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Stimulating Innovation in ASEAN Institutional Support, R&D Activity and Intellectual Property Rights

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Abstract: *Using a stylized framework of technological capability development through pursuing Keynesian-Kaleckian style demand management strategies, this paper discusses initiatives that poorer member governments should take to stimulate technological upgrading of firms at the bottom with a focus on innovation, as well as, discussed the governance framework of intellectual property rights (IPRs) in ASEAN. Typologies of taxonomies and trajectories were used to evolve a policy framework to coordinate the relationship between macro-institutions, meso-organizations and micro-agents (firms) for ASEAN members upgrade to transform from developing nations to join Singapore as developed nations. Recognizing the varying capacities of ASEAN members, the paper recommends that a common platform of IPRs be developed with the more developed members assisting the LDC members to quicken the development of a technologically more egalitarian region.*

***Keywords*:** Innovation, intellectual Property Rights, ASEAN, Institutions, R&D

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1. Introduction

This paper seeks to provide the arguments, the evidence, and the lessons that the Association of Southeast Asian Nations (ASEAN) could look at so as to evolve and upgrade innovation capabilities in sectors where they show existing and potential endowments. In so doing the paper borrows from the work of Schumpeter (1934, 1943) the innovation focus on creative destruction (Mark 1) first, and subsequently, what was extended from this argument by Nelson and Winter (1982) and Malerba (2007) on creative accumulation (Mark 11). Whereas the first refers to incremental innovations that include changes in production layouts, product adaptation, improvements in inventory and quality control systems and coordination interface with buyers and suppliers (Schumpeter, 1961: 161), the latter refers to the production of new stocks of knowledge. Whereas entrepreneurs can handle the first, large firms and R&D labs can undertake the latter. Especially the Least Developed Countries (LDCs) begin by first innovating through creative duplication – i.e. creatively adapting and applying existing stocks of knowledge incrementally (Kim, 1997). However, as proven by Korea and Taiwan – two countries that moved from the status of underdeveloped in the 1960s to developed status in one generation, all LDCs enjoy the potentially to replicate such a catch up (Reinert, 1994). Within ASEAN, Singapore has also become a developed country but it took off from a higher per capita income status than Korea and Taiwan.

Whereas the transition from Mark 1 to Mark 11 activities is not only exorbitantly expensive, it is also more uncertain and difficult. Hence, ASEAN LDCs should first focus on creative destruction innovation activities, though there should always be an attempt to support creative accumulation activities whenever the environment is favorable for it. As pointed out by Veblen (1915), Gerschenkron (1952) and Abramovitz (1956), latecomers can shorten the catch up process by simply avoiding errors and doing things better as they can view the paths taken by the early movers. Firms from ASEAN LDCs can eventually switch strategy from being a latecomer to become a first mover – examples include Samsung in memory chips and Taiwan Semiconductor Manufacturing Company (TSMC) in logic chips (see Yap and Rasiah, 2012).

In this paper I would like to provide a framework for ASEAN countries starting at the bottom of the development ladder to initiate innovation strategies and subsequently to support participation of firms in R&D activities. Singapore has become a developed economy, while Malaysia, Thailand, Vietnam, Indonesia and Philippines are ahead economically than the LDCs of Cambodia, Laos and Myanmar. The rest of the paper is organized as follows. Section 2 presents the theoretical considerations. Section 3 discusses typologies of policy and firm-level technological upgrading that ASEAN governments should consider when promoting the transformation of innovation from incremental engineering activities to R&D activities. Although Singapore is already characterized by strong participation in R&D activities, the discussion on the entire taxonomy is targeted at presenting the trajectory that other ASEAN economies may consider in strategizing their catch up plans. Section 4 describes about Governing IPRs in ASEAN. Section 5 finishes with the conclusions.

2. Theoretical Considerations

As Lall (2001) has shown convincingly from the evidence collected from Sub-Saharan economies, countries that developed technological capabilities have performed better economically than countries that did not. Hence, efforts to transform ASEAN into an open vibrant economic region that will benefit continuously from increasing globalization will require the development of technological capabilities in all member countries. Typical of Keynesian arguments, I consider early developers to be facing severe demand constraints, and as such a liberal policy approach will create an economic equilibrium far from the point of full employment (Keynes, 1936). Hence, examine the technological capability argument in this section.

