residents have significantly increased their use of some types of IP in the past ten years, and are ahead of other countries in the region in some respects (Table 4.1). The most important increases in usage relative to other countries occurred in patent applications: Malaysia moved from 45th to 31st position in the global ranking of resident patent applications between 2003 and 2012, reflecting a three-fold increase in the number of patent applications, from 376 to 1 114. By contrast, Malaysian residents are modest users of utility models.

Table 4.1. **GDP, population and IP applications, residents and non-residents, by filing office, 2013**

	GDP per capita (USD)	GDP (USD billions)	Population (millions)	Patents		Utility Models		Trademarks		Industrial Designs	
				Resident	Non-resident	Resident	Non-resident	Resident	Non-resident	Resident	Non-resident
Indonesia	3 475	868	249.9	633 (9% of total)	6 787 (91%)	233 (67%)	116 (33%)	44 288 (73%)	16 695 (27%)	2 771 (65%)	1 488 (35%)
Malaysia	10 538	313	29.7	1 199 (17%)	6 006 (83%)	70 (48%)	75 (52%)	14 705 (46%)	17 520 (54%)	679 (33%)	1 374 (67%)
Philippines	2 765	272	98.4	220 (7%)	3 065 (93%)	743 (96%)	32 (4%)	12 269 (54%)	10 416 (46%)	887 (64%)	489 (36%)
Thailand	5 779	387	67.0	1 572 (21%)	5 832 (79%)	1 561 (97%)	48 (3%)	27 881 (60%)	18 216 (40%)	2 774 (73%)	1 028 (27%)
Singapore	55 182	298	5.4	1 143 (12%)	8 579 (88%)	na	na	4 787 (23%)	16 181 (77%)	720 (30%)	1 673 (70%)
Viet Nam	1 911	171	89.7	443 (11%)	3 552 (89%)	226 (83%)	47 (17%)	24 629 (68%)	11 825 (32%)	1 362 (65%)	733 (35%)
India	1 499	1 877	1 252.1	10 669 (25%)	32 362 (75%)	na	na	183 172 (91%)	17 597 (9%)	5 182 (61%)	3315 (39%)
China	6 807	9 240	1 357.4	704 936 (85%)	120 200 (15%)	885 226 (99%)	7 136 (1%)	1 733 364 (94%)	115 494 (6%)	644 398 (98%)	15 165 (2%)
Germany	46 269	3 730	80.6	47 353 (75%)	15 814 (25%)	11 644 (75%)	3 826 (25%)	57 039 (88%)	7 787 (12%)	5 871 (90%)	672 (10%)
Japan	38 634	4 920	127.3	271 731 (83%)	56 705 (17%)	5 965 (78%)	1 657 (22%)	92 486 (79%)	24 712 (21%)	26 407 (85%)	4 718 (15%)
United States	53 042	16 768	316.1	287 831 (50%)	283 781 (50%)	na	na	270 761 (79%)	71 526 (21%)	20 271 (56%)	15 763 (44%)

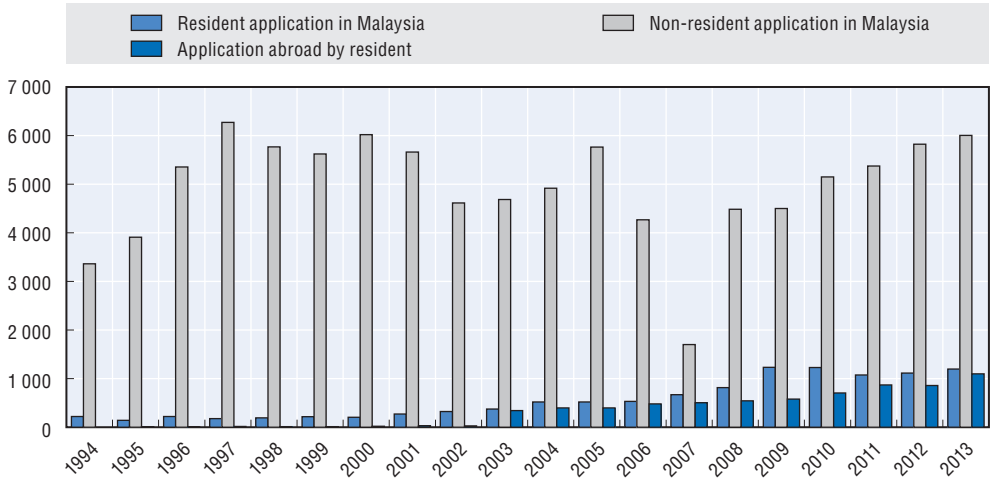
Note: GDP per capita and GDP are given in USD.

Source: WIPO *Statistics* (database) for numbers of patents, utility models, trademarks and industrial design applications; World Bank (2015), *Data* (database) for GDP per capita, GDP and population.

4.1. Patents

In 2013, the large majority of applications for Malaysian patents (83%) were filed by non-residents. Since the end of the 1990s, non-residents have filed an annual average of 5 000 patent applications in Malaysia. Residents, in contrast, have filed fewer than 1 000 applications per year, but their number of filings has increased considerably in the past five years, exceeding 1 000 applications per year since 2009 (Figure 4.1). This increase in resident patent applications has gone hand in hand with government efforts to promote the use of patents in Malaysia. Note that the drop in 2007 is due to the entry of Malaysia into the Patent Co-operation Treaty (PCT) system, which led to a shift in patent applications to the World Intellectual Property Organization (WIPO).

Figure 4.1. **Patent applications in Malaysia**

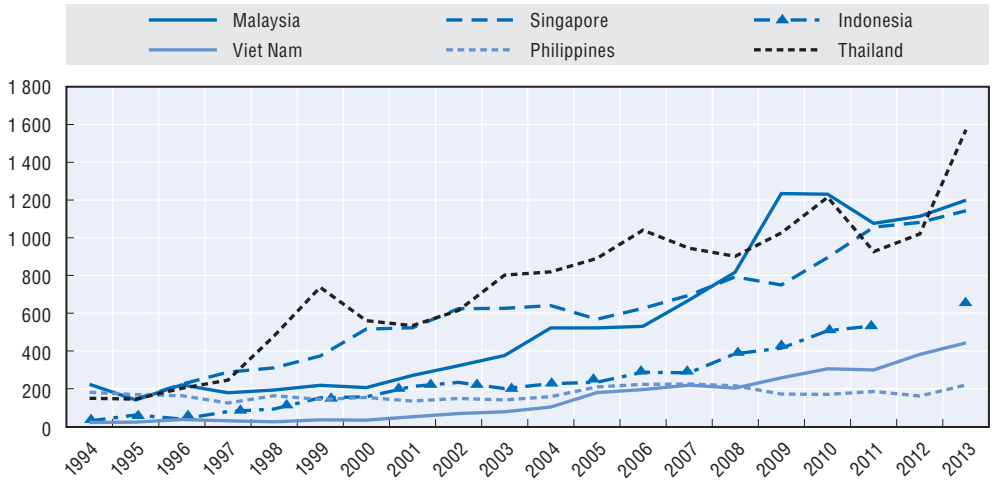


Note: A resident application is an application filed with an IP office by an applicant residing in the country in which that office has jurisdiction. A non-resident application is an application filed with a patent office of a given country/jurisdiction by an applicant residing in another country. An application abroad is an application filed by a resident of a given country/jurisdiction with a patent office of another country/jurisdiction.
Source: WIPO *Statistics* (database).

In terms of resident patents filed under PCT, an indicator of the expected commercial value of the invention on foreign markets, Malaysia fell a few positions in the world ranking, from 33rd in 2003 to 37th in 2012. The number of patent applications was 376 in 2003 and 1 114 in 2012 (WIPO, 2015c). Since 2006, Malaysian applicants have substantially increased their use of the PCT system to file patents internationally (Figure 4.3).

More than 5 000 PCT applications filed by non-residents entered the national phase in Malaysia in 2013, significantly more than entered the national phase in the Philippines and Viet Nam (both big countries in terms of

Figure 4.2. **Resident patent applications for selected ASEAN IP offices**



Source: WIPO *Statistics* (database).

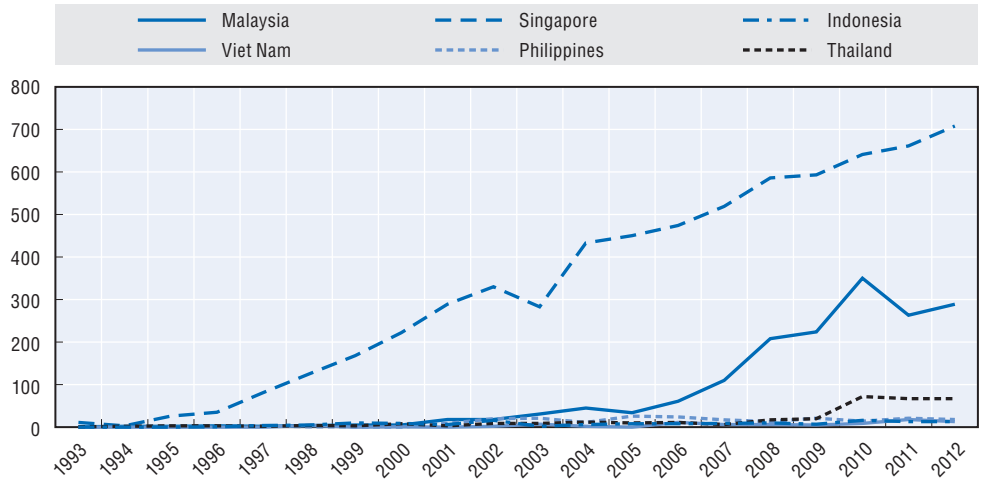
population but with much lower GDP), and close to the PCT national phase entries from non-residents in Singapore, Indonesia and Thailand (Table 4.2). The number of non-resident PCT applications reflects the importance of foreign direct investment in Malaysia from multinationals in the electrical and electronics sector, as well as the importance of Malaysia's GDP per capita, which makes it an attractive export market. Relative to its GDP and its population, PCT applications by non-residents in Malaysia are lower than the applications in Singapore but higher than the applications in Thailand (Table 4.2).

Table 4.2. **PCT national phase entry by resident and non-resident, 2013**

	PCT national phase entry applications			PCT national phase entry applications relative to GDP (in million USD)			PCT national phase entry applications relative to million population		
	Resident	Non-resident	Abroad	Resident	Non-resident	Abroad	Resident	Non-resident	Abroad
Indonesia	7	6 122	52	0.01	7.05	0.06	0.03	24.50	0.21
Malaysia	**32**	**5 252**	**592**	**0.10**	**16.77**	**1.89**	**1.08**	**176.84**	**19.93**
Philippines	2	2 745	40	0.01	10.09	0.15	0.02	27.90	0.41
Thailand	538	5 066	148	1.39	13.08	0.38	8.03	75.61	2.21
Singapore	303	6 254	2 224	1.02	20.99	7.46	56.11	1158.15	411.85
Viet Nam	2	3 061	34	0.01	17.86	0.20	0.02	34.12	0.38
India	172	27 420	4 173	0.09	14.61	2.22	0.14	21.90	3.33
China	2 923	69 944	15 940	0.32	7.57	1.73	2.15	51.53	11.74
Germany	13 136	3 554	62 422	3.52	0.95	16.73	162.98	44.09	774.47
Japan	17 881	35 177	96 205	3.63	7.15	19.56	140.46	276.33	755.73
United States	18 165	91 811	134 751	1.08	5.48	8.04	57.47	290.45	426.29

Source: WIPO *Statistics* (database).

Figure 4.3. **PCT applications for selected applicant country of residence**



Source: WIPO *Statistics* (database).

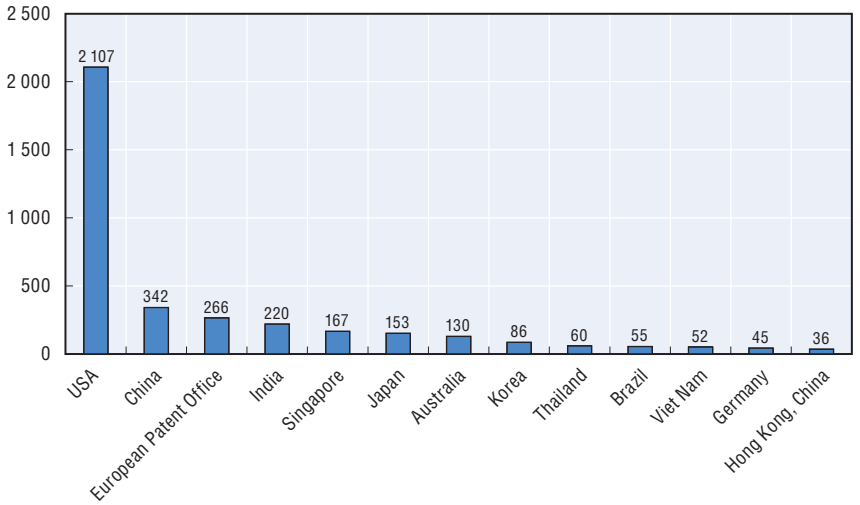
Considering total filings abroad, both direct filings to foreign patent offices and foreign filings via the PCT route, the United States was the top destination for Malaysian applicants with 2 107 filings in the period 2007-12, followed by China (342), the European Patent Office (266) and India (220). Figure 4.4 shows the international offices that received the highest number of patent applications from Malaysia between 2007 and 2012.

The most frequently granted patents to residents by the Malaysian Intellectual Property Office (MyIPO) in 2012 were those within medical technology, chemical engineering and computer technology (Figure 4.5). This reflects the importance of patents for those sectors (ESA-USPTO, 2012).

4.2. Utility models

Utility models, which protect minor inventions (e.g. improvements to known products and processes) and have a lower inventive threshold than patents, are a relevant tool for small and medium-sized enterprises (SMEs) and businesses in emerging countries because they provide to these companies potentially useful stepping stones toward seeking and obtaining full patents later (Nikomborirak and Paibunkott-aree, 2013). However, Malaysian residents barely use the utility model system: in 2013, only 70 resident applications were filed, compared to more than 1 000 patent applications, and the average number of utility model applications each year in the period 2003-12 was only 37. Usage of utility models in Malaysia differs from their use in both Thailand and the Philippines. In Thailand, residents filed roughly the same number of

Figure 4.4. **Top destinations of patent applications by applicants from Malaysia, 2007-12**

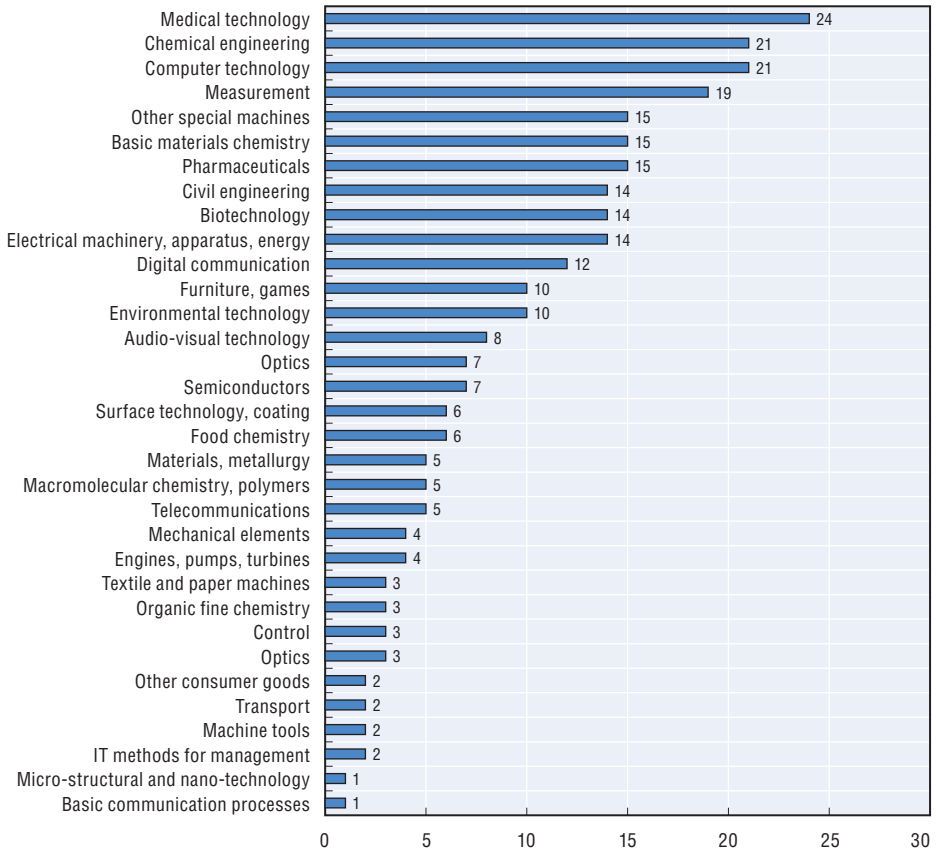


Note: Count by filing office and applicant origin. Total number of applications received, including direct filings and PCT national phase entries. Only countries with more than 50 total filings in the period displayed in the graph.
Source: WIPO Statistics (database) (table last updated June 2014).

patents and utility models in 2013 (approximately 1 500). In the Philippines, residents filed more than 700 utility models but only around 200 patents in the same year (Table 4.3).

The reason for this lack of use in Malaysia might be that the design of the utility model system is too similar to the patent system in terms of application procedures, eligible subject matter and cost, as well as a lack of awareness among businesses, notably SMEs that stand to gain the most from utility models. For researchers, the low value given to utility models in performance evaluation exercises is a further constraint. It is worth reviewing the application procedures and making utility model applications less cumbersome to applicants for minor inventions. In Malaysia's case, utility models undergo substantive examination, which is a source of costs (Table 3.4). In Thailand, utility models have the highest application numbers in ASEAN countries (Figure 4.6). The proportion of utility model applications relative to patents is much higher, as is to be expected for an emerging economy in which many firms lack the research and development capacities needed to successfully develop patentable applications. Steps taken to increase the use of utility models in Thailand include collaborative awareness campaigns between Thailand's Department of Intellectual Property and its Department of Vocational Education (Nikomborirak and Paibunkott-aree, 2013: 15). The application costs is also very low (USD 20 [250 Thai bhat]). The way forward in Malaysia is not necessarily to

Figure 4.5. **Patents granted to residents in Malaysia by technology, as a percentage of total patent grants**



Note: 310 patents were granted to residents in Malaysia in 2012. For 27 granted patents, no classification was attributed.
Source: WIPO *Statistics* (database).

simplify utility model application procedures excessively; Malaysia must find a good balance between facilitating easier access to utility model protection without encouraging a proliferation of low value IP titles.

4.3. Trademarks

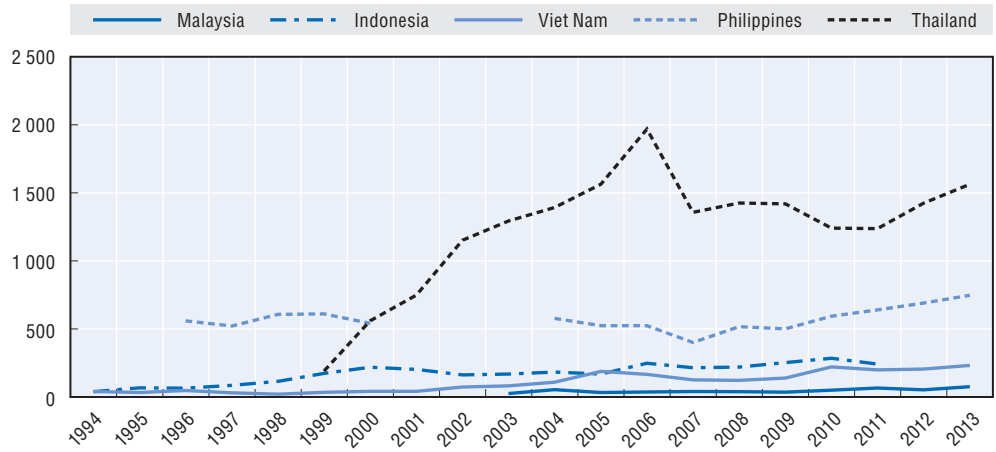
In comparison to patent and utility model applications, the number of trademark applications from residents and non-residents is more balanced in that non-resident applications are matched by substantial national applications. Compared with the other ASEAN 5 countries (Indonesia, Philippines, Thailand and Viet Nam), the number of resident and non-resident trademark applications in Malaysia are closer to those of the Philippines and Thailand, whereas in

Table 4.3. **Ratios of resident patent applications to resident utility model applications for selected countries, 2013**

Countries	Resident patent applications	Resident utility model applications	Ratio of resident patent application to resident utility model application
Philippines	220	743	3.38
Thailand	1 572	1 561	0.99
Viet Nam	443	226	0.51
Indonesia	663	233	0.35
Germany	47 353	11 644	0.25
Malaysia	**1 199**	**70**	**0.06**
Japan	271 731	5 965	0.02
France	14 690	200	0.01

Source: WIPO *Statistics* (database).

Figure 4.6. **Resident utility model applications for selected ASEAN IP offices**



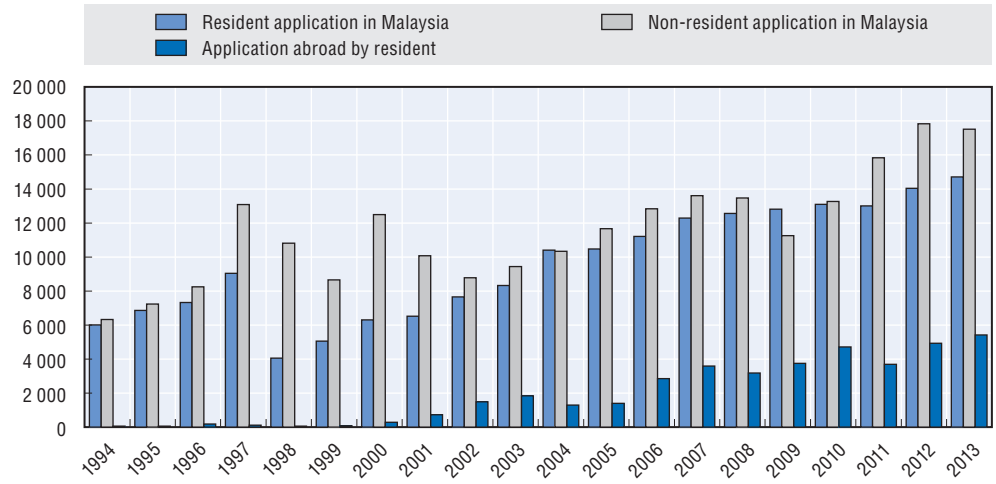
Source: WIPO *Statistics* (database).

Indonesia resident filings are much more numerous than non-resident filings (Table 4.1).

Resident trademark applications in Malaysia experienced high growth after the Asian crisis in 1997. Between the years 1998 to 2004, filing numbers increased from 4 063 to 10 406 (Figure 4.7). They have grown more modestly since 2005. Some neighbouring ASEAN countries have experienced even higher growth rates, including Thailand and Indonesia (Figure 4.8).

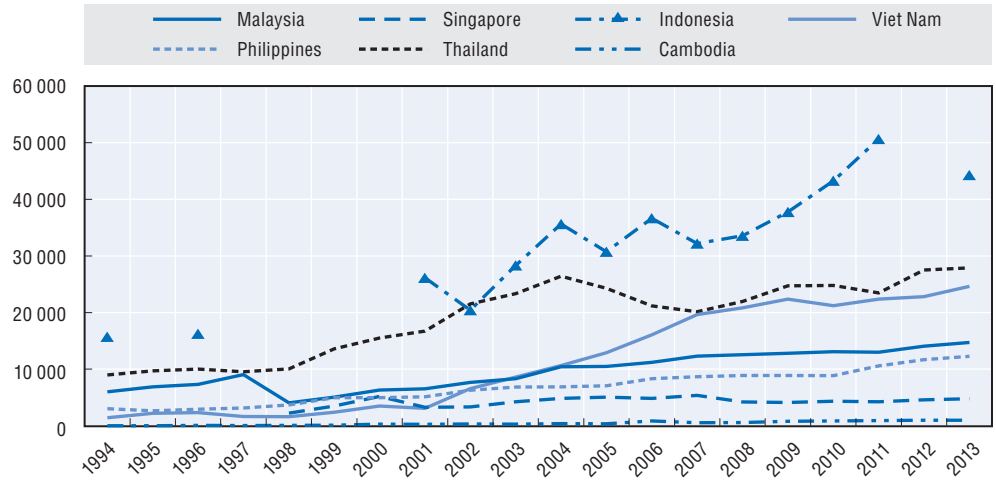
Table 4.4 lists the top ten trademark classes in terms of registrations in 2013. The proportion of resident registered trademarks is higher in services, food and clothing, while non-residents registered more trademarks related to electronics and electrical machinery, pharmaceuticals and chemicals.

Figure 4.7. **Trademark applications for Malaysia**



Source: WIPO *Statistics* (database).

Figure 4.8. **Resident trademark applications for selected IP offices**



Source: WIPO *Statistics* (database).

Table 4.4. **Top ten trademark registrations by class in 2013**

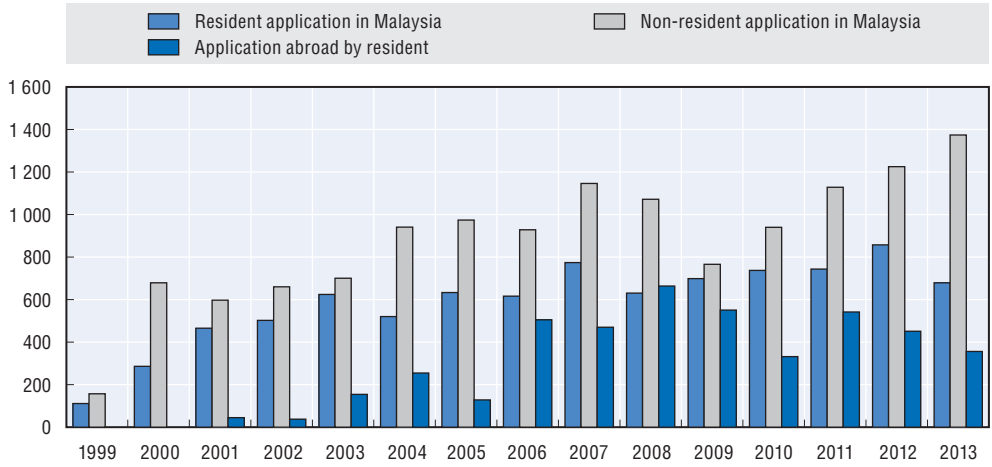
Rank	Type	Registrations (and % of total)	Local applicants	% class
1	**Machinery** (Class 9) Incl. scientific, photographic, optical instruments; apparatus for recording sound or images; data processing equipment and computers	2 237 (8.3%)	582	26.0
2	**Business services** (Class 35) Advertising; business management; business administration; office functions	1 939 (7.2%)	994	51.3
3	**Pharmaceuticals** (Class 5) Incl. pharmaceutical and veterinary preparations; sanitary preparations for medical purposes; disinfectants	1 577 (5.8%)	381	24.2
4	**Foodstuffs of plant origin prepared for consumption or conservation as well as auxiliaries intended for the improvement of the flavour of food.** (Class 30) Incl. coffee, tea, bread, pastry and confectionery, ices; honey, treacle; yeast, baking-powder; salt, mustard; vinegar, sauces (condiments); spices; ice	1 468 (5.4%)	762	51.9
5	**Chemicals** (Class 3) Bleaching preparations and other substances for laundry use; cleaning, polishing, scouring and abrasive preparations; soaps; perfumery, essential oils, cosmetics, hair lotions; dentifrices	1 464 (5.4%)	393	26.8
6	**Clothing** (Class 25) Incl. clothing, footwear, headgear	1 421 (5.3%)	584	41.1
7	**Stationary** (Class 16) Paper, cardboard and goods made from these materials, not included in other classes; printed matter; bookbinding material; photographs; stationery; adhesives for stationery or household purposes; artists' materials; paint brushes; typewriters and office requisites (except furniture); instructional and teaching material (except apparatus); plastic materials for packaging (not included in other classes); printers' type; printing blocks	1 182 (4.4%)	652	55.2
8	**Education and entertainment services** (Class 41) Incl. education; providing of training; entertainment; sporting and cultural activities	1 134 (4.2%)	522	46.0
9	**Meat and fish products** (Class 29) Meat, fish, poultry and game; meat extracts; preserved, frozen, dried and cooked fruits and vegetables; jellies, jams, compotes; eggs, milk and milk products; edible oils and fats	948 (3.5%)	406	42.8
10	**Hotel and Catering Services** (Class 43) Services for providing food and drink; temporary accommodation	927 (3.4%)	519	56.0

Note: Class numbers in parentheses correspond to the international classification of goods and services under the Nice Agreement. There are 45 classes in total. The title above the parentheses is based on the class description, which can be accessed in full detail at WIPO *International Classification for Industrial Design* (database).
Source: WIPO *Statistics* (database).

4.4. Industrial designs

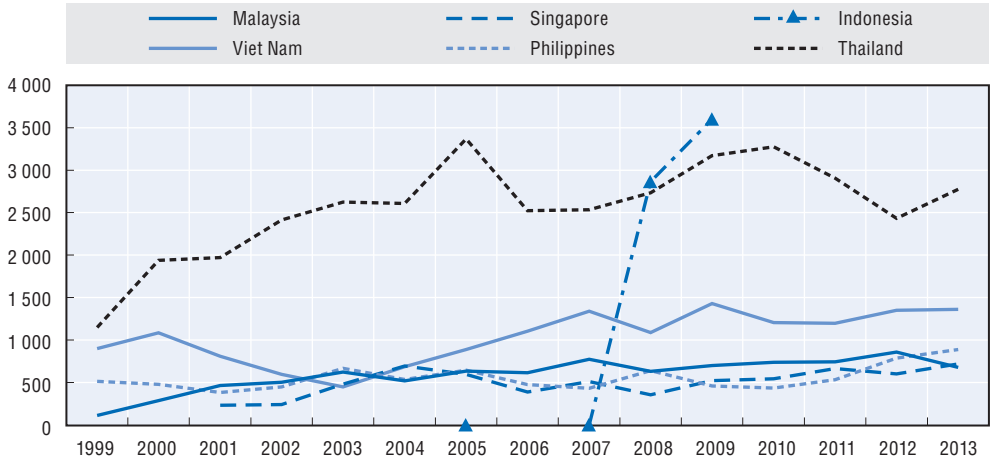
Industrial design applications have increased since the early 2000s (Figure 4.9), and are comparable to the number of resident applications received by several other ASEAN IP offices (Figure 4.10). Table 4.5 presents the distribution of registrations in the top ten industrial design classes in 2013.

Figure 4.9. **Industrial design applications for Malaysia**



Source: WIPO *Statistics* (database).

Figure 4.10. **Resident industrial design applications in selected IP offices**



Source: WIPO *Statistics* (database).

Table 4.5. **Top ten industrial design class registrations in 2013**

No.	Details	Registrations (% of all registrations)	Locals	% class registrations
1	Recording, communication or information retrieval equipment (Class 14)	306 (15.3%)	34	11.1
2	Packages and containers for the transport or handling of goods (Class 9)	253 (12.6%)	58	22.9
3	Fluid distribution equipment, sanitary, heating, ventilation and air-conditioning equipment, solid fuel (Class 23)	199 (9.9%)	73	36.7
4	Means of transport or hoisting (Class 12)	174 (8.7%)	20	11.5
5	Furniture and furnishing items (Class 6)	119 (5.9%)	85	71.4
6	Household goods (Class 7)	106 (5.3%)	34	32.1
7	Clothing (Class 2)	104 (5.2%)	93	89
8	Clocks and watches and other measuring instruments (Class 10)	83 (4.1%)	18	21.7
9	Building units and construction elements (Class 25)	80 (4.0%)	73	91.3
10	Lighting apparatus (Class 26)	76 (3.8%)	17	22.4

Source: WIPO *Statistics* (database).

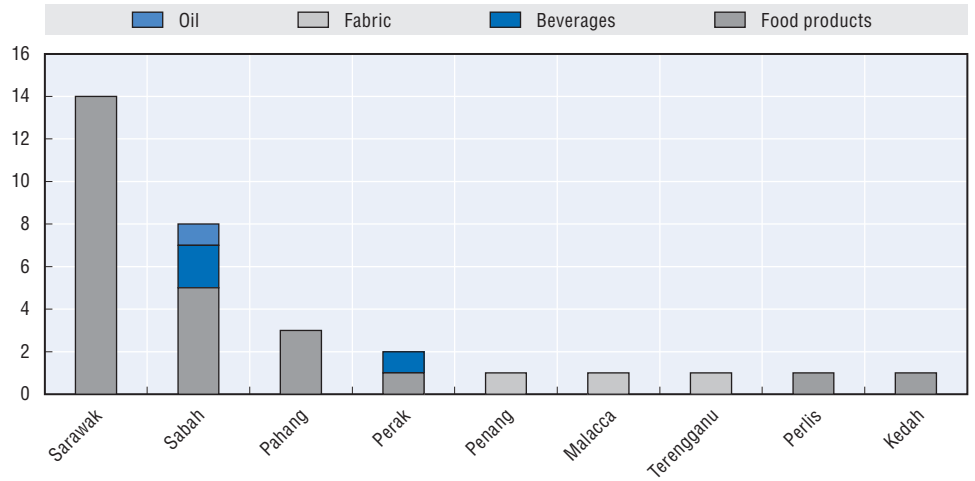
4.5. Geographical indications

From its introduction (in 2003) until July 2014, MyIPO received 74 applications for geographical indications (GIs). More than half of these requests were received in the period 2011-14, illustrating the fairly recent uptake of GIs in Malaysia. To date, 37 GIs have been granted, with 32 being for Malaysian products. Registered foreign GIs are Champagne, Pisco, Scotch whisky, Cognac and Parmigiano Reggiano. Registered local GIs are for plants, food products (fruit, pepper, tea, coffee, rice, cakes, ginger, etc.) and textiles. Sarawak state has the highest number of registered GIs in Malaysia with 14 products granted, followed by Sabah with 8 products (Figure 4.11). Sarawak's success is the result of a concerted effort by the Sarawak State Department to register GIs (see discussion in Chapter 5). Moreover, in 2013 the Ministry of Domestic Trade, Co-operatives and Consumerism introduced the Geographical Indications Logo to help consumers better identify registered products (MyIPO, 2013).

4.6. Copyright

Since copyright protection does not require registration, it is difficult to formally assess its importance. Often the size of the copyright or creative industry is used as a proxy. Using this method, a recent WIPO study estimates that in 2008, copyright industries accounted for 5.7% of Malaysia's GDP and 7.5% of its employment, above the world average of approximately 5.0% for both indicators (WIPO 2014). Table 4.7 shows the number of applicants for a voluntary copyright notification in 2013, following the introduction of the system in 2012.

Figure 4.11. **Geographical indications, per Malaysian state and type**



Source: Data from MyIPO, as of July 2014. Malaysian states not included in this figure have no GIs.

Table 4.6. **Geographical indications in Malaysia**

No.	Geographical Indication	19	Langkawi Cheese
1	Sarawak Pepper	20	Sarawak Litsea
2	Sabah Tea	21	Perlis Harumanis Mango
3	Borneo Virgin Coconut Oil	**22**	**Champagne**
4	Tenom Coffee	23	Belacan Bintulu
5	Sabah Seaweed	24	Sesar Unjur Sarawak
6	Bario Rice	25	Umai Sarawak
7	Buah Limau Bali Sungai Gedung	26	Tenun Pahang Diraja
8	**Pisco**	27	Biskut Dan San Sungai Lembing
9	**Scotch Whisky**	28	Kacang Goreng Sempalit
10	Sarawak Beras Biris	29	Gaharu Gopeng
11	Sarawak Beras Bajong	30	Terengganu Songket
12	Kuih Lidah Kampung Berundong Papar	31	Malacca Songket
13	Tambunan Ginger	32	Isau Sarawak
14	Sarawak Sour Eggplant	33	Durian Nyekak Sarawak
15	Sarawak Layered Cake	34	Ikan Terubok Mulut Besar Sarawak
16	Sarawak Dabai	35	Bentong Ginger
17	**Cognac**	36	Keningau Cinnamon
18	**Parmigiano Reggiano**	37	Tuhau Tambunan

Note: Foreign geographical indications are indicated in bold.
Source: MyIPO (2014a).

Table 4.7. **Applications for a copyright notification in 2013**

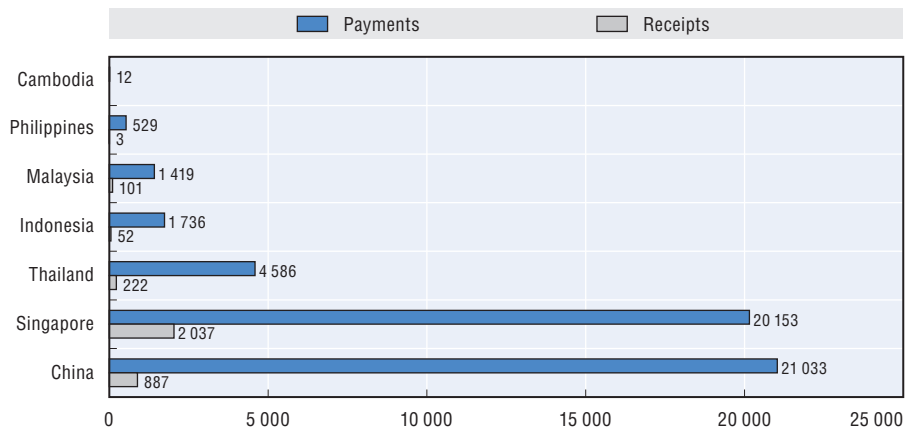
Type of Work	Notifications
Literary	779
Artistic	301
Sound recordings	56
Musical	33
Film	26
Derivative	21
Total	**1 216**

Source: MyIPO (2014b).

4.7. Royalties and licensing fees

As an emerging economy, Malaysia is a net importer of intellectual property, as is the case of other emerging countries in the region (Figures 4.12). In 2013, the country paid approximately USD 1.4 billion in royalties and licensing fees. Since the mid-2000s, royalties and licensing payments have increased by more than 50%, suggesting that Malaysia is tapping more intensively into the international knowledge base. During the same period – from 1995 to 2013 – receipts from royalties and licensing fees also increased, from USD 26.2 million to USD 101 million.

Figure 4.12. **Royalties and licensing fee receipts for selected countries, 2013**
Current USD (millions)



Note: Royalties and license fees are payments and receipts between residents and non-residents for the use of intangible, non-produced, non-financial assets and proprietary rights such as patents, copyrights, trademarks, industrial processes and franchises; and for the use of produced originals or prototypes.
Source: World Bank (2015), *World Development Indicators*.

References

ESA-USPTO (2012), *Intellectual Property and the U.S. Economy: Industries in Focus*, Economics and Statistics Administration and US Patent and Trademark Office US Department of Commerce, Washington, DC, *www.uspto.gov/sites/default/files/news/publications/IP_Report_March_2012.pdf*.

MyIPO (2014a), *Geographical Indications Statistics* (database), *www.myipo.gov.my/web/guest/geo-statistik* (accessed on 23 February 2015).

MyIPO (2014b), *Annual Report 2013*, Intellectual Property Corporation of Malaysia, Kuala Lumpur, *www.myipo.gov.my/documents/10192/139011/AR2013.pdf*.

Nikomborirak, D. and W. Paibunkott-aree (2013), "Study on the use of utility models in Thailand", Report prepared for Committee on Development and Intellectual Property, 12th Session, 18-21 September 2013, World Intellectual Property Organization, Geneva, *www.wipo.int/edocs/mdocs/mdocs/en/cdip_12/cdip_12_inf_6.docx*.

WIPO (2014), "Studies on the Economic Contribution of the Copyright Industries: Overview", World Intellectual Property Organization, Geneva, *www.wipo.int/export/sites/www/copyright/en/performance/pdf/economic_contribution_analysis_2012.pdf*.

Data Sources

WIPO (2015a) *International Classification for Industrial Design* (database), *www.wipo.int/classifications/nivilo/locarno/index.htm?lang=EN* (accessed on 23 February 2015).

WIPO (2015b), *Statistics* (database), *www.wipo.int/ipstats/en#data* (accessed on 23 February 2015).

WIPO (2015c), "Statistical Country Profiles: Malaysia", *Statistics* (database), *www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=MY* (accessed on 23 February 2015).

World Bank (2015), "World Development Indicators", *Data* (database), *http://data.worldbank.org* (accessed on 2 February 2015).

Chapter 5

Intellectual property opportunities and challenges

In Malaysia, there is a wide variety of actual and potential users of intellectual property (IP) whose IP needs differ based on their industry, size, export potential and other factors. This chapter summarises the characteristics and needs of four groups of users: innovators in traditional and informal sectors, "catching-up" businesses (such as SMEs and young companies), leading "frontier" businesses and public research institutions and universities.

Opportunities and challenges for using intellectual property (IP) to support innovation activities vary considerably among different actors in national innovation systems. Firms' needs for IP protection depend on their industry, size and other characteristics. Leading "frontier" businesses, including multinational companies and Malaysia's large government-linked enterprises, as well as leading universities and public research institutes, will look for IP protection abroad; in contrast, trademarks, utility models or design rights are often more useful to Malaysian small and medium-sized enterprises (SMEs). Moreover, geographical indications and traditional knowledge protection can be crucial for traditional sectors. Universities and public research institutions will use IP differently and face other challenges when it comes to the commercialisation of their IP.

In order to account for the needs and usages of diverse users, this chapter will discuss four stylised groups of innovators (OECD, 2014): i) innovators in traditional and informal sectors; ii) "catching-up" businesses; iii) leading "frontier" businesses; and iv) universities and research institutions.

5.1. Innovators in traditional and informal sectors

The informal sector and traditional industries are part of Malaysia's innovation system. Traditional knowledge and the country's biodiversity can be relevant alternative sources for innovation in regions where few firms have the technical expertise needed to engage in technology-based innovation activities. They may also serve to include groups in society that are often excluded from innovation systems. Various programmes in Malaysia have provided worthwhile support to innovators' IP in traditional and informal sectors.