2.1. Innovation Capabilities

The emphasis on technology as the driver of economic growth can be traced to Marx (1954) who referred to the introduction of capitalist social relations as essential to engender mass production capabilities. Whereas Marx focused on the transition to capitalist production organization and competition as essential to stimulate technological change, Schumpeter (1934, 1943) advanced this argument further by explaining the dynamic role played by entrepreneurs. While entrepreneurs benefit from incremental innovations, Schumpeter (1943) and Chandler (1977) promoted the role of large firms in the creation of new stocks of knowledge that can only be generated in R&D labs. While the latter has largely held, small firms have been able to participate in R&D activities by connecting to external R&D labs (Rasiah and Vinanchiarachi, 2012).

Reinert (1994) showed evidence of how it is possible for countries at the bottom of the technology ladder and enjoying very low per capita incomes to catch up technologically and eventually develop into high income economies. Indeed, Korea and Taiwan are examples of such economies that started with per capita incomes less than US$100 in the 1960s to enjoy per capita incomes exceeding US$20,000 since 2010 (World Bank, 2012). The successful development of Korea and Taiwan is all the more interesting because of the fact that they lacked natural resources to generate foreign exchange to support their industrial policy initiatives.

While the focus on innovation capability building is central to stimulating economic development in the ASEAN LDCs, strategic targeting is important to take account of Cambodia, Laos and Myanmar's particular economic and spatial structure. Whereas at the time of take off, Korea and Taiwan targeted selected industries for development because of the lack of resources and their small size (Amsden, 1989; Kim, 1997), the small population of Brunei, which is driven almost completely by petroelum exports, make such strategies impossible. However, consistent with the arguments of Reinert (1994) some features of industrial policy is both possible and essential for ASEAN's poor, tiny and middle income economies to grow rapidly and experience structural change into high value added activities, though, the liberalizing currents of globalization following the formation of WTO in 1995 has narrowed considerably the room for the use of such strategies.

The same logic applies for Cambodia, Laos and Myanmar, which are endowed with minerals, especially copper, gold and other minerals. Unless, the renewable resources are evolved to support economic growth, these economies will eventually be gripped by Dutch disease.[1] This has been the exerperience of Chad, Nigeria and Sudan. Hence, while this Dutch Disease phenomenon provides a powerful rationale to avoid succumbing to overdependence on minerals, the focus on technological capabilities is critical for the ASEAN's poor and middle income countries to stimulate economic development. The institutional framework then should be targeted at starting with incremental innovations but with a focus on eventually supporting R&D capabilities.

2.2. Towards a Stylized Framework

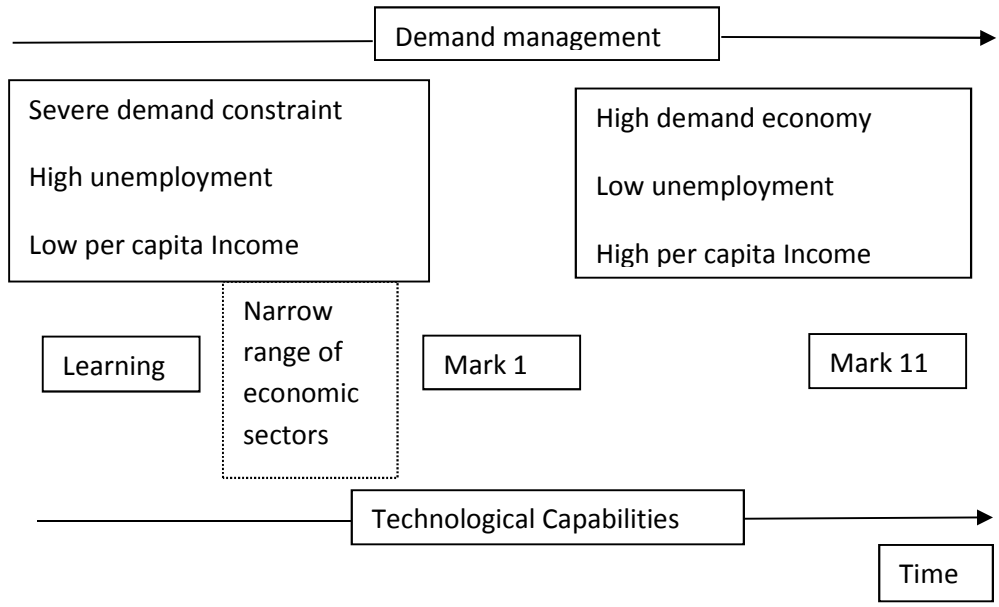
Given that Singapore is a developed country, much of the focus should be on how its experience in galvanising innovation capabilities can serve as a positive example for the other ASEAN countries. The ASEAN LDCs, and Indonesia, the Philippines, Thailand and Vietnam are economies faced with severe demand constraints as unemployment and poverty incidence are still high (see Figure 1). Malaysia has managed to lower unemployment and poverty significantly, but it is entrenched in the middle income trap (Rasiah, 2011). Borrowing from the pioneering work of Keynes (1936) and Kalecki (1976),[2] I make the argument that the poorer ASEAN countries require a policy framework that focuses on demand management. In doing so we prefer Kalecki's argument that calls for nation states to target technological capability building once development finance meets essential consumption. In doing so Kalecki made the masterful observation that employment creation and poverty alleviation can only be sustainable in the long run if the productive forces and competitiveness of the economy continues to rise.

Consistent with the Keynesian-Kaleckian focus on capital investment to address resource unemployment and underemployment, it is important for governments of the poorer ASEAN countries to focus on the Harrod (1939) and the Domar (1946) model, which defines higher incremental capital output ratios for the less developed than the more developed economies. In fact, when demonstrating the important role capital accumulation played in the development of Korea and Taiwan, one can argue

that these countries' growth path supports the argument that less developed economies require massive injections of capital in search of full employment (checking both unemployment and underemployment). Rodrik (1994) went further to explain how capital accumulation became the basis of rapid growth in Korea and Taiwan.

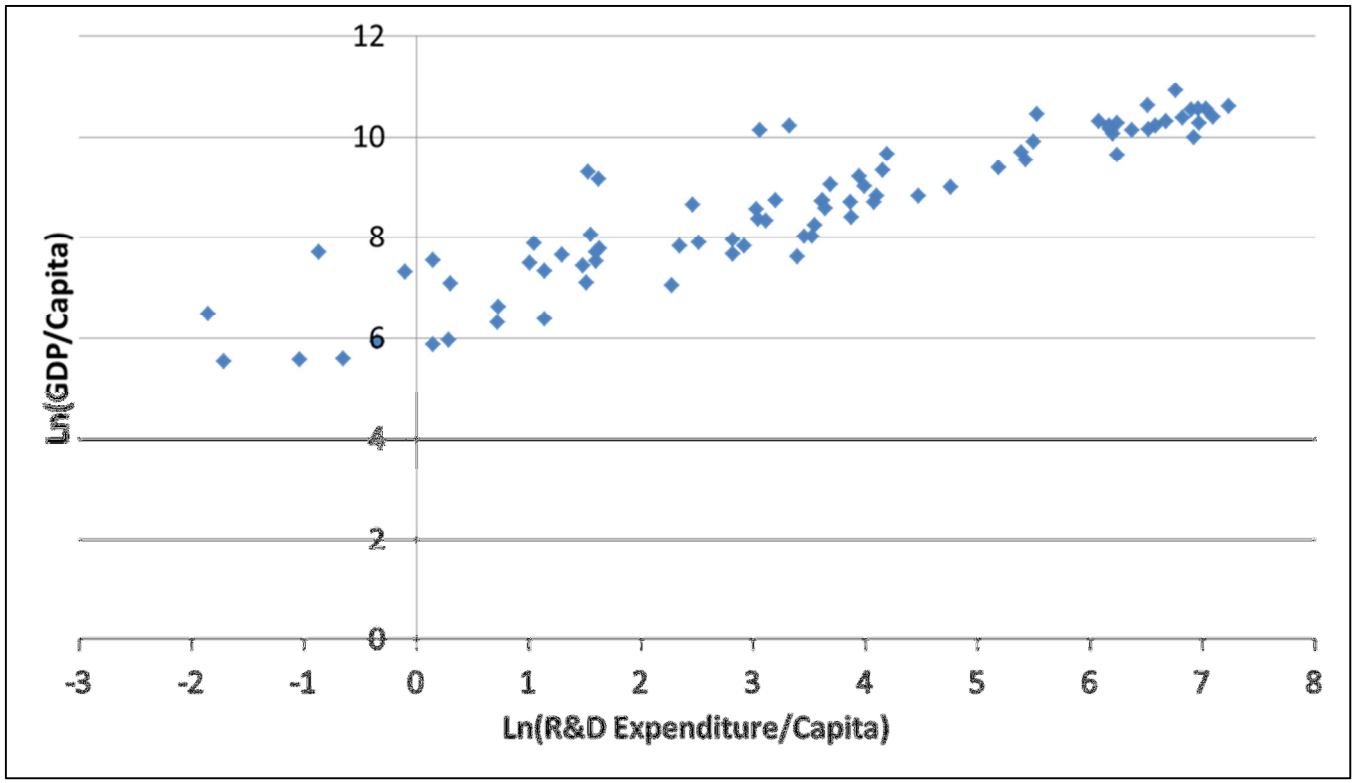
While Kalecki's (1976) analysis remains important, the practical application of his arguments in technological capability terms require the use of Schumpeter's assessment of creative destruction (Mark 1), and subsequently its extension through creation accumulation (Mark 11) that was advanced by Nelson and Winter (1982) and Malerba (2007). Whereas the first refers to minor or incremental innovations related to improvements and adaptations to plant layout, machinery and equipment, inventory and quality control systems and product that entrepreneurs can easily manage, the latter refers to the creation of new stocks of knowledge to support radical innovations that can only occur in large R&D laboratories. The importance of R&D in the growth of GDP per capita as countries seek higher incomes cannot be understated (see Figure 2). However, the argument on entrepreurial and the associated incremental engineering activities as the initial focus of countries at the bottom of the development trajectory obviously means that GDP growth is expected to support growth in R&D activities. It is only after a certain threshold of development is achieved will R&D activity drive GDP growth. For example, there is econometric evidence to argue that R&D growth began support GDP growth in Korea only from the 1990s (Jung and Lee, 2010).