5.1.1. *Traditional knowledge, genetic resources and traditional cultural expressions*

The Malaysian government supports the creation of an international legal framework to protect traditional knowledge, genetic resources and traditional cultural expressions. Important issues here relate to IP rights, and to regulations related to access and benefit sharing. The topic is an important international debate (Box 5.1). With regard to genetic resources, Malaysia is signatory of the Convention of Biological Diversity (CBD) since 1994 (CBD, 2014). Moreover, the states of Sabah and Sarawak have enacted their own laws to govern their biodiversity. The Sabah Biodiversity Enactment 2000 (SBE, 2000)

Box 5.1. **Intellectual property and traditional knowledge, genetic resources and traditional cultural expressions**

The term "traditional knowledge" tends to comprise traditional knowledge (TK), genetic resources (GRs) and traditional cultural expressions (TCEs). As noted by the World Intellectual Property Organization (WIPO):

In recent years, indigenous peoples, local communities, and governments – mainly in developing countries – have demanded IP protection for traditional forms of creativity and innovation, which, under the conventional IP system, are generally regarded as being in the public domain, and thus free for anyone to use. Indigenous peoples, local communities and many countries reject a "public domain" status of TK and TCEs and argue that this opens them up to unwanted misappropriation and misuse. (WIPO 2015a: 5)

Discussions are currently underway in the WIPO Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore towards the development of an international legal instrument or instruments to protect traditional cultural expressions and traditional knowledge, and to address the intellectual property aspects of access to and sharing of benefits from genetic resources. WIPO members have agreed to develop an international legal instrument (or instruments) that would give TK, GRs and TCEs protection. The instrument would define what is meant by TK and TCEs, who the rights holders would be, how competing claims by communities would be resolved, and what rights and exceptions ought to apply.

While the committee continues debating to find the best solution at the international level, individual countries have started to take the initiative. In India, the Traditional Knowledge Digital Library project (TKDL) is available. It is an initiative of several government agencies. The aim is to document the disclosed traditional medicinal knowledge available in the public domain. In Indonesia, a joint database on traditional knowledge is now being developed across several ministries and organisations, including the Ministries of Science and Technology; Agriculture (for genetic resources); and Education (for traditional knowledge and traditional cultural expressions), and the Institute of Sciences (OECD 2014: 63).

Source: WIPO (2015a); OECD (2014).

specifies under what conditions access to resources for exploitation is provided and how benefits are to be shared. The Sabah Biodiversity Council, the Sabah Biodiversity Centre and the Biodiversity Centre Fund are the relevant institutions overseeing the enactment's implementation.

Malaysia's National Biodiversity Strategies and Action Plans (NBSAP) aim to transform Malaysia into a centre of excellence for conservation, research

and sustainable use of tropical biodiversity by the year 2020. The NBSAP refer to a variety of policies but do not specifically focus on the commercial exploitation of the country's biodiversity. They set the long-term direction and strategic framework for the implementation of the CBD and the conservation of biodiversity in Malaysia. The NBSAP outline a vision statement, policy statements and objectives, as well as 15 strategies and 87 action plans (for example, to improve the scientific knowledge base, improve the sustainable utilisation of components of biological diversity and develop a centre of excellence in industrial research into tropical biological diversity) (Prip et al., 2010).

A first approach adopted in Malaysia has consisted of taking stock of available resources. Initiatives in this direction have included the establishment of open and closed systems:

- Among the open systems, the Bio-D Database was created as a comprehensive source of information on biodiversity (including information about relevant publications, multilateral agreements and legislation, and details about implementing agencies, national focal points, research institutes, universities and non-governmental organisations). The database is part of Malaysia's Clearing House Mechanism (MyCHM), which was set up as part of the government's commitments as signatory to the CBD. MyCHM aims to facilitate reporting and the transfer of biological diversity and conservation-related information both nationally and internationally (MyCHM, 2015).
- The government has also established closed systems, restricted to specific users, to ensure protection for uses of TK for economic purposes, such as the Traditional Knowledge Digital Library (TKDL). A pilot project called the Malaysian Traditional Knowledge Digital Library was launched in 2009, a collaboration between the state of Sabah, Department of Orang Asli Affairs (the Malaysian government agency that oversees the affairs of aboriginal people in Malaysia), National University of Malaysia, Institute for Environment and Development, and Malaysian Intellectual Property Office (MyIPO). The electronic database aims to help patent examiners in processing patent applications, ensuring that Malaysian traditional knowledge is not exploited unethically. The database only documents GRs. As of December 2013, more than 1 600 records relating primarily to species of medicinal plants had been collected.
- In addition, a collaboration between MyIPO and the Department of Heritage in the Ministry of Tourism and Culture has collected more than 200 TKE records relating to dances, songs, handicrafts, tales and ceremonies (SaBC, 2009; MyIPO, 2014: 7-8).

5.1.2. *Geographical indications, rural communities and producers of traditional products*

Another way for IP to serve rural communities and traditional producers are geographical indications (GIs), which have started to be taken up more actively over the past years, particularly in the states of Sarawak and Sabah. MyIPO has embarked on a new initiative, "Know the GI in your area", to identify and register local products for protection under the Geographical Indications Act. Sarawak Pepper was the first registered geographical indication in Malaysia, in November 2003. Pepper from Sarawak has been sold globally over the last 100 years. Other better-known examples of successful exports, fostered by GIs, include Bario rice and Perlis Harumanis mango (RSM Farook, 2007: 46-51). Most Malaysian GIs, however, are little known as yet and do not provide much return to producers of the GIs in question. Registration efforts seem at times to have focused more on quantity than on a GI's commercialisation potential, and support for the development of value-added products is lacking or has only recently started.

The main challenge consists of creating an institutional context, such as that in place for Sarawak Pepper, to create commercial products of quality and produce relevant marketing to promote them. The Malaysian Pepper Board (MPB, Box 5.2), located in Sarawak, is a good example of government support for collective action around a product protected by a GI with international recognition. MPB is the registered proprietor of the Sarawak Pepper brand name. It grants quality certificates without which producers cannot export and, what is more, it offers capacity-building courses to industry smallholders to teach them how to produce high-quality pepper. This includes providing them with information on how to produce pepper of sufficient quality to be exported. Some producers have also registered their own trademarks, such as MIKROKLEEN, SaraSpice and pepper sweets (Muling, 2013). However, the potential for promoting additional economic development based on pepper may be limited by the nature of the product, therefore requiring wider economic development efforts for the region. Pepper is different from palm oil and rubber in terms of its market size and its economic returns. The product is still in a development phase, trying to build an industry around the product that goes beyond bulk exports of the raw commodity, whereas both palm oil and rubber have already established industries of value-added products.

The application procedure for GIs established in Malaysia's Geographical Indications Act 2000 is well-established and involves fixed procedures moving from application to examination and, if necessary, amendments to registration. Legal measures in cases of third party opposition are regulated. However, the lack of co-operation between local producers has hindered further exploitation of GIs. Different from other IP rights, which provide

Box 5.2. **Malaysian Pepper Board: An institutional setting supporting traditional sectors**

The MPB is a government agency under the Ministry of Plantation Industries and Commodities. It is in charge of promoting the cultivation and industry of Malaysian pepper (MPB, 2014). The promotion and branding of pepper started in the 1970s. The geographic indication for Sarawak Pepper was the first geographic indication applied for and was obtained in 2003; its registered owner is MPB. No pepper is allowed to be exported from Sarawak unless it receives certification from MPB, and pepper production in Malaysia takes place almost entirely in Sarawak (99%). The pepper industry has reported revenues of around USD 523 million (MYR 1 billion) in the last five years (Prospect Group, 2013).

MPB guarantees the quality of the pepper being produced and exported. MPB grades the pepper and allows its export only if sufficient quality standards are reached and export standards fulfilled (e.g. the types of pesticides and other chemicals used in cultivation). MPB's grading system is ISO-certified. Maintaining quality is a large focus of MPB, which provides quality upgrading courses for the more than 67 000 smallholders producing pepper. Training courses of 3-4 days are provided at no cost to farmers. In these courses, farmers are taught how to plant, what pricing strategies to adopt, what fertilisers to use, and what kind of machinery to buy.

MPB collects a very small fee for grading the pepper produced by the farmers into the four different quality grades for pepper. As pepper is a world commodity, prices for each grade are set on international markets and may change every day. Currently, MPB only sells bulk pepper in international markets.

MPB has a research and development (R&D) division that employs about 30 people, 11 of whom are researchers engaged in research to develop new product opportunities. So far this has resulted in innovations such as pepper chocolate, pepper candies, pepper sauce and other food products, as well as non-food products such as insect repellent and perfumes. At present, when the R&D division has prepared a formula for a new product, MPB retains the original formula but teaches the industry how to produce the new product. The main role of MPB's research unit is to initiate the process and let the local industry market the product, as MPB is not in the position to produce on a large scale. Local companies are invited to learn how to make the new product, and then to produce it under their own label with their own production methods. The market for value-added products remains local, and MPB's R&D is still rather low-tech. However, MPB has plans to improve its research capabilities and has begun co-operating with University Malaysia Sarawak.

Source: MPB (2014).

individual ownership, GIs are collective IP rights, i.e. they belong to the group of regional producers of the protected good. This has the effect that producers do not take responsibility for registering GIs, leaving it to the government to take the initiative. Collective action is more important for innovators in informal and traditional sectors because many firms are small, have limited resources and lack sufficient skills. The former Secretary General of the Ministry of Domestic Trade, Co-operatives and Consumerism stressed the importance of government initiatives to encourage producers to form associations or co-operatives, so that the costs for registering the protected products can be shared and members can enjoy exclusive rights to exploit their GIs. At the same time, consumers have a guarantee of product quality (MyIPO, 2012).

5.1.3. *Promoting inclusive innovation*

The Malaysian Foundation for Innovation (YIM) was established in October 2008 under the aegis of the Ministry of Science, Technology and Innovation (MOSTI), in part to promote inclusive innovation. Indeed, YIM was assigned a key role in supporting inclusive innovation within the SME Masterplan (see Box 5.4), which aims to support innovation for the 40% of Malaysians living below the poverty threshold. YIM's objectives are to: i) develop and promote creative skills in the field of science and technology in academia, industry and society; ii) nurture and support scientific innovation at the grassroots level, particularly among youths, women and non-governmental organisations; and iii) conduct educational and awareness programmes to enhance appreciation of science and technology at schools and at the grassroots level (YIM, 2014). YIM's activities are inspired by India's Honey Bee Network and the National Innovation Foundation (Box 5.3) (NIF, 2014). It has undertaken several "innovation walks" in different regions in Malaysia aimed at identifying grassroots innovations by individual inventors, often in rural areas and from disadvantaged economic contexts.

Box 5.3. **Inclusive innovation and the role of grassroots innovation**

Inclusive innovation directly serves the welfare of lower-income and excluded groups. These kinds of innovations often modify existing technologies, products or services to better meet the needs of those groups. Within this category, grassroots innovations describe innovations that are undertaken by the excluded groups themselves. Institutions providing support to grassroots innovators can prove in many respects to be central to facilitating the activities of grassroots innovators. The Indian Honey Bee Network and the Indian National Innovation Foundation are successful representatives of such institutions.

Box 5.3. **Inclusive innovation and the role of grassroots innovation** *(cont.)*

The **Honey Bee Network** was founded in India in 1989 to support innovation processes by linking grassroots innovators from low-income groups with each other. The network has developed an extensive database documenting innovations by the poorest, including agricultural practices (e.g. natural pesticides) and machinery. This makes it possible to enhance the diffusion of knowledge to a wider group of potential users. Furthermore, the Honey Bee Network supports the protection of inventors' intellectual property and the commercialisation of marketable innovations by connecting informal innovators with formal institutions, including universities and public research institutions. Building on the philosophy of the Honey Bee Network, India's **National Innovation Foundation** was founded in 2000. As an autonomous body, it aims to provide nationwide institutional support to grassroots innovation and traditional knowledge from the informal sector. Similarly to the Honey Bee Network, the foundation offers technical and financial support for developing grassroots innovations.

Source: OECD (2015), *Innovation Policies for Inclusive Growth*, OECD Publishing, Paris.

YIM's search activities have identified 54 innovative products to date. One of them was awarded MOSTI's National Innovation Award in 2012. From these 54 products, 20 IP rights requests have been made, mainly for trademarks and design rights. YIM provides the necessary support and funding for IP registration. However, support has not yet fully allowed these inventors to make a living on the basis of their inventions owing to the nature of the inventions. A focus on more technology-intensive types of inventions, as well as on traditional medicines, could produce better results. It is in such sectors that obtaining IP rights for inventions will also be more difficult.

5.2. "Catching-up" businesses: SMEs and young companies

5.2.1. *IP use profiles of SMEs*

The group of "catching-up businesses" consists of formal businesses, including SMEs, engaged in creating incremental innovations based on technologies developed by others, including from abroad. They are often in the early stage of building their own, internal innovation capacities. SMEs account for 30.2% of gross value-added economic activity and 32.7% of employment in Malaysia (Department of Statistics Malaysia, 2012). The bulk of Malaysian SMEs (90%) are active in the services sector, followed by manufacturing (6%) and agriculture (3%). Microenterprises with fewer than 5 workers constitute the majority (74.9%) of SMEs. Most SMEs operate in the Klang Valley, Kuala

Lumpur's metropolitan area (35.7%), followed by Johor (10.3%), Perak (8.0%) and Kedah (6.8%) (National SME Development Council, 2012: 29).

The Third Industrial Master Plan 2006-20 indicates that in 2003 only 19% of all SMEs that invested in R&D had registered trademarks, and only 3% of them had applied for patents (MITI, 2006). Patents are less relevant for many SMEs because they operate in the services sector, which relies less on patent protections than does manufacturing (MASTIC, 2014). Moreover, more limited investment in R&D by many SMEs leads to much lower rates of IP adoption among the full population.

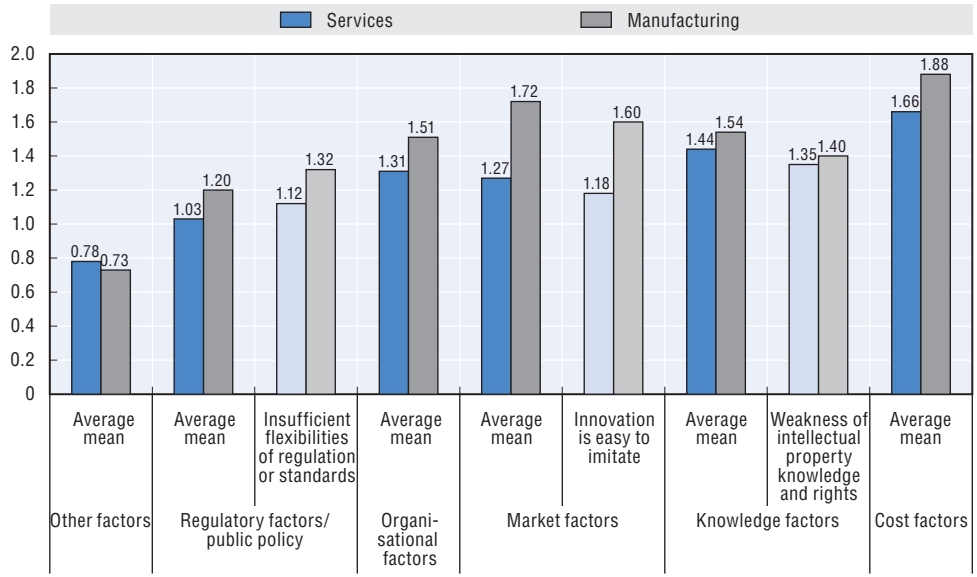
However, other types of IP, including trademarks and utility models, are often much more relevant. In a 2010 WIPO survey about their use of IP rights, Malaysian firms ranked trademarks as having the highest importance (scoring 5.1 on a scale of 1 to 7), well above patents (3.4), copyright (3.2) and industrial designs (2.4). Geographical indications were viewed as having very little importance (Hu et al., 2010). When asked about strategies other than IP rights to protect their innovations, results from the same 2010 survey showed that maintaining trade secrets came first (5.1), followed by speed to market (5.0) and offering superior services (4.9) for both product and process innovations (Hu et al., 2010).

IP-related issues such as fear of imitation and concerns over weaknesses in enforcing intellectual property rights are judged to be important but are generally are not among the factors that firms perceive to be the most important obstacles to innovation (Figure 5.1). More important are cost considerations and other market factors, such as uncertainty as to whether there will be sufficient demand for the new good or service, or the positioning of dominant players within an industry. This means that concerns about IP rights themselves impede innovation efforts but do not pose a major constraint on firms' innovation efforts.

5.2.2. Government support of SMEs' IP use

SMEs are an important target group of policies and programmes at the national and regional level promoting IP awareness and commercialisation. These include specific IP awareness campaigns implemented by MyIPO. In addition, creating an IP culture among SMEs has been a regional policy priority in Penang's electrical and electronics (E&E) cluster. E&E multinationals continue to rely substantially on other multinationals as service providers in Malaysia because local providers have invested less in R&D. There are, however, some exceptions, such as Inari Amerton, a large local electronics manufacturing services provider that offers services and support to the radio frequency, optoelectronics, fibre optics, and testing and measurement equipment sectors.

Figure 5.1. **Factors hampering innovation activities**



Note: The indicators are ranked on a scale of 0-3, where 0 indicates "not relevant" and 3 "highly important".
Regulatory factors and public policy consist of "Limitation of science and technology public policies" and "Insufficient flexibilities of regulation or standards". Organisational factors consist of "Lack of networking with research institution", "Lack of facilities", "Lack of infrastructure", "Inability to devote staff to innovation activities due to production requirement", "Managerial structure of enterprise", "Attitude of managers toward change" and "Attitude of personnel towards change".
Market factors consist of "Innovation is easy to imitate", "Uncertain demand for innovative goods and services" and "Market dominated by established enterprise". Knowledge factors consist of "Weakness of intellectual property knowledge and rights", "Difficulties in finding co-operation partners for innovation", "Lack of information on markets", "Lack of information on technology" and "Lack of qualified personnel". Cost factors consist of "Excessive perceived risk", "Lack of finance from sources outside the organisation", "Lack of funds within the organisation" and "Cost too high".
Source: MASTIC (2014: 113) based on Malaysia's National Survey of Innovation in 2012.

Malaysia's national technology commercialisation platform PlaTCOM Ventures supports SMEs in the process of obtaining and effectively developing innovations using IP. PlaTCOM provides commercialisation services for entrepreneurs, start-ups, spin-off companies and grassroots inventors, and assists in the exploitation of IP to generate income. The service also identifies gaps in clients' IP portfolios, as well as new industries and markets for clients to discover. PlaTCOM also delivers knowledge-based training modules on technology/knowledge transfer and commercialisation to foster the creation of an entrepreneurial mindset. However, PlaTCOM currently has only ten staff members and is able to work only on a very small scale. In 2014, PlaTCOM was supposed to support 16 Malaysian companies. The PlaTCOM approach is an interesting tool that can be of particular benefit for smaller businesses and can contribute to increased IP use. Deployment on a larger scale may be worth considering, e.g. adopting some of the innovative approaches used by Colombia's *Propiedad Intelectual* project (Box 5.5).

Box 5.4. **Malaysia's SME Masterplan 2012-20**

The SME Masterplan presents a cross-institutional plan for empowering the countries' SMEs. It involves 16 ministries with co-ordination by SME Corporation, an agency under MOSTI in charge of developing the countries' SMEs. It is based on the results of a study carried out by SME Corporation in 2010 to assess the economic situation and potential of Malaysian SMEs with the aim to develop the SME Masterplan for 2020. The study, which was undertaken with the World Bank, found that Malaysia's SMEs often had low productivity levels: only a few achieved high growth rates and there was a large informal sector. This was due to challenges in i) innovation and technology adoption; ii) human capital development; iii) access to financing; iv) market access; v) legal and regulatory environment; and vi) infrastructure.

The Masterplan set out to address these challenges, including issues that relate to SMEs' use of IP, mainly by connecting firms to IP-protected inventions held by universities and public research organisations. One of the six high-impact programmes, HIP2, specifically emphasises the importance of technology commercialisation platforms in matching inventors with investors and users as a means of supporting and promoting SMEs' innovation efforts. The HIP2 platform is a strategic partnership between SME Corporation and the Malaysia Innovation Agency.

Table 5.1. **Summary of initiatives under the SME Masterplan**

Six High-Impact Programmes	Four Thematic Measures	Measures for East Malaysia	Other supporting measures
HIP1: Integration of business registration and licensing to improve ease of doing business	Theme 1: Promote resource pooling and shared services	Improve connectivity and basic amenities	Complete the integrated trade clearance and facilitation system (single window)
HIP2: Technology commercialisation platform to encourage innovation	Theme 2: Create demand for SME products and services	Review restrictive laws and policies	Reform bankruptcy law to give entrepreneurs a second chance
HIP3: SME investment programme to provide early stage financing	Theme 3: Reduce information asymmetry	Ease market access	Review policy on SME taxation
HIP4: Going export programme to expedite internationalisation of SMEs	Theme 4: Build capacity and knowledge		Synchronise measures on productivity enhancement technologies with other relevant labour policies
HIP5: Catalyst programme to promote more home-grown champions			
HIP6: Inclusive innovation to empower the bottom 40%			

Source: SME Corp. (2012).