Figure 1: Stylized Framework of Upgrading from LDCs to Developed Status



Source: Author.

Figure 2: Relationship between GDP/Capita and R&D Expenditure/Capita, 84 countries, 2008 (US$)



Source: Plotted from World Bank (2012).

3. Stimulating Innovation Activities

The technological capabilities of ASEAN countries can be assessed based on the trade structure, as well as, the registration of IPRs. Table 1 shows the trade structure of ASEAN countries based on imports and exports. I could only get 2010 figures for Cambodia and Myanmar, and none at all for Brunei and Laos. The trade data shows that both imports and exports are dominated by intermediate products in Indonesia, Malaysia, the Philippines, Singapore, Thailand and Myanmar. Cambodia's imports are dominated by intermediate goods (clothing parts), but exports are dominated by consumption goods (clothing). Electronics, automotive and clothing components dominate imports of other countries in the table (Myanmar only clothing, while Singapore electronics). These trade figures appear to mask the technological capabilities of ASEAN countries because of the dominance of import-based exports of intermediate goods. Especially exports of intermediate electronics goods when can be equivalent to capital goods if dominated by integrated circuits and wafers. Hence, patenting capabilities may be a better measure of technological capabilities.

Table 1: Trade Structure, ASEAN

	Import			Export		
	Consumption	Intermediate	Capital	Consumption	Intermediate	Capital
Indonesia	6.0	75.0	19.0	15.4	80.3	4.3
Malaysia	8.9	73.4	17.7	10.2	78.8	11.0
Philippines	10.5	79.5	10.0	16.1	61.6	22.3
Singapore	8.8	79.4	11.9	7.9	81.2	10.9
Thailand	8.9	70.8	20.3	23.8	57.2	19.0
Myanmar	12.0	68.0	19.9	24.6	75.4	0.0
Cambodia	12.0	75.6	12.4	87.6	7.9	4.4
Vietnam	9.5	73.2	17.3	50.9	40.5	8.6

Note: * 2012 figures; # 2010 figures.
Source: collected.

Table 2 shows registration of patents in the United States. We use this data because it uses the most stringent patent filing system, and to avoid double counting. Although there are many other IPRs, the recording of patents appears to be the most extensive. It can be seen that Singapore leads all other countries followed by

Malaysia. While patents are not viewed as a major route to stimulating innovation in some industries, such as, semiconductors (e.g. Mowery, 2012), it generally regarded as one proxy of technological sophistication.

Singapore shows the highest take up of patents in the United States, followed by Malaysia. Thailand and Philippines occupy distant 3rd and fourth places. Indonesia is much further down in 5th place.

The numbers for Indonesia are low, while that of Vietnam and Brunei are even lower. The LDCs of Cambodia, Laos and Myanmar did not manage any over the period 2006-2012. These figures demonstrate the wide disparity in innovation capabilities among AS|EAN countries.

Table 2: Filing of Patents in the United States, ASEAN, 2006-2012

Countries	2006	2007	2008	2009	2010	2011	2012
Malaysia	113	158	152	158	202	161	210
Singapore	412	393	399	436	603	647	810
Thailand	31	11	22	23	46	53	36
Philippines	35	20	16	23	37	27	40
Vietnam	0	0	0	2	2	0	2
Indonesia	3	5	5	3	6	7	8
Brunei	0	0	0	1	0	1	0
Cambodia	0	0	0	0	0	0	0
Laos	0	0	0	0	0	0	0
Myanmar	0	0	0	0	0	0	0

Source: US Patent Office (2013).

Hence, efforts to stimulate innovation activities in ASEAN will require an understanding of the location of the members in the technological ladder, the endowments they enjoy and the innovation capabilities that could be developed. While the selection of sectors for promotion by individual countries will depend on the specificity of the ASEAN countries, government strategy to formulate technology development must take account of macro-institutions, meso-organizations and micro agents (firms and individuals) (see Katz, 2006). The right regulatory environment (macro institutions) must be created with a focus on the development of meso organizations (such as universities, standards organizations, training centres and incubators) to interface with firms to solve collective action problems. In doing so it

is critical that a set of typologies be developed by government planners that are specific to each country with one targeted at firm-level upgrading (Table 3) to the technology frontier with the other to coordinate policy in line with the evolutionary underpinnings critical to coordinate technological catch up by taking account of timing, location and industrial specificity (see Nelson and Winter, 1982; Nelson, 2008). Table 3 is developed on the basis of a profound understanding of technological upgrading in the automotive and electronics industries. Efforts must be taken to developed similar typologies for the other key sectors of the ASEAN members.

Following the systemic quad framework advanced by Rasiah (2009), governments should focus on the four pillars of basic infrastructure, high tech infrastructure, network cohesion and global integration simultaneously to evolve dynamic clustering in parallel with technological upgrading. Policy coordination is essential between all the four pillars. Sequencing is essential in stimulating policy coordination, and the link between policy and firm-level upgrading must also be interactive (Lundvall, 1992). Once the two typologies are done, and the clusters have been selected for promotion, efforts must be taken to appraise the level of upgrading achieved, and the effectiveness of the instruments framed to stimulate technological synergies.

The focus of government policy should then be one of coordinating the interface between the typologies of firm-level and policy taxonomies and trajectories with space for contingent flexibilities. In doing so, the four aspects of technological upgrading that policy makers should look at when creating or strengthening the meso organizations, and the relationship between them and firms are the following:

1. Promote technology dissemination
2. Foster technology cooperation to support R&D based on knowledge commercialization
3. Promote clusters and business networks
4. Finance technology development

While all the four focal areas require simultaneous promotion, the extent of emphasis will vary with the level of development of the ASEAN country involved. Committees comprising both the generic and specialized experts but drawn from those carrying tacit knowledge at world class level - will be needed to assist the

committees formed to appraise the regulatory instruments, meso organizations and where government subsidies and grants are involved even the firms to ensure technological upgrading.

Table 4 shows the policy dimensions that governments should follow as they evolve from the bottom to the top of the development ladder (see also Oyeyinka and Rasiah, 2009). The dimension of basic infrastructure is the first that is developed as physical access (road, railway, sea and air networks, utilities (power and water), schooling, housing and security are sought by living populations. The focus on high tech infrastructure rises as further economic growth requires a structural shift to higher value added activities. Increasingly, human capital, universities, broadband support, labs and grants to support such activities become important. Since the colocation of firms and meso organizations does not offer the relational synergy, connected networks (or clusters) are important to intense flows of information between economic agents and organizations help stimulate technological change and economic growth. Finally, integrating with the global economy expands the market for exports and imports, investment flows and knowledge flows.

The typology by taxonomy and trajectory shows the state of the LDCs at the bottom of the development ladder, and those that are shaping the technology frontier through the production of knowledge new to the universe. The LDCs of Cambodia, Laos and Myanmar are characterized by these conditions. Indonesia, Philippines, Thailand and Vietnam are at level 2. Malaysia is at the catch up phase attempting to stimulate technological upgrading. Singapore is at the advanced stage with MNCs playing a crucial role in the upgrading process. ASEAN countries in levels 1, 2, 3 and 4 are heavily reliant on foreign direct investment in driving technological change among the commercial ventures. The focus of universities in the LDCS are on training graduates for employment. Countries in levels 2 are also strongly focused on churning out technical graduates. None of the ASEAN economies are at the 5th technology level where extensive basic research is undertaken to drive creative accumulation. Both Korea and Taiwan Province of China have managed to make the transition to level 5 with strong participation in basic research. Hence, the creation of an egalitarian level playing field across ASEAN would require efforts to stimulate upgrading by significant numbers of firms to level four.