Box 5.5. ***Propiedad Intelectual Colombia***

The *Propiedad Intelectual Colombia* project, funded by the Inter-American Development Bank (USD 1.4 million) and regional Chambers of Commerce (USD 1.3 million), aims to foster the use of IP by micro, small and medium-sized Colombian firms. The project has a regional focus covering Antioquia, Bogotá, Cali, Cartagena and Barranquilla. The Inter-American Development Bank, via its Multilateral Investment Fund (FOMIN), the Chamber of Commerce of Medellin and the Superintendency of Industry and Commerce, Colombia's patent office, jointly implement the project over an initial period of four years.

The project supports the development of simplified IP application procedures and online modules for trademarks and patent applications. It has also developed various tools to inform businesses about the strategic value of IP, with the aim of overturning the widespread view of IP as a purely legal tool of little value to businesses.

The project's most ambitious service consists of providing specialised IP consulting services to around 400 companies, for which 150 national consultants have been trained. The process involves four steps. The first involves a detailed diagnostic of individual firms' use and management of IP from the perspective of innovation. The second step comprises practical courses to promote innovation, help companies identify sources of innovation financing, and train firms in finding useful information provided by publicly available IP databases. The third step involves the development of recommendations, based on an inventory of intellectual assets, to better manage a firm's intangible assets. The final step is the creation of a concrete plan detailing which IP the firm should apply for, how to conduct enforcement and what strategic priorities to set regarding IP.

Initial feedback from participating firms has been positive. Future evaluation will reveal which long-term benefits were derived from the project and, in particular, whether the training provided firms with the opportunity to manage their IP effectively beyond the project phase.

Source: OECD (2014: 127).

5.3. Leading "frontier" businesses

5.3.1. IP use among leading national frontier businesses

The top local industry players with the largest market shares and size in Malaysia are not necessarily active users of the IP system. Even in Penang's E&E industry, only one in four patents is owned by a national producer (NEAC, 2009). IP ownership still is a new "culture" for many local companies, even if they are strongly involved in R&D.

The five Malaysian companies that were listed in the United Nations Conference on Trade and Development's World Investment Report among the top non-financial transnational corporations in Southeast Asia are Petronas, Axiata, Genting, Sime Darby and Tanjong (UNCTAD, 2013). Sime Darby (a palm oil supplier) is also listed in position 1 583, with USD 41.9 million of R&D expenditure in 2012 and an R&D intensity of 3% with respect to sales in the European Union's R&D Scoreboard of 2013. Petronas (Box 5.7) and its Institute of Technology are among the top PCT (Patent Co-operation Treaty) applicants, as are two other private companies, IQ Group (a supplier of security and convenience products) and Widetech Manufacturing (a manufacturer of correction fluid products), both Malaysian technology-based firms created in the 1980s. As shown in Table 5.2, Petronas (4th) and Sime Darby (6th) are also among the leading patent applicants at the European Patent Office, as are IQ group (7th) and Widetech (29th), as well as many others, such as Harn Marketing (5th) and Qeos (25th) (see Box 5.6).[1]

Table 5.2. **Top ten Malaysian PCT applicants, 2012**

Applicant	Type	PCT filings
Mimos Berhad	Government-owned company	146
Universiti Sains Malaysia	Public university	39
Universiti Putra Malaysia	Public university	15
Petronas	Government-owned company	8
Malaysian Palm Oil Board	Government agency	7
IQ Group	Private company	4
Universiti Malaya	Public university	4
Widetech Manufacturing	Private company	4
Institute Of Technology Petronas	Government-owned company	3
Malaysian Rubber Board	Government agency	3

Source: WIPO *Statistics* (database).

Box 5.6. **The case of Qeos**

Quantum Electro Opto Systems (Qeos), number 25 in the ranking of Malaysian applicants to the European Patent Office, was founded by three researchers at the University of Illinois Urbana-Champaign in the United States to pioneer the commercial development of high-speed, low-cost and power-efficient fibre optic communications solutions. Qeos was initially supported by MOSTI's Brain Gain Malaysia Diaspora programme. Venture capital was provided by Kumpulan Modal Perdana and First Floor Capital. The company has also been supported by the Malaysian Industrial Development Authority's R&D programme and MOSTI's Technofund programme. The company is headquartered at Batu Berendam, Melaka, a free trade zone located in the southern region of peninsular Malaysia.

Source: Qeos (2014).

Box 5.7. **Petronas**

Petroleum Nasional Berhad (Petronas) is Malaysia's national petroleum corporation. It was incorporated in 1974 under the Companies Act (1965) and is wholly owned by the Malaysian Government. Ownership and control of all petroleum resources in Malaysia rests with Petronas through the Petroleum Development Act (1974). Petronas is engaged in the exploration and production of oil and gas: oil refining, marketing and distribution of petroleum products, trading, gas processing and liquefaction, gas transmission pipeline network operations, marketing of liquefied natural gas, petrochemical manufacturing and marketing, shipping, and property investment. The total number of the company's employees is close to 40 000.

IP has played a significant role in the growth and business development of Petronas. In this context, the company established a separate IP division within its legal department. One key strategy of the IP Division is to conduct IP awareness programmes within Petronas, particularly relating to the value of intangibles and the registration of Petronas trademarks and patents.

Petronas has a comprehensive strategy to promote the company's brand impact. Its brand promotional activities have made customer loyalty the most important target. The Petronas logo is registered in many countries, including the United States. Additionally, the company has more than 200 trademarks spread over 65 countries. In Malaysia, Petronas has registered 110 trademark applications in 45 classes with MyIPO. Petronas has carried out well-calculated and concerted efforts to promote its brand, using direct and indirect approaches. The most direct form of brand promotion has consisted of introducing logos on its products. In Malaysia, Petronas is the most popular brand among gas stations and its products can be found in even the most remote corners of the country. Petronas has also become a household name for cooking gas, which has found its way into many homes.

Source: WIPO (2015b).

5.3.2. The role of foreign multinationals in Malaysia

Multinational companies' affiliates established in Malaysia predominate among the top applicants from Malaysia at the US Patent and Trademark Office (USPTO) (see Table 5.4). The evidence indicates that these companies have R&D labs in Malaysia, where inventions are made, whose protection is filed in the United States. Feedback from interviews with industry and university representatives suggests that so far only a few of those inventions were developed jointly with local businesses or research institutions.

Feedback from interviews also suggests that multinationals have trust in the strength and legal certainty of the Malaysian IP system. Factors holding back further R&D investment in Malaysia included shortages in skilled personnel, as well as a shortage of SMEs with the capacity to serve as partners in R&D activities.

Table 5.3. **Top 30 Malaysian patent applicants in the European Patent Office, filing years 2000-11**

Rank	Applicant	Filings	Rank	Applicant	Filings
1	Malaysian Palm Oil Board (MPOB)	38	16	Simplex Major	4
2	Universiti Putra Malaysia (UPM)	37	17	Universiti Malaya (UM)	4
3	Mimos Berhad	29	18	Universiti Teknologi Malaysia (UTM)	4
4	Petronas	18	19	WRP Asia Pacific	4
5	**Harn Marketing**	16	20	Borneo Tsang Furnishing	3
6	**Sime Darby**	15	21	Easycup International	3
7	**IQ Group**	14	22	**Inqpharm Group**	3
8	**Shimano Components**	13	23	Koosan	3
9	**Oyl R&D Centre**	11	24	**Pure Circle**	3
10	**Biolitec Pharma Marketing**	10	25	**Quantum Electro Opto Systems (Qeon)**	3
11	Universiti Sains Malaysia (USM)	8	26	Standards and Industrial Research Institute of Malaysia	3
12	Government of Malaysia	6	27	**Texchem**	3
13	**Neuramatix**	6	28	**TMS Technologies**	3
14	**Easy Pack International**	6	29	**Widetech Manufacturing**	3
15	**Gha Brands Limited**	4	30	**Advanced Pyrotech**	2

Note: For EPO patents, Malaysian origin is determined by the country of origin of any of the applicants, and the table displays the counts of patents associated with them based on full counting, i.e. if an EPO patent has two different Malaysian applicants, it would appear twice.
Source: EPO *Worldwide Patent Statistics* (database).

Table 5.4. **Malaysia's top ten patent owners at USPTO, grant years 2009-13**

Rank	Patent owner	Patents	Company sector of activity	Malaysian private company	MNC
1	Avago Technologies ECBU and General IP (Singapore) Pte. Ltd.: Designer, developer and global supplier of analogue, digital, mixed signal and optoelectronics components and subsystems with a focus in semiconductor design and processing	209	E&E		X
2	Intel Corporation: One of the world's largest semiconductor chip makers	92	E&E		X
3	Altera Corporation: Manufacturer of programmable logic devices (PLDs), reconfigurable digital circuits	71	E&E		X
4	Infineon Technologies AG: Semiconductor manufacturer	39	E&E		X
5	Freescale Semiconductor, Inc.: Designs and produces embedded hardware and software for the automotive, networking, industrial and consumer markets	35	E&E		X
6	Purecircle SDN BHD: Provider of natural sweeteners to the global food and beverage industry	33	Food	X	
7	Malaysian Palm Oil Board: Premier government agency entrusted to serve the country's oil palm industry	29	Food		
8	Western Digital Technologies, Inc.: One of the largest computer hard disk drive manufacturers	22	E&E		X
9	Spansion LLC: Manufacturer of flash memory microcontrollers, mixed-signal and analogue products, as well as system-on-chip solutions	21	E&E		X
10	Schlumberger Technology Corporation: World's largest oilfield services company	17	Oil and gas		X

Note: For USPTO patents, the Malaysian origin is determined by the country of the first-listed inventor and the table displays first-named assignees and the counts of their associated patents.
Source: USPTO (2015).

5.3.3. *Support policies for IP use of frontier innovators*

The Multimedia Super Corridor (MSC) was established in 1996 to act as a hub for companies in the information and communications technology sector (ICT) with ICT-enabled working and living environments. The MSC Malaysia Intellectual Property Grant Scheme subsidises up to 70% of the initial costs of applying for trademarks, patents and industrial designs (Day and Muhammad, 2011). The overall support scheme has led to an increase in patents granted in the ICT industry from 2 in 1990 to 101 in 2006 (Heng Gee et al., 2009).

5.4. Public research institutes and universities

5.4.1. *Universities and research institutes as leading users of the IP system*

Public research institutions and universities increased their use of IP over the past decade: from 2005 to 2012 their patent applications increased five-fold. In the period 1988-2004, the total number of patent applications filed in Malaysia by universities was quite low (Chandran and Wong, 2011). However, in 2010 public research institutions and universities accounted for 60% of all Malaysian patent filings: most of these were filed by universities (MASTIC 2014: 133). Public research institutions and universities are also leading applicants abroad, in both PCT applications (Table 5.5) and EPO filings (Table 5.3).

Table 5.5. **Local patent and utility model applications by type of applicant, 2005-12**

	Total applications by residents	Universities (public and private)	%	Public research institutes	%
2005	522	81	16	38	7
2006	531	94	18	40	8
2007	670	165	25	109	16
2008	864	272	31	151	17
2009	1 234	547	44	204	17
2010	1 275	574	45	222	17
2011	1 136	442	39	164	14
2012	1 160	407	35	177	15

Source: MyIPO (2014).

Leading universities in terms of total patent applications include Universiti Sains Malaysia (USM), University Malaya, Universiti Putra Malaysia and Universiti Teknologi Malaysia (Box 5.8). USM was, in 2012, among the top 50 university applicants, with 39 PCT applications. USM had gone from 10 and 16 PCT applications in 2010 and 2011 respectively, to 39 in 2012 (MASTIC 2014). Two public research institutions, MIMOS and the Malaysian Palm Oil Board

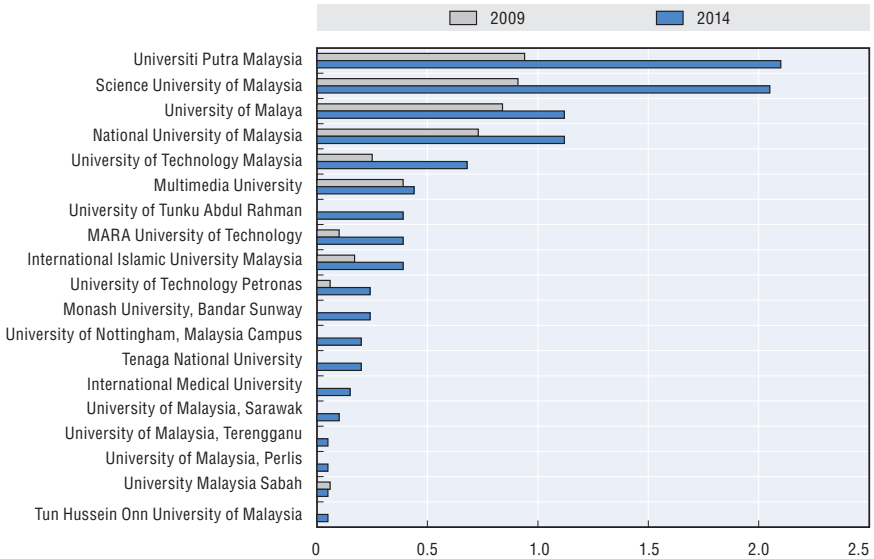
(MPOB), are among the top patent applicants in the country. In particular, MIMOS has been the top Malaysian PCT applicant in the past few years (see discussion below), filing at least 100 more PCT applications than the next Malaysian PCT applicant. These count-based publication and IP rankings are useful in providing an overview of the publication activities and the uptake of IP by Malaysian institutions. They say, however, little regarding efficiency because they do not account for publications output relative to research income, staff and government resources.

5.4.2. *The commercialisation of public research remains limited*

In spite of a much larger and increasing number of IP applications, the commercialisation rate of research from public institutions has until recently remained limited (Thiruchelvam et al., 2011). In a review of R&D commercialisation challenges for Malaysia, Chandran (2008) analysed a survey of 5 232 research projects by public research institutions and universities in the period 1991-99. Of these, 14.1% were identified as candidates for commercialisation and 5.1% were commercialised. The commercialisation rate was lower, at 3.4%, for the period 2000-05. Effectively, much of IP-protected research in Malaysia is never commercialised. However, much has happened in recent years to enhance commercialisation, including learning from past experience and an easing of infrastructure and bureaucratic hurdles to commercialisation, as well as efforts to improve industry-university linkages. Some actors have been more successful in their commercialisation efforts, including USM, MPOB, the Malaysia Rubber Board (MRB) and Universiti Putra Malaysia (Chandran, 2008; Damodaran, 2010).

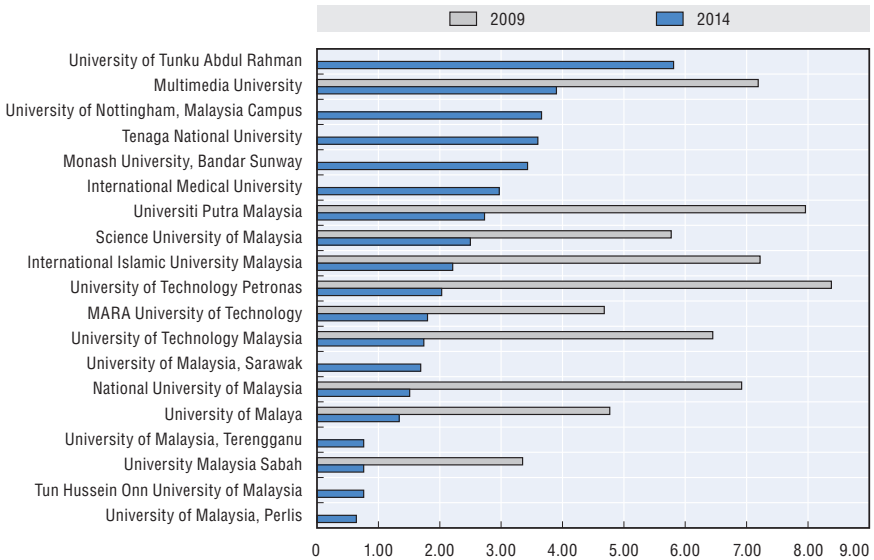
The "technological impact" of Malaysian scientific results on innovation can also be measured indirectly through patents citing publications from Malaysian universities. Figures 5.2 and 5.3 provide two relevant measures based on data from the SCImago (2014) "Institutions rankings": a) innovative knowledge, defined as the number of scientific publications cited in patents; and b) technological impact, defined as the ratio between the scientific publications of an institution that are cited in patents with respect to all of its scientific publications in technologically related scientific areas. The graphs show that even Malaysia's best performing universities (based on information from publications) have a low level of both innovative knowledge and technological impact compared to the top institutions in the world, the best of which have a score of 100 compared to the maximum of 8 reached by Malaysia's institutions. However, almost all Malaysian universities increased their level of innovative knowledge between 2009 and 2014, and the scientific production of new institutions has become visible "technologically" in those five years. This may well be the result of substantial policy efforts aimed at enhancing universities' contributions to the innovation system.

Figure 5.2. **Innovative knowledge of Malaysian institutions, 2009-14**



Note: Innovative Knowledge is a measure that depends on the number of scientific publications cited in patents. The Innovation Knowledge Indicator is size-dependent, i.e. larger institutions will rank higher because these institutions are likely to produce a larger number of publication.
Source: SCImago (2014).

Figure 5.3. **Technological impact of Malaysian institutions, 2009-14**



Note: Technological Impact is a measure based on the ratio between the number of scientific publications produced by an institution and the number that are cited in patents. The Technological Impact indicator is size-independent.
Source: SCImago (2014).

5.4.3. *Challenges to universities' commercialisation activities*

Universities have faced a variety of challenges that are relevant to IP and its commercialisation. These include:[2]

- Poorly structured technology transfer offices and information process
- Lack of demand-oriented research and poor IP management
- Bureaucracy
- Lack of relevance of university R&D to industry
- Lack of co-operation with industry in general
- Insufficient government support and incentives, including financial incentives
- Lack of information on technology and appropriate markets for inventions
- Lack of skilled personnel and absorptive capacity and human capital in SMEs that hampers university-industry knowledge flows and innovation more generally
- Lack of funding at various stages of the commercialisation process (e.g. prototype, marketing).

It is, however, worth noting that over the past years, progress has been substantial. Bureaucratic hurdles have been addressed more successfully than before. Universities have acquired greater expertise by engaging in business or drawing on foreign expertise by consulting with foreign experts or, in the case of some foreign universities operating in Malaysia such as the University of Nottingham's Malaysia Campus, drawing on the expertise of the foreign company's headquarters.

5.4.4. *Government policies and IP in public universities*

As is the case in many other countries, Malaysia has focussed on the question of how public research can contribute more substantially to innovation. As recognised in the 10th Malaysia Plan, improving the quality of education at all levels is a long-term undertaking and will likely require interventions in several areas, including changes in the ways that secondary teachers are trained and recruited, as well as comprehensive changes in curricula. In light of the dissatisfaction of employers with the relevance of formal education in Malaysia, industry representatives are to be involved in the development of education curricula, and will influence the composition of graduates across disciplines in an attempt to align graduates' skills with industry demand.

Low patent numbers and commercialisation results from public universities became a policy issue for the Malaysian Government in the mid-2000s. Realising that a substantial amount of public funding had been invested in research and development with relatively few products being commercialised, the government sought to increase the returns on its

Box 5.8. **Overview of Malaysia's universities**

The Higher Education Department within the Ministry of Education (MOE) co-ordinates and monitors the activities of public and private universities and colleges in Malaysia. Malaysia has 20 public universities, 33 private universities and 4 branch campuses of foreign universities (see Chapter 2). Public universities are categorised by MOE into three groups: 5 **research universities** (focussing on research, competitive entry, quality lecturers and a ratio of undergraduates to postgraduates of 50:50); 11 **technical/focused universities** (focussing on technical, education, management and defence research issues, competitive entry, quality lecturers and a ratio of undergraduates to postgraduates of 50:50); and 4 **comprehensive/teaching universities** (focussing on teaching, competitive entry, quality lecturers and a ratio of undergraduates to postgraduates of 70:30). Table 5.6 provides an overview showing that the largest public university of the country is University Teknologi Mara, with 34% of all tertiary students in Malaysia in 2013. Ten public universities have been either newly created or were given university status in the 1990s.

Table 5.6. **Size and type of public universities in Malaysia**

Type of university	Acronym	Year of creation	Name	Student enrolment	% Total enrolment	Top 10 PCT Malaysian applicant 2012
Research	UM	1949	Universiti Malaya	27 091	5	Yes
Research	USM	1969	Universiti Sains Malaysia	29 065	5	Yes
Research	UKM	1970	Universiti Kebangsaan Malaysia	30 041	5	No
Research	UPM	1931	Universiti Putra Malaysia	32 092	6	Yes
Research	UTM	1904	Universiti Teknologi Malaysia	33 361	6	Yes
Focussed	UUM	1984	Universiti Utara Malaysia	30 837	6	No
Comprehensive	UIAM	1983	Universiti Islam Antarabangsa Malaysia[3]	32 086	6	No
Comprehensive	UNIMAS	1992	Universiti Malaysia Sarawak	17 198	3	No
Comprehensive	UMS	1994	Universiti Malaysia Sabah	25 207	4	No
Focussed	UPSI	1922	Universiti Pendidikan Sultan Idris	27 659	5	No
Comprehensive	UiTM	1956	Universiti Teknologi Mara	189 551	34	No
Focussed	UniSZA	2005	Universiti Sultan Zainal Abidin	7 977	1	No
Focussed	UMT	1979	Universiti Malaysia Terengganu	8 715	2	No
Focussed	USIM	1998	Universiti Sains Islam Malaysia	13 022	2	No
Focussed	UTHM	1993	Universiti Tun Hussein Onn Malaysia	15 319	3	No
Focussed	UTeM	2000	Universiti Teknikal Malaysia Melaka	12 593	2	No
Focussed	UMP	2002	Universiti Malaysia Pahang	8 904	2	No
Focussed	UniMAP	2001	Universiti Malaysia Perlis	10 415	2	No
Focussed	UMK	2007	Universiti Malaysia Kelantan	6 443	1	No
Focussed	UPNM	2006	Universiti Pertahanan Nasional Malaysia	2 783	0	No
			Total enrolment	**560 359**	**100**	

Source: MOE (2015) for the list of public universities and their type; WIPO (2014) for the top ten PCT applicants; Internet search for the creation year of each university.