Table 3: Technological Taxonomy and Trajectory of Firms, E.g. of Automotive and Electronics Sectors for ASEAN

	HR	Process	Product
Knowledge depth Simple activities (1)	On the job and in-house training	Dated machinery with simple invetory control techiniques	Assembly or processing of component, CKD and CBU using foreign technology, or cut make and pack (CMP) activities
Minor improvements (2)	In-house training and performance rewards	Advanced machinery, layouts and problem solving	Precision engineering
Major improvements (3)	Extensie focus on training and retraining; staff with training responsibility	Cutting edge inventory, process and service control techniques, SPC, TQM, TPM	Cutting edge qualtiy control systems (QCC and TQC) with original equipement manufacturing (OEC) capability
Engineering (4)	Hiring engineers for adaptation activities; Separate training department	Process adaptation: layouts, equipment and techniques	Product adaptation to meet regional or local tastes. Product extensions through proliferation
Early R&D (5)	Hiring engineers for product development activities; Separate specialized training activities	Process development: layouts, machinery and equipment, mmaterials and processes	Product development capability. Some firms take on original brand manufacturing (OBM) capability
Mature R&D (6)	Hiring specialized R&D scientists and engineers wholly engaged in new product research. Some use minimum	Process R&D to devise new layouts, machinery and equipment prototypes, materials and processes	New product development capability, with some taking on original brand manufacturing (OBM) capability, and patents in the United States

Source: Adapted from Rasiah (2010).

Table 4: Typology of Policy framework for ASEAN

Phases	Basic Infrastructure	High Tech Infrastructure	Network Cohesion	Global Integration
Initial Conditions (1) Cambodia, Laos, Myanmar	Political stability and efficient basic infrastructure	Emergence of demand for technology	Social bonds driven by the spirit to compete and achieve	Linking with regional and global markets
Learning (2) Thailand, Philippines, Indonesia, Vietnam	Strengthening of basic infrastructure with better customs and bureaucratic coordination	Learning by doing and imitation	Expansion of tacitly occurring social institutions to formal intermediary organizations to stimulate connections and coordination between economic agents	Access to foreign sources of knowledge, imports of material and capital goods, and FDI inflows
Catch-up (3) Malaysia	Smooth links between economic agents	Creative destruction activities start here through imports of machinery and equipment, licensing and creative duplication	Participation of intermediary and government organizations in coordinating technology inflows, initiation of commercially viable R&D	Licensing and acquisition of foreign capabilities. Upgrading synergies through technology imports. Emergence of strong technology-based exports
Advanced (4)	Advanced infrastructure to support meet demands of economic agents	Developmental research to accelerate creative destruction activities.	Strong participation of intermediary and government organizations in coordinating technology inflows, initiation of commercially viable R&D	Access to foreign human capital, knowledge linkages and competiveness in high tech products
Frontier (5) Singapore	Novel infrastructure developed to save resource costs	Basic research. R&D labs to support creative accumulation activities	Participation of intermediary organizations in two-way flow of knowledge between producers and users	Connecting to frontier nodes of knowledge, and competitive export of high tech products

Source: Developed by Author

While it is the responsibility of the individual countries in ASEAN to stimulate innovation activities in their countries, the establishment of the AEC will obviously require the streamlining of intellectual property rights (IPRs) across the region. Initiatives are currently underway to use the small and medium enterprises (SME) index to locate and eventually stimulate technological convergence in the policy and organizational support frameworks in ASEAN (ERIA, 2013). While these initiatives are expected to lead to the formation of a dynamic and vibrant innovative region that will become increasingly competitive in the world, a common IPR framework that is in harmony with the global IPR agreements of the world is pertinent. Institutions as defined by North (1994) as the 'rules of the game' and 'organizations and entrepreneurs as the players' are important, and hence a common IPR framework should become part and parcel of the post 2015 AEC framework. Hence, the next section discusses the importance, current state, and efforts of the ASEAN Working Group on Intellectual Property Rights to make this possible.

4. Governing IPRs in ASEAN

An enabling Intellectual property right (IPR) environment will be important in stimulating innovative activities in ASEAN. The ASEAN Economic Community must pursue the recommendations advanced by the ASEAN IPR Action Plan of 2011-2015 to address the diverse location of member countries in the development trajectory to harmonize the coordination of IPR issues in the region. IPR refers to rights its owner possesses that can be licensed, shared, sold or given away by the owner. IPRs were in existence since the copyright was introduced with the Berne Convention. After several unilateral and multilateral efforts to impose IPR regulations, they became part of trade governance when they were incorporated in the World Trade Organization (WTO) under the Trade Related Intellectual Property Rights (TRIPs) agreement. When the WTO started operations in 1995, the TRIPS agreement contained provisions for patents, industrial designs, copyright, trademark, trade secrets and geographical indications (Rasiah, 2002). There has been intense contestations over the rationale, motive, definition and suitability of protecting IPs

both from the angle of stimulating innovations (Mazzoleni and Nelson, 1998; Nelson, 2001; Chang, 2001), as well as, addressing the plight of the poor, especially those living in the Least Developed Countries (LDCs) and the disadvantaged who are plagued by communicable but deadly diseases, such as, aids. Poor countries are also concerned by the prospect of bio-piracy occurring on a large scale as private prospectors take advantage of a lack of governance capability to appropriate IPs from their countries.

Schumpeter (1961) had argued persistently that IPRs are essential to stimulate cycles of innovation, which Best (2001) considered as the springboard for the speciation of new industries. Schumpeter (1961: 161) had argued using the analogy that drivers would not dare raising car speeds in the absence of protective brakes, it is because of improving brake systems producers have continued to produce more powerful car engines. However, the use of IPRs must always balance what it essential to stimulate knowledge creation but in the interest of the wider society.

IPRs cover assets (both tangible and intangible) arises from people's creativity and innovation, or discovered/prospected and evolved over the years in particular geographical locations. However, while IPRs are now recognized as an important asset that qualifies for protection, its enforcement has always been a major problem. IP Offices have sprung up all over to register such assets. However, differences in emphasis, and the lack of capabilities has seriously affected enforcement in many countries.

As is the experience of most global and regional associations in the world, the institutional framework for defining and governing IPRs has been discussed actively in ASEAN following the setting up of the ASEAN Working Group on Intellectual Property Cooperation (AWGIP) in 1995. Also, since the opening of the WTO the focus of global governance on IPRs has shifted to trade. Hence, efforts of governments to promote economic growth through the promotion of education, health, traditional sources of knowledge, bio-diversity and bio-technology, internet, cultural and creative industries and the generation of knowledge to check climate change and support sustainable development are increasingly coordinated to prevent a collision with the TRIPS agreement. While it is pertinent to ensure that the playing field established by IPR frameworks (especially the TRIPS agreement) is level,

ASEAN members must look at IPR governance as a vehicle to stimulate national and regional participation in innovative activities, as well as, an instrument to attract value adding foreign direct investment. ASEAN needs to craft a governance mechanism that takes account the diverse demands, varying capacities and capabilities among the member countries. Unlike typical trade agreements, IPRs often deal with knowledge goods, which being public goods, carry the properties of being non-excludable and non-rivalrous. Regional collaboration to develop knowledge goods can also check the problem of the "tragedy of commons", which often breaks out in the association – e.g. the spread of haze from burning in Sumatra and Kalimantan to Singapore and Malaysia. Collaboration can also remove obstacles that arise from IPRs so as to stimulate technology transfer.

The state of governance in IPR protection varies across the ASEAN member countries. Singapore has the most advanced IPR system. Its intellectual property and copyright laws have been harmonized with global laws: e.g. IPRs are accorded the protection standards of WTO's TRIPS Agreement, and the Berne and Paris Conventions (Singapore, 2013). The Copyright Act (Cap 63) was amended in August 1999 to provide a strong and conducive IPR regime to encourage the growth of a knowledge-based economy and promote electronic commerce and creative innovations. The Singapore government amended the Copyright Act to allow end users to browse materials through the internet, and explained when intermediaries, such as, Internet Service Providers (ISPs) are exempted from liabilities. Whereas the Infocomm Development Authority (IDA) provides support in the info-communications aspects, the lead agency handling IPRs in Singapore is the Intellectual Property Office of Singapore.