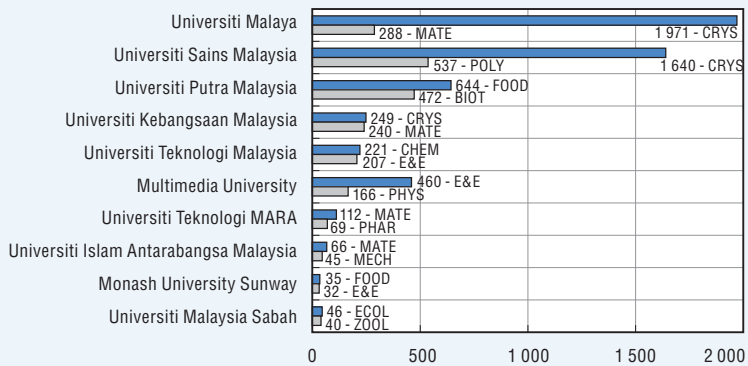
Box 5.8. **Overview of Malaysia's universities** *(cont.)*

Malaysia's leading public research universities produce most of the research output in the country. They also accounted for two-thirds of all Malaysian publications between 2001 and 2011: two of them, University Malaya (7 508) and Universiti Sains Malaysia (7 073), alone account for about 51% of all publications. When combined with the publications from the other three research universities, Universiti Putra Malaysia (4 947 publications), University Kebangsaan Malaysia (3 708) and Universiti Teknologi Malaysia (1 641), these five universities account for two-thirds of total publications. The reader should note that absolute publication numbers deliver an imperfect picture of university performance, as universities' staff sizes, research and teaching budgets and available infrastructure differ substantially.

During the last decade, private universities in Malaysia have become more important, both with regards to student numbers and with regards to their publication activities. Among private universities, the Multimedia University, set up in 1996, leads in terms of publications in the period 2001-11 with1 348 publications. Other leading private universities in terms of publications are Monash Universiti (532), University Abdul Rahman (409), Universiti Teknologi Petronas (388) and University of Nottingham Malaysia (363) (MASTIC, 2014: 89-90). Most recent data show stronger publication numbers for private universities, notably at Universiti Teknologi Petronas, but also at Monash University and Nottingham University. This indicates that these institutions, which are still quite young, have successfully positioned themselves in contributing to research outputs in Malaysia.

University research also contributes to areas relevant to industry, with a few universities catering to the needs of the E&E sector. There are also other areas of specialisation across institutions (Figure 5.4).

Figure 5.4. **Universities and their two leading research fields with number of publications, 2000-11**



Note: BIOT – Biotechnology & Applied Microbiology; CHEM – Chemical Engineering; CRYS – Crystallography; E&E – Engineering, Electrical and Electronic; ECOL – Ecology; FOOD – Food Science and Technology; MATE – Materials Science, Multidisciplinary; MECH – Engineering, Mechanical; PHAR – Pharmacology and Pharmacy; PHYS Physics, Applied; POLY – Polymer Science; ZOOL – Zoology.

Source: Mastic (2014: 93).

investment that could be translated into economic growth (MIGHT, 2009). Greater emphasis on commercialisation was one of a wider set of policies aimed at improving the performance of universities (Box 5.9), particularly in the National Higher Education Plan 2007-12. A rating system for Malaysian higher education institutes (SETARA) was introduced in 2007 to enhance quality and promote best practices in public universities (OECD, 2013). The Accelerated Programme for Excellence (APEX) was created, providing privileges and greater autonomy for excellence in research and innovation. By the end of 2014, only USM had been awarded APEX status (OECD, 2013).

In order to support wider efforts by universities to seek IP as a way to commercialise their research, in 2009 MOSTI introduced the IP Commercialisation Policy (MOSTI, 2009) for research institutions. The policy recommended that research institutions provide cash rewards of MYR 500 (USD 265) to researchers on disclosure of an invention, up to MYR 10 000 (USD 5 302) when a patent was granted, as well as a share in the revenues from commercialisation of IP generated by government-funded projects (MOSTI, 2009). However, the necessary funds to implement the measure were not added to the public funds received by the universities and few universities implemented the measures. Those that did, in the end, had to draw from their own budget. USM, for instance, only provides rewards to inventors once there is a return from an invention, but not before.

The universities show evidence of learning regarding the costs and returns from IP. Some universities are more selective than others when deciding what disclosures to protect by seeking patent protection and what disclosures to put in the public domain by publishing results in scientific journals. Feedback from universities indicates that although increasing the number of filings might have been the objective in recent years, they may become more selective mainly because of financial constraints. Getting IP rights is costly, so that universities become more careful and only patent inventions with the highest commercial potential. The same applies to the question of whether or not to file nationally or via PCT, and whether to get into national phase entries via PCT and if so, in which countries. The same is true for IP renewals. These decisions are likely to be more cost-conscious with universities' new autonomy starting in 2015.

What is more, universities have also received greater autonomy in key areas of governance, including legal, operational (governance), academic and financial matters, and in issues relating to human resources, enrolment, and income generation (see also Chapter 2). To gain autonomy, universities need to comply with certain framework conditions related to the quality of the institution, as well as to governance, as specified by the MOE. USM, Universiti Teknologi Malaysia, Universiti Malaya, Universiti Kebangsaan Malaysia and Universiti Putra Malaysia were the first universities that obtained autonomy in

Box 5.9. **Policies in support of the commercialisation of public research**

Legislative reforms, the growing importance of science for technological innovation, and changes in the way governments allocate funds to public research institutions and universities have all contributed to the rise of market-oriented activities by universities and research institutions worldwide. In particular, the demand for universities to engage in commercialisation activities has increased.

There are three main policy areas that frame IP commercialisation at academic institutions:

First, IP policies regarding ownership and commercialisation at the institutional level provide clarity in the legal framework, facilitating co-operation with private entities. University policies regarding IP and technology commercialisation include policies conveying norms about the creation, registration and exploitation of IP rights.

Second, policies towards inventor participation in the technology transfer process are crucial. These may include inventor royalty compensation, awards, recognition in curricula (e.g. credits for tenure), equity participation in spinoffs, etc. According to international best practices, royalty sharing and equity participation are proven policy mechanisms to encourage the participation of researchers in patenting and the commercialisation of technology.

Third, organisational arrangements are needed to link with the external environment, and co-ordinate and execute technology transfer activities. By facilitating the division of tasks across stakeholders, technology transfer offices (TTOs) relieve the administrative burden of IP and commercialisation from researchers, and by building reputation and networking competences, they facilitate institutions' integration into technology markets. Several studies have emphasised the role of TTOs in licensing and start-up formation. An example is the Innovation Agency (INOVA), a TTO at University of Campinas (UNICAMP) in Brazil. UNICAMP is the biggest university technology transfer provider in Brazil and Latin America, a fact based on its strong component of graduate and post-graduate researchers (one-half of students are graduate students) and on its effective management of INOVA. INOVA is a multitask agency charged with encouraging, promoting and facilitating the relationship between the university and the market. Instead of selecting UNICAMP's technologies and offering them to the market, INOVA first identifies a market demand and, in response, looks to the university for the solutions available. Another factor that contributes to INOVA's success is the professional staff involved in technology transfer. Furthermore, it manages several collaborative programmes with industry.

Source: Zuniga, P. (2011).

2012 (Kulasagaran, 2012; Abd Rahman, 2013). Greater autonomy is expected to increase their international competitiveness, but should also ease commercialisation activities by removing administrative hurdles.

Commercialisation has been eased as universities have received not only greater autonomy but also greater flexibility in their IP policy, although some obstacles remain. To reduce administrative hurdles associated with being governed by public administration rules, some universities have established their own wholly-owned subsidiaries in order to operate more flexibly with industry. However, public policies reward the number of patents held (which might lead universities to renew patents even of low value). Some of the leading universities have also started to adopt new strategies, moving away from previous efforts to create spin-offs, which involve high costs for the university, in favour of licensing, an activity that is often done by universities' subsidiaries.

The Malaysia Education Blueprint 2015-16, released by Malaysia's Prime Minister in April 2015, sets out a wider reform agenda aimed at strengthening the higher education sector's contribution to the country's 2020 goal of becoming a high-income nation. The plan specifies ten "shifts" that would be needed; Shift 7 focuses on the contributions of the education sector to Malaysia's innovation ecosystem. It emphasises a range of initiatives, including enhancing industry-university relationships with new programmes similar to the Private-Public Research Network (PPRN) that was created in 2012, as well as support for Collaborative Research in Engineering, Science and Technology (CREST), which was created in 2012, and which has helped enhance industry-university relationships. It also foresees improving the ability of universities to commercialise their research by creating an Innovation and Technology Managers Association to create synergies and learning among different institutions' technology transfer offices and staff (MOE, 2015).

5.4.5. *University funding: Implications for commercialisation activities*

Starting in 2015, all public universities are required to generate 25% of their own operating costs. The budget allocated to universities from the government has been reduced in line with the government's objective to decrease the public deficit to 3% of GDP. This obligation for universities will increase to generating 75% of their own budgets by 2025. The five Malaysian research-focussed public universities (see Box 5.8) receive between USD 26.5 million and USD 53.0 million (MYR 50-100 million) in block grants and 5-10% of that money is dedicated to technology transfer.

Commercialisation of public research can certainly be regarded as an option for generating such revenues, the new governmental requirement

representing a new incentive mechanism. However, it is also true that universities' experiences have been that commercialisation offers few rewards to most institutions. Apart from commercialisation, other revenue streams, such as student fees and consultancy services, will be needed to raise 25% (and 75% by 2025) of their operating revenue. Neither the supply side (universities providing IP for commercialisation) nor the demand side (firms seeking IP to develop innovations) seems mature enough for IP to become a sustainable source of revenue. What is more, only a few institutions have successfully developed business models around commercialisation (OECD, 2013).

Apart from licensing, there are other methods of transferring technological knowledge. Non-technological knowledge can be transferred via professional services such as consulting and contract research. For instance, Malaysia is a leader in Islamic finance and halal banking research. In sectors where patents are much less relevant, branding and reputation-building of universities' research can be important and might be supported by trademarks. Leading US universities have engaged in branding their research excellence. Also, the Malaysian example of ZAPPA demonstrates the importance of branding (Box 5.10).

Box 5.10. **ZAPPA: A best practice example for branding and commercialisation**

One of the major problems faced by rice farmers in Malaysia is that the water used during sowing and harvesting can easily become contaminated. In 1999, researchers at the Agricultural Faculty of Universiti Putra Malaysia (UPM) were tasked by the Malaysian Government with developing a new technology that would reduce water contamination, help to rid fields of weeds and increase rice paddy yield. UPM teamed with Diversatech (M) Sdn. Bhd. (Diversatech), a prominent Malaysian agricultural company. The researcher's R&D focused on developing a technology that would allow the sowing of rice paddy seeds in deeper water. In 2001 their work came to fruition with the development of Zap PadiAngim (ZAPPA), a specially-formulated seed germination enhancer. Individual farmers have greatly benefitted from ZAPPA, as they can produce more rice by using ZAPPA, thus increasing their income by up to USD 500 per hectare. ZAPPA has become a well-known product not only in Malaysia, but also in other countries in the region. As of 2012, gross sales of the product have exceeded USD 2.6 million, and UPM has received royalties in excess of USD 52 000.

Important to the success of Diversatech and UPM's innovative technology was the development of a strong brand. To that end, the two partners chose the name "ZAPPA" as a unique combination of a common English word – "zap" – which means to make something disappear, and a Malay word – "pa" –

Box 5.10. **ZAPPA: A best practice example for branding and commercialisation** *(cont.)*

which is an abbreviation for "paddy angin" (weedy rice). The combination of the two into "ZAPPA" means to make the weeds in rice paddies disappear. A catchy brand name, ZAPPA is easy to remember and describes the product's effects in a single word.

From the outset, Diversatech has been UPM's primary vehicle for technology transfer and partner for commercialisation, activities that were undertaken before any IP protection was secured. UPM researchers have also developed information brochures and posters, and launched various pilot demonstrations to show farmers the advantages of the technology and how to use it properly. Farmers were also provided with demonstration units free of charge that they could try themselves, along with the guarantee that if the rice yield were lower than normal production, Diversatech would compensate the farmers for the difference. Through these efforts, farmers and agricultural organisations and companies were convinced of the effectiveness of the technology.

Because the technology behind ZAPPA was invented at a research university, transferring the technology to the private sector was vital for its commercialisation. Although the university already had a relationship with Diversatech in place, it knew that securing IP rights was a vital step in technology transfer and commercialisation.

Source: WIPO (2015c).

5.4.6. Public research institutes and the use and commercialisation of IP

In general terms, research institutes seem to be less prepared to pursue commercialisation than are universities. They also face larger administrative barriers, have experienced larger budgetary cuts to their research activities and have a slow-to-adjust culture that until recently put little emphasis on either collaboration with the private sector or on producing IP. However, these institutions have very different profiles (Box 5.11). This section examines the approaches to the commercialisation of IP of several different types of research institutes: MIMOS, a publicly owned company; MPOB and MRB, two government agencies engaged in research related to two of the country's most important commodities (palm oil and rubber); and six research institutes under the Ministry of Health.

MIMOS Berhad

MIMOS Berhad is the leading patentee in Malaysia. In 2013 it ranked 12th among the top public research institutes in the world in terms of PCT filings

Box 5.11. **Malaysia's public research institutes**

By 2011, there were 29 public research institutes (PRIs) in Malaysia. These PRIs share the mandate to act as the interface between science, industry and society. They differ with regard to their institutional forms and the focus of their mostly applied research. Most of them have a sectoral focus on natural resources (agriculture, palm oil, rubber, cocoa, forest, etc.); industry and engineering (electronics and industrial productivity); healthcare (medical research); or other selected fields (nuclear technology, remote sensing, economics, etc.). The 2008 National Survey of R&D noted that agricultural sciences dominated the R&D expenditure of PRIs. Other areas that receive high levels of R&D funding include forestry sciences, material sciences, engineering science and biotechnology (Thiruchelvam et al., 2011: 31). While mainly reliant on public funding, some institutions have received important additional funding from the private sector. For example, Malaysia's Cancer Research Initiatives Foundation has individual and corporate donors such as Sime Darby and Petronas (OECD, 2013: 204).

Table 5.7. **Selected public research institutes in Malaysia**

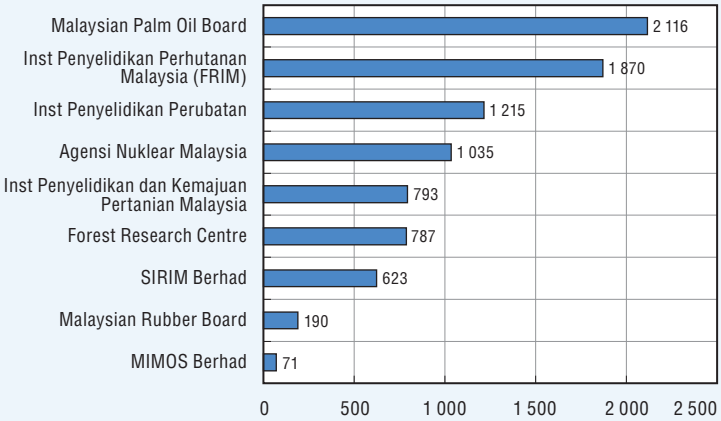
	Name	Research field	Institutional status	Ministry in charge
1	MIMOS Berhard	ICT	Corporate	MOSTI
2	Malaysian Agricultural Research and Development Institute	Agriculture	Government	MAABI
3	Malaysian Palm Oil Board	Palm Oil	Government	MPIC
4	Malaysian Rubber Board	Rubber	Government	MPIC
5	Malaysian Cocoa Board	Cocoa	Government	MPIC
6	Forest Research Institutions Malaysia	Forest	Government	MNRE
7	Standards and Industrial Research Institute of Malaysia	Standards	Corporate	MOF
8	Malaysia Productivity Corporation	Management research	Corporate	MITI
9	Institute for Medical Research	Medicine	Government	MOH
10	Institute for Health Systems Research	Medicine	Government	MOH
11	Institute for Public Health	Medicine	Government	MOH
12	Institute for Health Management	Medicine	Government	MOH
13	Clinical Research Centres	Medicine	Government	MOH
14	Institute for Health Behavioural Research	Medicine	Government	MOH
15	National Heart Institute	Medicine	Corporate	MOF
16	Agro Biotechnology Institute	Biotechnology		MOSTI

Source: Based on Thiruchelvam et al. (2011) and relevant institutional webpages.

Less emphasis has been placed on publications. Between 2001 and 2011, the MPOB published 395 ISI publications, followed by the Forest Research Institute Malaysia (357), Institute of Medical Research (321), Nuclear Agency of Malaysia (256), Malaysian Agricultural Research and Development Institute (153), SIRIM (111), Forest Research Centre (92), MRB (48) and MIMOS (45).

Box 5.11. **Malaysia's public research institutes** *(cont.)*

Figure 5.5. **Citations received by public research institutions**



Source: MASTIC (2014: 98).

with 82. In 2012, MIMOS filed 146 PCT applications and ranked 6th in the world (WIPO, 2014). In the period 2000-11, MIMOS was the third largest EPO applicant from Malaysia, with 29 filings. In the course of 2014, MIMOS has been granted four patents at EPO; another had the status "grant of patent is intended" and many others were still pending. MIMOS spends approximately USD 1.59 million (MYR 3 million) per year to file PCTs and USD 1.59 million (MYR 3 million) per year to file nationally. Some progress has also been made regarding commercialisation: at present, about 10% of MIMOS's revenues come from royalties obtained from non-exclusive licensing contracts.

MIMOS was established initially as a unit under the Prime Minister's Department to perform R&D in ICT and microelectronics and then was transformed into an incorporated company of the Ministry of Finance in 1997. Its mandate is to conduct R&D in ICT and microelectronics, support business development in the sector and be Malaysia's national ICT policy secretariat. This mandate was expanded in 2006 to improve the ecosystem for the development of the national ICT industry. MIMOS's funding is 100% public, its budget is negotiated with MOSTI based on a five-year working plan and has to be justified annually. The commercial arm of MIMOS, Frontier Novatur, is responsible for setting up research and commercialisation collaborations with industry and for marketing technologies to potential industry partners. Engagements may be in the form of technology licensing or the formation of joint ventures.

The patenting strategy of MIMOS is the result of a fundamental re-orientation that was initiated in 2006, focusing on IP and commercialisation activities exclusively. The institution's key performance indicators call for it to make 100-120 patent filings per year. These arise from the institution's three areas of R&D: applied research, advanced technology and application development. Unlike universities and other research institutes, no basic research is conducted and publications are not sought. With increased threats of budget cuts in the future, the incentive for MIMOS to gain revenue from commercialisation has increased even further.

Success has also been achieved by modifying staff incentive programmes to include tiers: staff members who submit an invention to the IP committee receive USD 53 (MYR 100); if the invention results in a patent filing, the staff member receives USD 1 590 (MYR 3 000); a patent grant (which usually happens 3-4 years after filing) earns the staff member another USD 530 (MYR 1 000). Inventors receive a share of the royalties if the product is commercialised (part of the revenues from commercialisation go to maintaining the IP, and the rest is shared between the inventors and their supporting team). All IP on the invention is owned by MIMOS Berhad.

The limited capacity of national SMEs to take advantage of inventions proposed by MIMOS challenges the further expansion of MIMOS's commercialisation activities. Most SMEs will only license IP if it offers "ready-to-market" products and will not engage in more elaborate product development. A substantial share of MIMOS's licensing contracts is provided to government at low prices given the public status of MIMOS. The government is then expected to showcase the inventions to industry groups to create additional licensing opportunities.

Malaysian Palm Oil Board

MPOB was founded in 2000 as a government agency to promote and develop the palm oil industry in Malaysia. Palm oil has become the second most-consumed oil in the world, after soybean oil. Malaysia is the world's second largest producer of palm oil, which constitutes an important source of its exports revenue. In 2011, palm oil exports reached 39 million tonnes worldwide. Malaysia's share of the world total was 46% (18 million tonnes) (MPOB, 2015a).

Current challenges include increasing the value-added in export products. Malaysia made significant progress in developing a more elaborate industry around palm oil production following the goal-setting of the Industrial Master Plans 1 and 2. However, there remains the potential to build complementary industries and produce higher value-added products. Such complementary industries would not only create more value within the

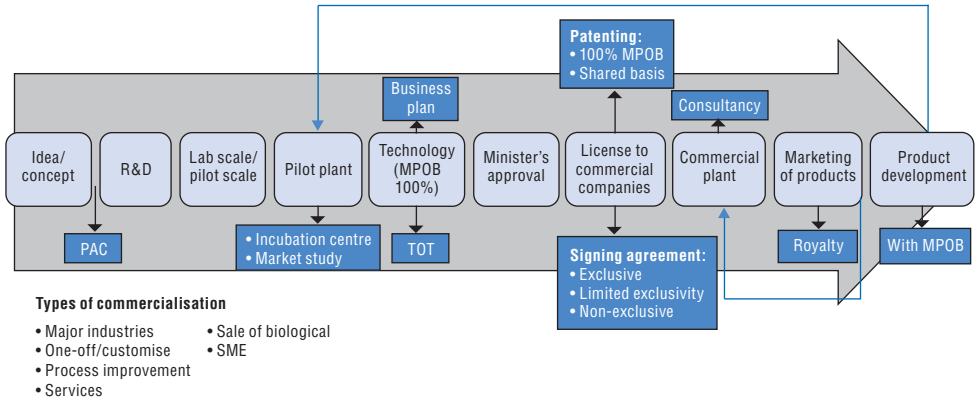
Malaysian economy, they would have other positive effects. First, such developments trigger infrastructure development in remote areas where palm oil is planted. Second, they provide employment in these same areas. Finally, they reduce the dependency on the primary commodity itself because the availability of different business models helps to reduce the negative effects of overproduction and mitigates the effects of volatile world market prices (Rasiah, 2006).

MPOB is the second largest PCT applicant among Malaysian PRIs after MIMOS, with seven PCT filings published in 2012. It is also the number one Malaysian patent applicant at EPO, with 38 patent applications for the filing years 2000-11, and the fourth largest Malaysian patent owner at EPO and USPTO with 7 and 29 patents granted in these offices respectively. MPOB filed approximately 284 patents from 1980 to the end of 2014; 150 have been granted in various countries, including the United States, Thailand, Indonesia and Brazil, where palm oil production is important.[4] They file in major offices such as China, Japan, the United States and the European Patent Office. MPOB spends approximately USD 1.1 million to USD 1.6 million (MYR 2-3 million) each year on servicing its IP filing and management, as well as on licensing activities. Similar to MIMOS, MPOB's efforts aimed at seeking and commercialising IP have intensified over the past decade.

MPOB receives industry funding from every ton of palm oil and palm kernel oil produced. Firms have to pay a tax (referred to as "cess"). MPOB aims to serve the palm oil industry as its research institution, responding to immediate common industry challenges. Its mission goes beyond aiming to transform the industry into one that offers more diversified, higher value-added, and globally more-competitive products. MBOP also receives budget allocations from the government to fund development projects and for approved research projects under the Intensification of Research in Priority Areas (IRPA) programme, the largest funding system for public R&D. While such long-term investments are a source of sustainable income flows, they are not popular within the palm oil industry because easy-to-obtain shorter-term benefits from lower value-added sales are available.

Obtaining IP titles is not the end objective at MPOB. It is to make the most effective use of IP in the industry, as shown in Figure 5.6. To this end, MPOB engages intensively with industry and global experts. The research agenda is determined at the annual Programme Advisory Committee meetings where MPOB gathers world experts who discuss the feasibility of certain types of research. The industry provides input at that stage so as to ensure that the research done effectively serves the industry. MPOB also participates frequently in exhibitions to showcase technologies. MPOB licenses its technologies (including patents) to interested parties under mutually agreed terms, with both exclusive and non-exclusive licenses. About 60 of its patents

Figure 5.6. **Commercialisation of IP at MPOB**



Source: Information provided to the OECD by MPOB.

have been commercialised (MPOB, 2015a: 31-33), with more than 563[5] technologies offered in total. Examples of commercialised technologies include red palm oil, palm-based printing ink and personal care products. To finance future R&D, MPOB asks for royalties, which are usually set as a percentage of sales or, in a few cases, as a lump sum, but can be combination of both. Yet, it is difficult for MPOB to obtain negotiated royalties because sales from licensees are hard to monitor. In some cases, at the request of industry, MPOB has also taken on the role of incubator, allowing its facilities to be used for trial manufacturing. This function includes providing technical support and help with the marketing of products, subject to payment of additional consultancy fees. In some cases, MPOB conducts research in co-operation with industry upon mutually agreed terms and conditions (MPOB, 2015b).

Success has also been the result of an internal incentive system that emphasises fostering MPOB's contributions to industry. Researchers at MPOB are required in their performance evaluation requirements to produce two research outputs per year, which may include research papers, patents, commercialisation and product development. Incentives for researchers include equal sharing of royalties between the researcher and the institution.

Malaysian Rubber Board

Malaysia is one of the world's largest producers of rubber and the primary objective of MRB is to assist in the development and modernisation of the Malaysian rubber industry in all its aspects, from cultivation of the rubber tree, the extraction and processing of its raw rubber, the manufacture of rubber products and the marketing of rubber and rubber products (MRB, 2014a). MRB has filed about 37 patent applications and 15 trademarks nationally. They

recently engaged in efforts at the international level and were among the top Malaysian PCT applicants in 2012 with three PCT filings, but it had not filed any patent applications at the EPO in the period 2000-11. Neither is it the assignee of any patent granted in the United States between 2009 and 2013.

MRB has taken efforts to commercialise IP, although with only limited success to date. MRB has engaged in some concrete negotiations with its industry. Negotiations, however, often failed in the end as the industry generally required that product development risks be incurred by MRB. MRB also provides some technology for free, to support smallholders and the general well-being of the industry, but has also signed a few exclusive licensing agreements.

The rubber industry contributed substantially to Malaysia's total exports in 2013, with exports totalling approximately USD 17.9 billion (MYR 33.7 billion). In the early 1970s, rubber accounted for 32.5% of the country's export value, but this proportion had fallen to about 4.7% in 2013 (Sukirno, 2004; MRB, 2014b: 13). Malaysia is currently the world's largest manufacturer of medical rubber gloves, the largest producer of sheath contraceptives, the second largest manufacturer of rubber thread, the third largest exporter of natural rubber and the sixth largest producer of natural rubber. However, rubber's importance in Malaysia's economy is decreasing. In 2000, the area under rubber cultivation stood at 1.43 million hectares but this had fallen to 1.06 million hectares in 2013 and now Malaysia is sixth in the world in terms of production. This is due to a variety of reasons, including the fact that other developing countries have much lower product costs for rubber, the high price volatility of rubber, as well as the limited development of higher value-added products. In 2013, exports of Malaysian rubber products totalled USD 4.18 billion (MYR 14.62 billion). Latex-based goods exports (i.e. rubber gloves, condoms, catheters, latex thread, rubber foam-like mattresses and cushions, etc.) represented 82.4% of these exports; general and industrial rubber goods represented 6.0% and 3.5% respectively. Tyres, inner tubes and footwear accounted for the rest. MRB launched the One Nation Rubber Strategy in 2014, which aims to increase the competitiveness of the national rubber industry (including by commercialising green specialty rubber and promoting rubber as renewable material for environmentally friendly development objectives) (MRB, 2015).

In attempting to commercialise the results of its research, MRB has flexibility to fix the terms and conditions of its technology licensing agreements. In addition, MRB has set up a researchers' incentive programme to foster IP disclosure, protection and commercialisation. The programme offers upfront rewards to researchers at the time of filing, additional rewards if the IP right is granted, USD 15 907 (MYR 30 000) if the invention reaches commercialisation irrespective of the revenue it makes, as well as 70% of the royalties if revenue is generated (30% goes to the institution). RRIM-Consult Corporation, established on 1 July 2002 as the commercial arm and wholly-owned

subsidiary of MRB, is tasked with undertaking these commercialisation activities (RRIM-Consult Corporation, 2014).

Commercialisation is becoming important to support the research budget. Currently, MRB obtains 60% of its revenues from government funding; 40% is internally generated. One of its targets for 2020 is to increase its own resources from royalties through the commercialisation of its R&D findings, with the objective being the generation of USD 530 223 (MYR 1 million) per year for the period 2014-16. Other sources of funds include increasing income from consultancy services related to technology commercialisation, with an expected outcome of USD 2.3 million (MYR 4.4 million) per year; increasing income from testing services by improving business management; and enhancing income generation through consultancy fees from industry support services. The last two activities are expected to generate revenue of USD 530 223 (MYR 1 million) per year from 2014 to 2016.

Challenges MRB faces in successfully supporting industry with research it can license include the following:

- Being a government agency, it does not have as much management and recruitment flexibility as private institutions (e.g. MIMOS) and must abide by general rules of public administration, which restrains its flexibilities in research compared to universities.
- Finding interested commercial partners who are ready to invest is difficult, as Malaysian companies do not want to accept the risk of developing prototypes. This is especially an issue in rubber as the Malaysian rubber industry is dominated by smallholders: according to information provided by MRB to the OECD, smallholders account for 92.5% of the total planted area and contribute 91.7% of total production.
- It is difficult for MRB to do research openly and share information because of a lack of trust among companies in the industry. Companies do not want to reveal what difficulties they face or what issues they are considering out of fear of competitors, and because they do not trust results from research institutes. Thus, research is mostly defined and decided from the research side.

Health research institutes

There are six public research institutes under the aegis of the Ministry of Health (MOH): i) Institute for Medical Research (IMR); ii) Institute for Health Systems Research (IHSR); iii) Institute for Public Health (IPH); iv) Institute for Health Management (IHM); v) Clinical Research Centres (CRC); and vi) Institute for Health Behavioural Research (IHBR). These institutes are very new to seeking IP and its commercialisation. By the end of 2014, they jointly had around 20 IP rights titles.

Some institutional reforms have been implemented to support IP and its commercialisation. A dedicated committee now decides which inventions will be taken forward for IP protection and commercialisation, based on disclosures received from researchers. However, often research institutions choose to implement solutions directly in the health system, rather than by creating spin-offs or by licensing IP to industry.

The institutes have not yet successfully commercialised their IP due to a variety of reasons including:

- There is limited capacity and expertise among researchers in establishing contacts with industry and a lack of intermediaries to support them. In the past, the Malaysia Innovation Agency provided them with support by identifying 11 of their products as having commercialisation potential.
- As government institutions, they face multiple constraints regarding human resource management, including incentive schemes for commercialisation. Researchers' performances are evaluated based on the quantity rather than the quality of their publications. Patents have only more recently been introduced, but again only quantity counts, and the difficulty of obtaining patents makes seeking them much less attractive for researchers.
- While a national IP commercialisation policy was circulated by the Ministry of Science, Technology and Innovation in 2009, it has not been put into practice yet because of a lack of funding and practical guidance from the Treasury, notably about the implementation of guidelines on revenue sharing with researchers (MOSTI, 2009).
- There is no specific budget for filing patent applications, which is very costly, particularly because of patent attorney fees.

Notes

1. Harn Marketing, Sime Darby and Shimano Components were also among the top five Malaysian patent "owners" with granted patents from the EPO for grant years 2009-13.
2. More information on challenges faced by Malaysia's research organisations with regard to financing is provided in the following: Chandran (2011); Li and Imm (2007); MOSTI (2006); OECD (forthcoming, 2013); Thiruchelvam et al. (2011).
3. Also known as International Islamic University Malaysia.
4. Information provided by MPOB to the OECD in March 2015.
5. Information provided by MIMOS to the OECD in March 2015.

References

Abd Rahman, A. (2013), "Funding reforms in Malaysian public universities transition towards competitive funding", *Australian Journal of Basic and Applied Sciences* Vol. 7/10, pp. 553-561.

CBD (2014), "Country profiles: Malaysia", Convention on Biological Diversity, *www.cbd.int/countries/profile/default.shtml?country=my#facts* (accessed on 23 February 2015).

Chandran, V.G.R. and C.Y. Wong (2011), "Patenting activities by developing countries: The case of Malaysia", *World Patent Information*, Vol. 33, pp. 51-57.

Chandran, V.G.R. (2010), "R&D commercialization challenges for developing countries: The case of Malaysia", *Tech Monitor*, Nov-Dec, pp. 25-30.

Chandran, V.G.R. et al. (2008), "The commercialization of research results among researchers in public universities and research institutions", *Asian Profile*, Vol. 36/3, pp. 235-250.

Damodaran, R. (2010), "MPOB's efforts to commercialise technology pay off", *Business Times*, 23 September 2010.

Day, N. and A. Muhammad (2011), *Malaysia: The Atlas of Islamic-World Science and Innovation*, Country Case Study No. 1, Royal Society of London for Promoting Natural Knowledge, London, *http://hdl.handle.net/10625/48146*.

EPO (2015) *EPO Worldwide Patent Statistical Database* (database), *www.epo.org/searching/subscription/raw/product-14-24.html*, using data from April 2014 (accessed on 23 February 2015).

Heng Gee, L. et al. (2009), "Reforms towards intellectual property-based economic development in Malaysia", *The Journal of World Intellectual Property*, Vol. 12/4, pp. 317-337.

Hu, A.G. et al. (2010), *The Strategic Use of Intellectual Property to Enhance Competitiveness in Select Industries in ASEAN*, WIPO Publication No. 953E, World Intellectual Property Organization, Geneva, *www.wipo.int/edocs/pubdocs/en/intproperty/953/wipo_pub_953.pdf*.

Kulasagaran, P. (2012), "Varsity autonomy", *The Star*, 5 February 2012, pp. 6-7, *www.thestar.com.my/Story/?file=%2F2012%2F2%2F5%2Feducation%2F10661055&sec=education*.

Li, L.P. and A.O.C. Imm (2007), "Performance requirements in Malaysia", in K.S. Jomo (ed.), *Malaysian Industrial Policy*, NUS Press, Singapore.

MASTIC (2014), "Malaysia science, technology and innovation (STI) indicators report 2013", *www.mastic.gov.my/en/web/guest/27*.

MIGHT (2009), "Malaysia high technology industry report", MIMOS Berhad, *www.mimos.my/* (accessed on 27 November 2014).

MITI (2006), "Third Industrial Master Plan 2006-2020", Ministry of International Trade and Industry, Putrajaya, Malaysia, *www.miti.gov.my/cms/content.jsp?id=com.tms.cms.article.Article_8e595aba-7f000010-72f772f7-733da6e4*.

MOE (2015), *www.moe.gov.my/en/ipta* (accessed on 23 February 2015).

MOSTI (2012), "Science and technology knowledge productivity in Malaysia: Bibliometric study 2012", Malaysian Science and Technology Information Centre, Putrajaya, Malaysia, *www.mastic.gov.my/documents/10156/462d0525-6585-4f96-9d29-7a974df67135*.

MOSTI (2009), "Intellectual property commercialisation policy for research and development (R&D) projects funded by the Government of Malaysia", *www.mosti.gov.my/en/policies-roadmaps/ip-commercialization-policy/* (accessed on 23 February 2015).

MPB (2014), Malaysian Pepper Board, *www.mpb.gov.my* (accessed on 27 November 2014).

MPOB (2015a), "Malaysian Palm Oil Board, Ministry of Plantation Industries and Commodities", *www.mpob.gov.my/images/stories/pdf/cb_complete.pdf* (accessed on 23 February 2015).

MPOB (2015b), Malaysia's Palm Oil Industry, *www.mpob.gov.my/images/stories/pdf/cb_complete.pdf* (accessed on 27 February 2015).

MRB (2015), *www.lgm.gov.my/news/news2014Apr1NRS.htm* (accessed on 24 February 2015).

MRB (2014a), *www.lgm.gov.my/general/Aboutus.aspx* (accessed on 23 February 2015).

MRB (2014b), "Natural rubber statistics 2014", *www.lgm.gov.my/nrstat/nrstats.pdf* (accessed on 23 February 2015).

Muling, L.S. (2013), "Geographical indications: What is new in the Asia-Pacific Region? A Malaysia Perspective", Presentation given at the World Intellectual Property Organization, October 2013, *www.wipo.int/edocs/mdocs/geoind/en/wipo_geo_bkk_13/wipo_geo_bkk_13.pdf*.

MyCHM (2015), *www.chm.frim.gov.my/About-Us.aspx* (accessed on 25 February 2015).

MyIPO (2014), "Interview with Minister of Domestic Trade, Co-operatives and Consumerism YB Dato' Sri Hasan Bin Malek", *MyIP Bulletin*, April 2014, pp. 5-8.

MyIPO (2012), *MyIP Bulletin*, October 2012.

National SME Development Council (2012), "The SME Masterplan 2012-2020: Catalysing Growth and Income", National SME Development Council.

NEAC (2009), "New Economic Model for Malaysia Part 1",National Economic Advisory Council, *www.pmo.gov.my/dokumenattached/NEM_Report_I.pdf*.

NIF (2014), National Innovation Foundation-India, *www.nif.org.in/* (accessed on 27 November 2014).

OECD (2015), *Innovation Policies for Inclusive Growth*, OECD Publishing, Paris.

OECD (2014), *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264204485-en*.

OECD (2013), *Innovation in Southeast Asia*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264128712-en*.

Qeos (2014), *www.qeosystems.com/* (accessed on 27 November 2014).

Prip, C. et al. (2010), *Biodiversity Planning: An Assessment of National Biodiversity Strategies and Action Plans*, United Nations University Institute of Advanced Studies, Yokohama, Japan, *http://archive.ias.unu.edu/resource_centre/UNU-IAS_Biodiversity_Planning_NBSAPs_Assessment_final_web_Oct_2010.pdf*.

Prospect Group (2013), "Interview with Grunsin Ayom from the MPB" (video), *www.theprospectgroup.com/malaysian-pepper-board-mpb-director-general-grunsin-ayom-2020-growth-targets-pepper-industry-81984/*.

Rasiah, R. (2006), "Explaining Malaysia's export expansion in palm oil and related products", in: Chandra, V.G.R. (ed.), *Technology, Adaptation, and Exports: How Some*

Developing Countries Got It Right, The World Bank, Washington, DC, *http://siteresources.worldbank.org/INTEXPCOMNET/Resources/Chandra_2006.pdf*.

Reuters (2013), "Insight: Nation-states enter contentious patent-buying business", *www.reuters.com/article/2013/03/20/us-patents-nations-insight-idUSBRE92J07B20130320* (accessed on 27 November 2014).

RRIM-Consult Corporation (2014), *http://rrimcorp.lgm.gov.my/Aboutus.aspx* (accessed on 23 February 2015).

RSM Farook (2013), "Harumanis Mango Flowering Stem Prediction using Machine Learning Techniques", *Research Notes in Information Science*, Vol.13.

SaBc (2009), "Biodiversity information management & TK in Sabah", *Biocultural Diversity and Conservation Learning Platform Briefing Notes*, Vol. 4, *www.bbec.sabah.gov.my/phase2/downloads/TEK_study_2011/04%20Biodiversity%20Information%20Management%20and%20TK%20in%20Sabah.pdf*.

SCImago (2014), "Institution Rankings", *www.scimagoir.com*, (accessed on 17 November 2014).

SME Corp. (2012), "SME Masterplan 2012-2020", *www.smecorp.gov.my/vn2/node/190*.

Sukirno, S. (2004), "Growth and transformation of the Malaysia economy", *www.ekonomikerakyatan.ugm.ac.id/My%20Web/sembul20_1.htm*.

Thiruchelvam, K. et al. (2011), "Financing innovation: The experience of Malaysia", Towards Effective Policies for Innovation Financing in Asia Project, working paper report for the International Development Research Centre, Canada.

UNCTAD (2013), "World Investment Report 2014: Annex Tables", United Nations Conference on Trade and Development, *http://unctad.org/en/pages/DIAE/World%20Investment%20Report/Annex-Tables.aspx*.

USPTO (2015), "Patenting by geographic region (state and country): Breakout by organization: Malaysia, *www.uspto.gov/web/offices/ac/ido/oeip/taf/stcasg/myx_stcorg.htm*.

WIPO (2015a), *Intellectual Property and Genetic Resources, Traditional Knowledge and Traditional Cultural Expressions*, WIPO Publication No. 933E, World Intellectual Property Organization, Geneva, *www.wipo.int/edocs/pubdocs/en/tk/933/wipo_pub_933.pdf*.

WIPO (2015b), "Creation of a Brand Name: Petronas", *Case Studies on Intellectual Property* (IP Advantage), World Intellectual Property Organization, *www.wipo.int/ipadvantage/en/details.jsp?id=2630*.

WIPO (2015c), "University R&D to Feed a Nation", *Case Studies on Intellectual Property* (IP Advantage), World Intellectual Property Organization, *www.wipo.int/ipadvantage/en/details.jsp?id=2917*.

WIPO (2014), *Patent Cooperation Treaty Yearly Review: The International Patent System*, Economics & Statistics Series, WIPO Publication No. 901E/2014, World Intellectual Property Organization, Geneva, *www.wipo.int/edocs/pubdocs/en/patents/901/wipo_pub_901_2014.pdf*.

YIM (2014), Malaysian Foundation for Innovation, *www.yim.my/index.cfm?&menuid=37&lang=EN* (accessed on 23 February 2015).

Zuniga, P. (2011), "The state of patenting at research institutions in developing countries: Policy approaches and practices", *WIPO Economics Working Papers*, Working paper no. 4, *www.wipo.int/export/sites/www/econ_stat/en/economics/pdf/wp4.pdf*.

Chapter 6

Intellectual property markets, financing and standards

The chapter reviews Malaysia's policies for creating intellectual property (IP) market exchange platforms; developing financing opportunities based on IP; and enhancing firms' capacities to take up external IP to develop innovations.

Malaysia has recently implemented policies aimed at making IP more "tradable". These policies are valuable because patents and other IP titles can support innovation more if they can be sold or licensed by their inventors, providing firms the opportunity to transform their protected intangible assets into innovations. Moreover, if the intangible asset that IP rights represent can serve as collateral for firms to obtain credit, this will help cash-poor businesses to innovate. However, factors such as the challenge of correctly estimating the value of IP rights makes it difficult to create IP markets.

6.1. IP markets in Malaysia's policy agenda

Malaysia has in recent years taken important steps to create IP markets in order to increase the commercialisation of IP (Box 6.1). Many of Malaysia's initiatives were defined in its 2007 National Intellectual Property Policy addressing the key future issues in Malaysian IP policy (MyIPO, 2007). One of the policy framework's objectives was to create an infrastructure of IP transactions through the following means:

i) Reviewing current laws and regulations in company law, securities regulation, and banking and finance law in general to ensure that the business, banking and financial infrastructure facilitates IP-based transactions

ii) Encouraging the banking and finance sector to develop banking and financial instruments such as mortgages and securities that are based on IP assets

iii) Creating an IP exchange to stimulate the trading of IP assets and to develop a more liquid market for IP trading

iv) Reviewing existing laws and business practices to enhance the business climate for financing IP-based investments, including setting up a specialised IP financing house.

Implementation of the 2007 National Intellectual Property Policy has resulted in various initiatives by MyIPO, PlaTCOM Ventures and Malaysia Debt Ventures, among others. In 2013, MyIPO received a budget of USD 10.1 million (MYR 19 million) to create an IP financing and valuation system in Malaysia. These varied initiatives have allowed for a significant amount of policy experimentation. This experimentation has been useful in this policy context, given that no full-proof policy approach exists. However, most policy measures work best if they complement each other; the implementation of these initiatives without sufficient co-ordination has weakened their effects.

Box 6.1. **The promise of IP markets globally**

Traditionally, innovators used IP rights, namely patents, as a means to protect their inventions and to exclude potential competitors from knowledge that might increase the innovator's competitiveness within a market. Starting in the 1990s, the economic environment became increasingly knowledge-based, and due to growing technological complexities companies began to apply an "open innovation" strategy, i.e. they sought to acquire external knowledge. As a result, an international market for IP emerged, where ideas and technologies can be transferred from one entity to another. In effect, this market treats intellectual property like other types of property.

In principle, IP markets provide mutually beneficial conditions for buyers, sellers and society. Buyers gain knowledge that enables them to employ state-of-the-art technology without being dependent on high research and development (R&D) expenditures, sellers receive compensation for their R&D investments and society benefits from an increasing diffusion of knowledge and opportunities to innovate.

Together with the emerging IP market, other agents appeared in addition to traditional inventors. In the market, IP rights are traded like assets by brokers, and consulting firms help their clients to develop and license their ideas. Moreover, universities and public research institutions entered the market to monetise their IP, and networks emerged with a business model of matching inventors and investors. In other words, IP markets have huge potential to facilitate the mobilisation, sharing and exchange of patents, supporting the development of new IP in the process, notably for the following reasons:

- Inventions are born out of a combination of existing ideas, data and insights, which are initially separate and need to be brought together for new ideas to emerge. Thus, creating conditions that encourage the flow of knowledge will foster innovation, and will allow for the better exploitation of complementarities across innovative entities, thereby boosting the collective efficiency of innovators.
- Knowledge flows make possible a broader, more diverse and better use of existing competences and knowledge beyond the uses or applications foreseen by the original inventor.
- Increased knowledge transfers by making inventions available to a broader range of potential manufacturers allows for the implementation of inventions on a larger scale, in greater quantities and in greater variety, increasing the incentives to commercialise IP.

Despite these advantages, the wider development of an IP market has been hampered by several factors, including the difficult task of valuing IP rights. While there are methods to calculate the value of licensing revenues, market value is complex and therefore hard to measure, leading to difficulties in trading these assets.

Source: Kamiyama, S., J. Sheehan and C. Martinez (2006); Yanagisawa, T. and D. Guellec (2009); OECD (2014, 2013).

6.2. Creating IP market places

6.2.1. *KRSTE.my and TECHMart*

Knowledge Resources for Science and Technology Excellence Malaysia (KRSTE.my), an online platform provided by MOSTI, was launched in November 2011 (KRSTE.my, 2014). The platform presents the knowledge and expertise of various institutions and organisations within Malaysia. KRSTE.my includes a database, the TECHMart platform, which stores local products or technologies from the public or private sectors with the potential for commercialisation. Initiated in 1996, the TECHMart database contained 2 696 products or technologies in 2012 that were the outcome of public research initiatives (TECHMart, 2012).

6.2.2. *PlaTCOM Ventures' platform*

PlaTCOM Ventures established Innovation Business Opportunities (IBO), a platform that allows inventors from public research institutions and private enterprises to display their inventions to potential buyers or licensors. Each technology shown in IBO, which may or may not be IP-protected, has been selected on the basis of the invention's quality (its "uniqueness") and its ability to meet industry needs (PlaTCOM, 2015). The IBO website provides snapshots of each selected "business opportunity", where priority is given to describing the product in non-technical business terms, presenting mainly its competitive advantages and commercial potential, rather than emphasising its technical features, as happens in patent documents. For each product on the platform, IBO specifies if there are any IP rights protecting the invention. In February 2015, 259 business opportunities were listed on the platform.

PlaTCOM Ventures also acts as an intermediary between universities and public research institutes and companies interested in a specific technology. PlaTCOM Ventures, a collaboration between the Malaysia Innovation Agency and SME Corporation, runs the "Technology commercialisation platform to encourage innovation" (HIP2) of the SME Masterplan 2012-20 (Box 5.4). For those businesses interested in specific technologies, information is provided on whether inventors would like to license or sell the technology. More importantly, PlaTCOM Ventures offers a point of contact, ensuring quick follow-up with inventors in response to requests from potential licensees or buyers. When the IBO site was launched in 2012, an online bidding system for a selection of IPs was introduced, in part to draw attention to the platform. In that process, 20 inventions were taken up by industry for licensing, illustrating the potential for commercialisation.

Moreover, PlaTCOM Ventures has introduced the InnoSeed events that showcase Malaysian IP rights to industry, including to small and medium-sized enterprises (SMEs). The concept behind the events consists of presenting technologies, prototypes and products in face-to-face encounters with SMEs,

thus taking a different and a proactive approach in bringing good IP rights to market. The first InnoSeed event, which focused specifically on the cosmetics industry, took place in Kuala Lumpur in July 2014 and led to the transfer of 25 IP rights to SMEs who had participated in the event (PlaTCOM Ventures, 2015).

6.2.3. MyIPO's IPR Marketplace

MyIPO's platform IPR Marketplace, launched in June 2014, publishes a list of IP rights that are available for sale or licensing. IPR Marketplace covers the full spectrum of IP titles from patents to design rights, trademarks and copyright. Most of the IP rights' titles come from universities. The information provided is technical in nature, based on the descriptions provided in the IP rights' filings. For each IP-protected invention, IPR Marketplace provides the title, a brief description, the name of owner/assignee, the listing date, whether the IP is available for sale or licensing, the licensing terms and the selling price. As of April 2015, 175 IPs have been listed in the IPR Marketplace portal. The site is still too young to allow for an initial evaluation.

IPR Marketplace is close to the "licenses of right" system adopted by several patent offices, including the UK Intellectual Property Office (UK IPO, 2015). Patent owners declare the availability of the patent for licensing and receive in return a 50% reduction in patent maintenance fees. Malaysia may consider adopting such a system and apply corresponding fee reductions for patents posted on IPR Marketplace.

The platform itself is part of MyIPO's online IP rights marketplace that was also launched in June 2014. The marketplace aims to connect IP owners to businesses and investors and expands market access to global IP marketplaces. To support its commercialisation efforts, it co-operates with seven foreign IP marketplaces, six of them in China.[1]

6.2.4. Platform initiatives in Malaysia

The three ongoing platforms described above reflect efforts with overlapping objectives and target licensees. They are not the first IP platform initiatives in Malaysia. In 2010, Multimedia Development Corporation, a government-linked organisation that supports information and communications technologies (ICT) in Malaysia, created an IP market platform (IPConnect) for multimedia technologies. The site no longer exists. While such experimentation is valuable in identifying best practice, there are downsides to such diversity. Notably, some university representatives expressed fatigue regarding platform initiatives: too many requests for information had been received. Each request required additional effort because formats for providing information differed across platforms. There was also limited follow-up from platform administrators to ensure that the information provided was up-to-date, in particular regarding the contact information for different IP titles. With the limited

success of past efforts, potential licensees and sellers did not make supporting such information-sharing platforms a priority in their activities.

If creating a single platform is difficult, finding ways to cross-reference technologies can help reduce the number of requests sent to users and maximise the information provided on any one site. Moreover, a joint platform that displays a larger number of technologies attracts more potential buyers and licensors. Sellers and licensees will provide information on their technologies more willingly if they know that the site helps their commercialisation efforts. If an IP platform risks being discontinued, sellers and licensees are unlikely to make an effort to showcase their technologies on the website.

It is important that funding to support such platforms be provided over longer periods because uptake will not be immediate. Continuing an existing platform has distinct benefits over closing a site and introducing a new platform. Moreover, the approach adopted by PlaTCOM Ventures provides many advantages, including the provision of simplified explanations of the proposed technologies to businesses and the offer of an intermediary service.

6.3. Supporting IP as a source of finance for innovation

Financing constraints for innovators are substantial in Malaysia (see Chapter 2). It is therefore important that Malaysia's innovation system explore opportunities to use IP to expand financing opportunities (Box 6.2). Recently, Malaysia implemented an ambitious IP financing programme, which is organised by Malaysia Debt Ventures (MDV) and supported by complementary efforts by MyIPO.

Box 6.2. **Background on IP financing**

The financial system often relies exclusively on tangible assets such as real estate when it comes to collateral for loans. Small firms or start-ups may not have such resources and, consequently, have less access to loans. They may, however, have intellectual property and these intangible assets may help them to obtain funding. One of the first cases where patents were used as collateral to secure financing dates back to the 1880s, when Thomas Edison used his patent for the incandescent electric light bulb as collateral to raise funds to start his company, the General Electric Company. However, this was one of only a few successful cases; until recently, there have been hardly any IP rights-based financing schemes.

A recent study from the United States has shown that by 2012, as many as 20% of all US Patent and Trademark Office filings held by US firms in the 1990s had been used as collateral, particularly in sectors where patents were used extensively (such as pharmaceuticals, medical instruments and suppliers,

Box 6.2. **Background on IP financing** *(cont.)*

computer programming and data processing, and electronic components) (Mann, 2014). The collateral value of companies' patent portfolios contributed significantly to their financing capacity. However, in most cases IP financing is still very much in its infancy.

It has proven challenging to develop IP financing opportunities due to differences between tangible and intangible capital. It is difficult to determine the value of IP because it is hard to estimate the future licensing and royalty income. There are two classes of intangible assets that can be distinguished when it comes to IP management: i) cash flow assets, which are licensed IP rights where royalty payments are directly attributable to the licensed assets (e.g. patents, trademarks, copyright); and ii) assets with implicit value, such as non-licensed IP rights or IP rights exclusively used internally (e.g. customer lists, database rights). "Cash flow assets" is the preferred asset category for investors when using IP as collateral. Valuation of IP in the "assets with implicit value" is more difficult and potential IP liquidation relies on the value of the IP together with connected assets (even the value of the firm itself) (WIPO, 2008). Problems with information and uncertainties abound in the use of debt to finance innovative projects, especially when patents are used as collateral to secure loans (Hochberg et al., 2014). Public policy support can help alleviate risks and maximise innovation (Amable et al., 2010).

There are other ways for IP to facilitate financing, such as IP securitisations. Using this finance tool, a company transfers IP rights in receivables to a financial service institution. Then it issues securities to the market and transfers the funds obtained back to the IP inventor. IP securitisation has been most common in the film and music industries, with high-profile examples related to securitised royalty streams on the copyrights owned by famous musicians.

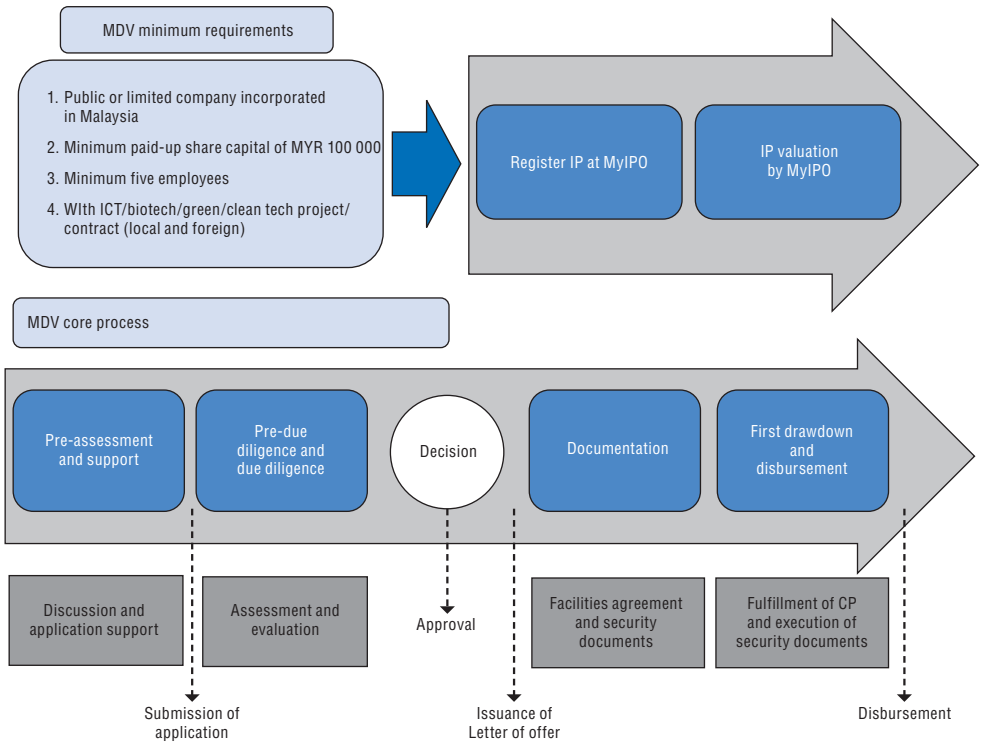
6.3.1. Malaysia Debt Ventures

Malaysia Debt Ventures (MDV), a publicly owned provider of loans to those actors with difficulty accessing credit on regular markets, introduced Malaysia's Intellectual Property Financing Scheme (IPFS) in 2012. The IPFS, implemented in co-operation with MyIPO, seeks to provide SMEs with easier access to credit through their IP assets. In the 2013 budget, an allocation of USD 106.5 million (MYR 200 million) was provided to fund the programme. Under the scheme, the government provides a 2 percentage point interest rate subsidy and a guarantee of 50% of the principal amount, with the remainder of the risk being covered by banks. Loans are available up to USD 5.3 million

(MYR 10 million) and can be for no more than 80% of the IP valuation, with a maximum period of 60 months for the loan.

If baseline conditions are fulfilled, MDV examines i) the management team (their credit track record, education, experience of individuals, etc.); ii) the market conditions for the firm's proposed projects (competence of the firms, market potential, competitors, difficulty of the project, patents, etc.); iii) legal factors (terms and conditions of the project contract for which the funding is needed); iv) financial status (financial performance of the firm in the past 3-4 years, and expected project cash flow); and v) available collateral, including the available IP. The full application process is shown in Figure 6.1.

Figure 6.1. **IPFS application process**



Source: Malaysia Debt Ventures (MDV) (2014), IP Potential in Financial Landscape Evolution, Presentation at the Intellectual Property Financing Conference 2014, 23 September 2014.

The system has progressed only slowly to date: As of September 2014 there had been 20 applications for IPFS, of which 10 worth USD 20.1 million (MYR 38 million) had been approved, 1 had been rejected (USD 1.6 million/ MYR 3 million) and 9 were still being processed (USD 15.9 million/ MYR 30 million). Most of the applications were for ICT projects (16), with 3 in the

biotechnology sector and 1 in the green sector. Loans in the amount of USD 18.6 million (MYR 35 million) were approved in the ICT sector, and USD 1.6 million (MYR 3 million) in the biotechnology sector. The creative industry (animation, the entertainment industry) is the largest sector in terms of seeking loans. All the deals are fairly new; the first was only signed in early 2014.

Several challenges remain:

- There are inherent challenges in using IP as collateral for a loan. In case of default, a lender can take traditional forms of collateral (e.g. real estate in mortgage loans) and sell it to recover the amount of the loan. It is not so easy to do this with IP. First, it is more difficult to value IP and more difficult to sell IP in the case of default than is the case for traditional tangible assets. IP would more often be valued and sold alongside other company assets rather than as a stand-alone asset. MDV would thus probably have to auction both the company and the IP in the case of default because the loan is "with the company" and the valuation of IP as collateral combines the IP and connected assets, as recommended in MyIPO's national valuation model. Second, it is difficult to track IP ownership changes and previous charges (e.g. the use of the same asset as collateral in other loans). Recording changes of IP ownership or IP's use as collateral in a public registry for design rights was introduced in 2012 but is not yet required for patents and trademarks in Malaysia, although there are plans to modify the law.
- IP is difficult to value. The value of IP may be estimated by the revenue stream derived from licensing IP rights to others, but this excludes the value of non-licensed IP, which is harder to quantify. Furthermore, valuing an IP asset is complicated because its value varies with market developments (Bishop, 2003). It has proven challenging to convince financial institutions that IP can be valued like any other asset. Only MDV provides IP-backed loans in Malaysia.

Since the establishment of the IPFS in 2012, other ASEAN countries, such as Singapore, have developed similar approaches to IP financing for local companies (Box 6.3).

Box 6.3. **Singapore's initiative**

On 8 April 2014, Singapore announced a new two-year IP financing scheme implemented by the Intellectual Property Office (IPOS) to help local businesses secure bank loans by using their patents as collateral (Mirandah, 2014). Under the programme, the government partially guarantees the value of patents used as collateral in the event of default in order to encourage banks

Box 6.3. **Singapore's initiative** *(cont.)*

to accept IP as "tangible" assets. As part of the approval process, patents will be valued by a panel appointed by IPOS; panels include expert valuation companies with international experience.

At the time of writing, three local banks had agreed to participate in the scheme. The banks will begin to accept loan applications under this scheme between 2014 and 2016 and will charge interest rates that are lower than market rates. However, the banks are participating with the expectation that the government will at least partially underwrite the value of the patent-backed loans in case of default. It remains to be seen if private banks would offer IP-backed financing programmes on their own, which is to say without public support. It is also the case that while this programme will allow IP owners to access credit, it will probably benefit established firms primarily. This model is unlikely to help young, innovative companies – those most in need of start-up financing – to access credit because their risk of default is considered too high.

Other countries in the region may follow Singapore's lead, but have not done so yet. The Philippine Government released guidelines on IP valuation, commercialisation and IP sharing in 2012 (Estavillo 2014).

Source: IPOS (2014), Mirandah (2014), Estavillo (2014).

6.3.2. Complementary support policies

Malaysia's Prime Minister announced that the IP valuation model (IPVM) envisaged in the National Intellectual Property Policy of 2007 will be developed by MyIPO with the support of the Multimedia Development Corporation (MyIPO, 2013a: 10-11). To that end, the Malaysian Government allocated USD 10.1 million (MYR 19 million) to MyIPO to conduct training programmes for local intellectual property evaluators and other complementary efforts, including the creation of the IP rights market platform described above (MyIPO, 2013b).

The National Intellectual Property Valuation Model (IPVM) was officially launched in 2013 and aims i) to become a widely accepted IP valuation method for lending purposes where IP serves as collateral for Malaysia-specific objectives; and ii) to be used by lenders (banks and venture capitalists) and IP valuers as a reference. A key feature of the IPVM is that IP assets must be pledged along with other connected assets that contribute to the efficient use of the IP assets. The idea is that the lender also receives other collateral. This other collateral could be tangible assets (e.g. buildings) or intangible assets (e.g. other IP or know-how).

The preferred valuation methodology used in the model is the income approach in which an IP asset is valued based on forgone future royalty income that a company loses when selling the IP, discounted to present day

value. Other methodologies (e.g. the market value approach) are used as cross-checks to provide a reliable estimate of the fair value of IP assets. Furthermore, the IP valuations aim to meet internationally accepted valuation standards, including the International Valuation Standard Council's standards on valuing intangible assets, the International Financial Reporting Standard norm on fair value measurement, and the International Standard Organisation's brand valuation standard. Since the establishment of the financing programme, MDV has provided USD 21.2 million (MYR 40 million) in financing to 11 companies. Many of these applicants operate in the ICT sector (Wong, 2015).

An IP valuation-training module was also introduced to build a pool of local IP valuers so that IP valuation becomes more accessible and affordable, especially for SMEs. The training is to be provided in tranches of three months by local IP practitioners and international IP valuers. In the third quarter of 2014, a first beginner-level training course was conducted with 53 candidates: 23 passed the examination and were certified as IP valuers by MyIPO and the World Trade Institute at the University of Berne, Switzerland. Ongoing training also will be provided to already-certified local IP valuers to enhance their competency and skills.

Malaysia also organised a Global Intellectual Property Valuation Conference in November 2013. The event allowed influencers, stakeholders, decision makers and key players in the IP fraternity to share best practices in IP valuation and IP financing. A second conference was held in Kuala Lumpur in June 2015. The conference focused on approaches to help commercialise and capture the value of IP as a new asset class and, more generally, on ways to foster markets for technology.

6.4. Matchmaker initiatives for industry-university collaborations

Several initiatives in Malaysia aim to enhance industry-university collaboration as a way to promote IP markets. Three initiatives that most closely relate to collaborative IP are described below; however, there are many others, such as the Malaysian Industry-Government Group for High Technology's Technology Nurturing and Science to Action programmes. These and other initiatives are discussed in detail in the *OECD Review of Innovation Policy: Malaysia* (OECD, forthcoming).

6.4.1. *Malaysian Technology Development Corporation*

The Malaysian Technology Development Corporation (MTDC), owned by Khazanah Nasional Berhad, was established in 1992 to promote the adoption of foreign and local technologies by Malaysian companies (MTDC, 2012). Its efforts focus specifically on increasing the adoption of IP generated by universities and public research institutions. Its activities include:

- Technology centres: Incubators hosted by universities and public research centres to promote collaboration between academia and industry and to promote commercialisation activities. In 2015 there were five, at Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Teknologi Malaysia (UTM), Forest Research Institute of Malaysia (FRIM), Universiti Teknologi Mara (UiTM).
- Market Validated Technologies Directory: The result of a comprehensive innovation market validation exercise undertaken in 2012/2013. MDTC assessed 358 research outputs in different subject areas (including biotechnology/life sciences, healthcare, medical devices and social sciences) from seven public universities (Universiti Sains Malaysia, Universiti Malaya, Universiti Islam Antarabangsa Malaysia, UKM, UTM, UPM and UiTM) to assess their potential value to industry. The directory describes those research results that might benefit industry, as well as defining potential users and markets, and IP status; recommended royalty rates, start-up requirements, return on investment calculations and recommendations for commercialisation.
- Fund management: MTDC's Technology Acquisition Fund and the Commercialisation of R&D Fund support local companies, helping them to improve their use of technology and increase their competitiveness.
- Business advisory services: MTDC provides advice to start-up companies about how to take their ideas from conception to full commercialisation.
- Graduate entrepreneurship programme: MTDC trains selected graduates to become entrepreneurs.

6.4.2. Collaborative Research in Engineering, Science and Technology

Collaborative Research in Engineering, Science and Technology (CREST) was set up in 2012 as an industry-led organisation to stimulate R&D and innovation in Penang's electrical and electronics (E&E) industry. It was founded by ten leading E&E companies, several universities and Khazanah Nasional Berhad (Malaysia's governmental strategic investment fund). CREST provides support for collaborative research conducted by foreign and domestic firms, as well as research institutions. In 2015, CREST has a portfolio of 71 projects. Generous funding is provided for research projects by the Malaysian Government's Economic Planning Unit. To receive CREST funding, at least one university and one company must be involved. Companies are required to cover at least half of the project research costs.

Within the context of establishing public-private partnerships a frequent issue is the allocation of property rights, increasing transaction costs for legal consultations. Here, the establishment of standard collaboration agreements can help support public-private collaboration. A role model might be the

Lambert toolkit that was created by the UK Intellectual Property Office (UK IPO) in 2005. It covers a number of standardised agreements, contracts and guidelines that can be adopted in research joint ventures between public and private institutions (UK IPO, 2013). An evaluation of the toolkit eight years after it was introduced concluded that it served as a foundation for negotiation, simplifying agreements (UK IPO, 2013).

6.4.3. Steinbeis Malaysia Foundation

The Steinbeis Malaysia Foundation was established in August 2014 to provide an industry-focused platform to stimulate industry-academia collaboration. It is an initiative of the Malaysia Innovation Agency (AIM) with the Steinbeis Foundation Germany, an institute that promotes the transfer of academic findings and knowledge to business. The success of the original institution, established in 1971, has led to the creation of around 1,000 transfer enterprises at the end of 2014. In Malaysia, the Foundation i) provides a network of consultants from academia to support industry projects; ii) creates transfer centres between industry and academia; and iii) identifies industry needs. The Foundation will also make the commercial arrangements and complete the paperwork for university-industry collaborations, allowing researchers to focus on scientific challenges. Most of its activity takes place in the healthcare, nanomaterial and E&E sectors.

6.5. IP and standards

6.5.1. Standards, quality and business innovation support

Standards, which may be defined as "state-of-the-art quality requirements", can complement IP rights in supporting innovation (Box 6.4). Standards are similar to geographical indications in that they do not serve an individual firm or group of firms, but are useful collectively to an entire sector or community. While some standards have wide application, such as the ISO 9000 quality management criterion, more specific standards may apply only to certain sectors of the economy. Obtaining standards certificates can help Malaysian companies gain market access by showing their adherence to a certain quality of performance.

Standards are particularly important in some sectors in which Malaysia has a competitive natural resource advantage, such as rubber and palm oil. The success of Malaysian rubber exports has been attributed to the country's efforts to establish standards and ensure their compliance by national firms (Sud, 2004). Other Malaysian resource-based sectors, such as palm oil, have benefitted from the implementation of ISO 14001 on environmental management. The implementation of this framework improved the sustainability of palm oil production and enabled producers to provide

Box 6.4. **Standards and their contribution to innovation**

Standard setting, the process of determining a common set of characteristics for a good or service, often promotes competition to the benefit of consumers. Standards allow products to inter-operate and therefore make networks more valuable. Within the International Standards Organisation (ISO), the two most widely used international standards are ISO 9000, targeting quality management, and the ISO 14 000 family of standards for environmental management. Both relate more to how products are produced than to characteristics of specific products. But there are also many product-specific standards. ISO has established more than 200 technical committees over the years, and these have published more than 20 000 standards. The first ISO technical committee was established in 1947 (to consider screw threads). The most recent committees are considering topics that range from innovative fine bubble technology, promoted by Japan (Denis 2014), to the chain of custody of wood and wood-based products to support sustainable forest management. Other well-known international standard-setting organisations focus on specific sectors or products. These include the International Electrotechnical Commission or the European Telecommunications Standards Institute.

The benefits of agreeing on a common technological standard include ensuring compatibility among different components that make a system work, as well as less uncertainty about key attributes of a new product. In the absence of standards, the development of new markets may be delayed because of a lack of confidence on the part of suppliers, consumers and producers that the new product will be widely accepted in the marketplace. Reducing uncertainty in the market and increasing the size of the potential market for a new product increases the potential revenues for a new invention. At the same time, standards reduce production and development costs because they are usually based on best practices.

Standards can be especially useful to SMEs because they can i) increase customer confidence that products are safe and reliable; ii) help SMEs to meet regulation requirements, at a lower cost; iii) reduce business costs; iv) help SMEs to gain access to global markets; and v) signal an SME's technical know-how and competence to larger firms.

Source: International Standards Organisation.

evidence of high-quality, sustainable palm oil production, which is increasingly demanded on the world market (Guan and McKay, 2011).

Standards provide incentives to businesses to reach high-quality levels in production, notably through business management innovations, which themselves can then spur further innovation. Adoption of the use of standards

in Malaysia has been substantial: SIRIM Berhad, the national standards development agency responsible for the implementation of standards, sold and delivered a total of 10 306 Malaysian standards and 900 international and foreign standards/documents in 2013 (SIRIM, 2013).

6.5.2. Building global leadership through standards

Standards have a significance beyond simple quality signalling in that they play a critical role in harmonising the technical specifications of products and services. Some national standards turn into international standards and are adopted in many countries. If a country becomes a leader in a standard, this can give firms in that country an advantage over competitors in other countries. While Malaysia is in many instances a follower, there are a few areas, such as halal food preparation, Islamic finance and logistics, in which Malaysia can aspire to building its international leadership (Box 6.5).

Box 6.5. **Islamic finance and halal food and logistics in Malaysia**

Islamic finance

Islamic finance draws its principles from religious rules that require financial services risk sharing (profit and loss sharing) and ban risk shifting (debt that pays interest). Financial services prohibit interest (*riba*), gambling and speculation, and forbid investment in certain products (such as alcohol, pork or gambling). Although debt is not forbidden, it must be interest free: thus, debt plays a negligible role in Islamic finance. The Islamic financial system in Malaysia has grown substantially over the past three decades. In 2012, Iran accounted for 43% of the world's Islamic banking assets, with Saudi Arabia (12%) and Malaysia (10%) ranking second and third (Economist, 2014). Islamic financing has grown into a global industry, with estimated total assets of approximately USD 2 trillion (2012). Islamic banks and Islamic units of conventional banks account for approximately 80% of this market. The rest takes the form of *sukuk* (bonds, 15%), Islamic investment funds (4%) and *takaful* (insurance, 1%).

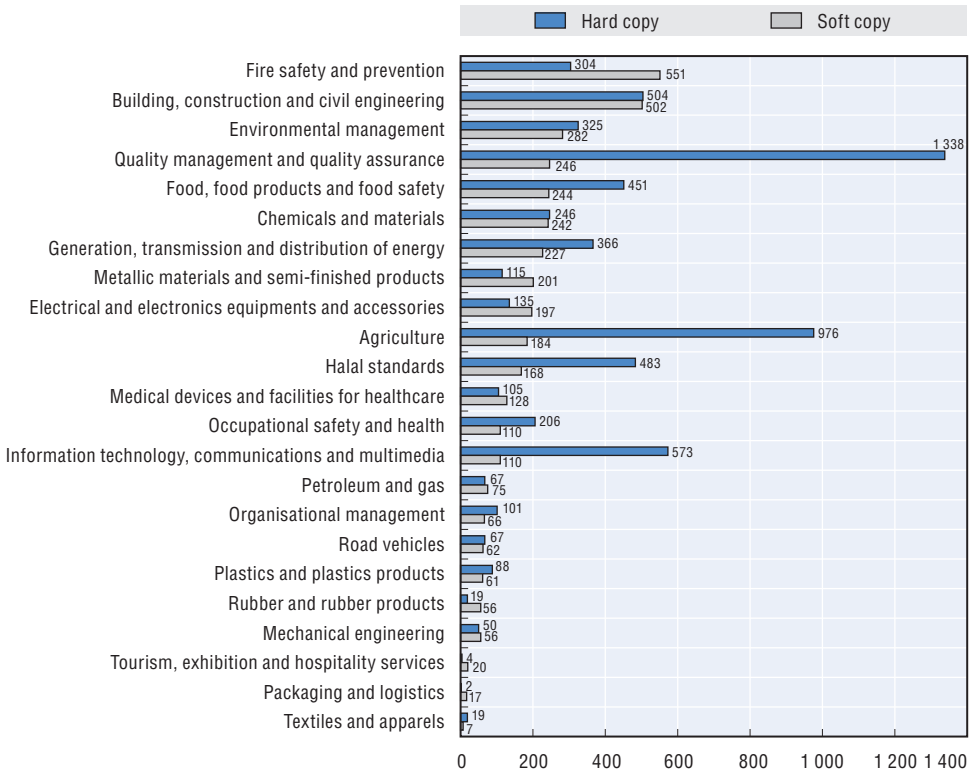
Halal food and logistics

Halal (permitted) food describes products or services permitted by the Muslim religion. For products to qualify as halal, they must be produced, traded and stored in ways specified by Islamic law. According to estimates from the Malaysia Investment Development Authority, the global halal food industry is worth between USD 600 billion and USD 2.1 trillion, providing market opportunities to Malaysian companies on local and international markets (Ab Talib and Abdul Hamid, 2014).

Source: Economist (2014), Ab Talib and Abdul Hamid (2014).

Standards Malaysia, which is both the National Standards Body and the National Accreditation Body in Malaysia, has published ten national standards that are used both nationally and globally (Standards Malaysia, 2014). These include MS 1500:2009 (Halal Food – Production, Preparation, Handling and Storage – General Guidelines) and MS 2424:2012 (Halal Pharmaceuticals – General Guidelines). The latter provides halal guidelines for medicine. The national certification body, the Department of Islamic Development Malaysia, has since 2009 acted as the halal certification body and has created a network with other Muslim countries to export MS 1500. In Malaysia in 2013, directories of halal standards were the fifth highest-selling directories in terms of total sales, and the fourth highest-selling in terms of hard copies (Figure 6.2).

Figure 6.2. **Sales of standards in 2013**



Note: Hard copies are printed standards directories; soft copies refer to electronic copies.
Source: Standards Malaysia, October 2014.

6.5.3. Standards to enhance returns from intellectual property

Patents and standards can complement each other. This is the case for a range of products produced by Malaysia's rubber industry. For instance,

Topglove is an important Malaysian supplier of surgical gloves in the United States. Its products and production processes comply with international standards (Topglove, 2015). Compliance with standards is proof of the production quality of the rubber product and facilitates export opportunities. At the same time, the company applies for patents at the US Patent and Trademark Office so as to exclude others from making or selling its innovative rubber products.

Standards can be used in combination with IP to strengthen market opportunities for halal foods. There are examples of patents filings on halal manufacturing processes.[2] Copyright and design rights might also provide opportunities for IP protection of halal food-producing businesses (for instance, by protecting packaging or protecting specific brands).

It is in the electric, electronics and telecommunications sectors where tensions between standards and IP rights are more prevalent because of the need to guarantee interoperability in settings characterised by high investments in technology and patent protection. In such contexts, when patents are declared to be "standard-essential", patent owners must commit to free or fair licensing policies in order for their technology to be included in the standard. Standards can enable firm innovations after agreeing on common technology roadmaps in formal standard-setting processes. Standards matter for defining innovation opportunities in the E&E sector, among other activities.

Notes

1. The seven IP marketplaces are China Technology Exchange (CTEX, Beijing); Shanghai Technology Transfer Exchange (STTE, Zhejiang); Northern Technology Exchange Market (NTEM, Tianjin); Zhejiang Provincial Science and Technology Exchange Centre (ZSTEC); Beijing University Office of Science and Technology (PKU-SUZHOU, Beijing); Hong Kong Trade Development Council (HKTDC, Hong Kong); and NUS Enterprise (NUS ETP, Singapore).
2. See for example the PCT patent application with publication number WO 2010013993 A1, filed in 2008 in Malaysia, entitled "Halal polymer resins and process for making the same" (see *www.google.com/patents/WO2010013993A1?cl=en*).

References

Ab Talib, M.S. and A.B. Abdul Hamid (2014), "Halal logistics in Malaysia: a SWOT analysis", *Journal of Islamic Marketing*, Vol. 5/3, pp. 322-343.

Amable, B., J.B. Chatelain and K. Ralf (2010), "Patents as collateral", *Journal of Economic Dynamics and Control*, Vol. 34/6, pp. 1092-1104.

Bishop, J.C. (2003), "The challenge of valuing intellectual property assets", *Northwestern Journal of Technology and Intellectual Property*, Vol. 1/1, pp. 58-65.

Baron, J., J. Ménière and T. Pohlmann (2014), "Standards, consortia and innovation", *International Journal of Industrial Organisation*, Vol. 36, pp. 22-35.

Economist (2014), "Big interest, no interest", *The Economist*, 13 September 2014, *www.economist.com/news/finance-and-economics/21617014-market-islamic-financial-products-growing-fast-big-interest-no-interest*.

Estavillo, M. (2014), "IP as an asset. Or even a bank collateral?", *www.interaksyon.com/infotech/ip-as-an-asset-or-even-a-bank-collateral* (accessed on 27 November 2014).

Guan, C.C. and A. McKay (2011), "Sustainable industrial systems: A case study from the Malaysian palm oil industry", PLM11 8th International Conference on Product Lifecycle Management, Eindhoven, The Netherlands, *www.phi-kpe.nl/docs/147 Choong - Sustainable Industrial Systems - A Case Study from the Malaysian Palm Oil Industry.pdf*.

Hochberg, Y.V., C.J. Serrano, and R.H. Ziedonis (2014), "Patent collateral, investor commitment, and the market for venture lending", *NBER working paper* No. 20587, National Bureau of Economic Research, *www.nber.org/papers/w20587*.

Denis, E.G. (2014), "The fine bubble breakthrough", International Standards Organisation, *www.iso.org/iso/home/news_index/news_archive/news.htm?Refid=Ref1844*.

Kamiyama, S., J. Sheehan and C. Martinez (2006), "Valuation and exploitation of intellectual property", *OECD Science, Technology and Industry Working Papers*, No. 2006/5, OECD Publishing, Paris, *http://dx.doi.org/10.1787/307034817055*.

KRSTE.my (2014), *https://krste.my/home;jsessionid=C36C75FAA13146635E089EC834784ECD* (accessed on 3 February 2015).

IP marketplace (2014), *www.iprmarketplace.com.my* (accessed on 3 December 2014).

ISO, International Standards Organisation, *www.iso.org*.

Mann, W. (2014), "Creditor rights and innovation: Evidence from patent collateral", *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2356015*.

IPOS (2014), Intellectual Property Rights Organisation Singapore, *www.ipos.gov.sg/IPforYou/IPforBusinesses/IPFinancingScheme.aspx* (accessed on 17 February 2015).

Mirandah (2014), "Patents as collateral for Singapore companies", *www.mirandah.com/pressroom/item/397-patents-as-collateral-for-singapore-companies*.

MTDC (2012), Malaysian Technology Development Corporation, *www.mtdc.com.my/complete_equation.php* (accessed on 10 November 2014).

MyIPO (2013a), "Intellectual property valuation in Malaysia", *MyIP Bulletin*, April 2013, pp. 10-11, *www.myipo.gov.my/documents/10192/141264/myip-042013.pdf*.

MyIPO (2013b), "IP valuation model", *www.myipo.gov.my/documents/10192/0/IP%20VALUATION%20MODEL%20Ringkasan%20LATEST.pdf*.

MyIPO (2007), "National IP policy", *www.myipo.gov.my/documents/10180/21979/ip_policy_eng.pdf* (accessed on 16 February 2015).

OECD (forthcoming), *OECD Review of Innovation Policy: Malaysia*, OECD Publishing, Paris.

OECD (2014), *National Intellectual Property Systems, Innovation and Economic Development: With perspectives on Colombia and Indonesia*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264204485-en*.

OECD (2013), "Knowledge networks and markets", OECD *Science, Technology and Industry Policy Working Papers*, No. 2013/7, OECD Publishing, Paris, *http://dx.doi.org/10.1787/5k44wzw9q5zv-en*.

PlaTCOM Ventures (2015), *www.platcomventures.com/* (accessed on 3 February 2015).

SIRIM (2013), *From Ideas to Impact: SIRIM Berhad Annual Report 2013*, SIRIM, Shah Alam, Malaysia, *www.sirim.my/document/annual report/2013 SIRIM Annual Report.pdf*.

Standards Malaysia (2014), *www.standardsmalaysia.gov.my/about-us* (accessed on 17 February 2015).

Sud, R.R. (2004), "Participation in ISO: A win-win experience in Malaysia", *ISO Focus*, December 2004, *www.iso.org/iso/livelinkgetfile-isocs?nodeId=15004495*.

TECHMart (2012), *www.mastic.gov.my/en/web/guest/techmart* (accessed on 3 February 2015).

Topglove (2015), *www.topglove.com.my/* (accessed on 17 February 2015).

UK IPO (2015), *Patents Endorsed License of Right (LOR) and Patents Not in Force (NIF)* (database), *www.ipo.gov.uk/p-dl-licenseofright.htm* (accessed on 27 February 2015).

UK IPO (2013), *Collaborative Research Between Business and Universities: The Lambert Toolkit 8 Years On*, UK Intellectual Property Office, Newport, UK, *www.gov.uk/government/uploads/system/uploads/attachment_data/file/311757/ipresearch-lambert.pdf*.

WIPO (2008), "Intellectual property financing: An introduction", *WIPO Magazine*, *www.wipo.int/wipo_magazine/en/2008/05/article_0001.html*.

Wong, A. (2015), "Banking intellectual property", *The Edge Malaysia*, 9 February 2015, *www.pwc.com/my/en/assets/press/150209-theedge-banking-on-intellectual-property.pdf*.

Wong, J.N. (2014), "IP valuation", *Noviatas*, April 2014, *www.wjnt-law.com/pdf/knowledge_bank/Novitas-April 2014.pdf*.

Yanagisawa, T. and D. Guellec (2009), "The emerging patent marketplace", *OECD Science, Technology and Industry Working Papers*, No. 2009/09, OECD Publishing, Paris, *http://dx.doi.org/10.1787/218413152254*.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Union takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economic, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

OECD PUBLISHING, 2, rue André-Pascal, 75775 PARIS CEDEX 16
(92 2015 02 1 P) ISBN 978-92-64-23724-7 – 2015

Boosting Malaysia's National Intellectual Property System for Innovation

Contents

OECD*publishing*
www.oecd.org/publishing

ISBN 978-92-64-23724-7
92 2015 02 1 P