Malaysia, Thailand, the Philippines, Indonesia and Vietnam have fairly developed IPR system but they lack the same level of reach and enforcement as Singapore. Despite its income status and enforcement capabilities IPR registration in Brunei is very pronounced. It is the LDCs of Cambodia, Laos and Myanmar that lack the capacity and capabilities to implement and enforce IPR regulations in sync with the demands of the TRIPS agreement. IPR registration, monitoring and advancement has been pursued strongly in these countries, though, the extent of active government participation in developing domestic or attracting foreign

capabilities has varied strongly. Malaysia's patent office records IPR registrations, but it does not enjoy any coordination with the technology transfer unit in the Ministry of International Trade and Industry (MITI) to enhance technology transfer from foreign transnational corporations to national firms. Despite having three industrial policy blueprints, Malaysia has never introduced pro-active appraisal of domestic capabilities when approving licensing. Nevertheless, Malaysia did include take up of IPRs in continuing R&D grants issued to approved technology firms since 1990 (Rasiah, 2011), though its impact in the take up of patents in the United States only rose strongly following the extension of such grants to foreign firms in 2005 (Rasiah and Yap, forthcoming). The registration of IPRs in Malaysia is undertaken by *Perbadanan Harta Intelek Malaysia* and it registers IPRs on patents, trademarks, industrial designs, copyright, geographical indication and layout designs (Malaysia, 2013). There is no technology transfer units in Thailand, the Philippines and Indonesia. The Department of Intellectual Property in the Ministry of Commerce handles IPR registration and monitoring of enforcement , which persistently seeks to implement the TRIPS compliant regulations (Thailand, 2010). The Intellectual Property Office deals with both the registration, monitoring and enforcement of IPR laws in the Philippines (Philippines, 2013). It focuses on the IPRs of patents, utility models, copyright, design and trademark. The National Office of Intellectual Property handles the registration, monitoring and enforcement of IPR laws (Vietnam, 2013). IPR governance in Brunei is primarily focused on enforcement of the TRIPS agreement (Brunei, 2013).

Indonesia has taken efforts to implement the provisions of the TRIPS agreement since 1994. Indonesia became a member of WTO and World Intellectual Property Rights Organization (WIPO), has signed the Berne and Paris Conventions, the Hague Agreement, the WIPO Performances and Phonograms Treaty (WPPT), the WIPO Copyright Treaty (WCT) and the Trademark Law Treaty. Indonesia has since revised its IPR framework to bring it in line with ASEAN and international IPR standards. Laws were either introduced or amended to strengthen the protection of new plant varieties (law no. 29), trade secrets (law no. 30), industrial designs (law no. 31), and layout designs of integrated circuits (law no. 32) were enacted in 2000 (IPEG, 2012).

By 2007 Indonesia had passed and started enforcing laws to protect all TRIPS based intellectual property.

Cambodia and Laos became members of WIPO in 1995 and the Paris Convention in 1998. However, it is only since 2000, the Cambodian and Laos Government began passing a series of laws and have set up regulatory frameworks to protect IPRs in the country targeted at meeting the conditions stipulated in the TRIPS agreement (Cambodia, 2013; Laos, 2013). However, Cambodia and Laos still lack the capacity to promote, register and enforce IPR regulations. IPR registration and enforcement is probably the least developed in Myanmar among the ASEAN countries with laws and institutional development towards meeting the TRIPS agreement still in its infancy (WST, 2012).

Nonetheless, since Brunei, Malaysia, Thailand, the Philippines, Vietnam and Indonesia have developed the capacity to stimulate harmonization with the TRIPS agreement, only the LDCs of Cambodia, Laos and Myanmar would require a second track so that they will have enough time to build their capabilities to follow such steps. However, the other ASEAN member countries should provide assistance to quicken the catch up process so that ASEAN as a region will have a common platform to support full integration of the region. In doing so, the developing economies of China, India (greater ASEAN) and Malaysia can be good examples as the take of patents from these countries have risen strongly especially from 1995 (UNCTAD, 2012: 38-39).

The AWGIPC was mandated to develop, coordinate, and implement all IP-related regional programmes and activities in the ASEAN region. Since then two major action plans were launched: the first ASEAN IPR Action Plan of 2004-2010, and the second ASEAN IPR Action Plan of 2011-2015. The first targeted the acceleration of the pace and scope of IP creation in ASEAN, while the second gave a strong focus on commercialization and protection, and to improve the regional framework of policies and institutions related to IPRs. The second action plan also promoted cooperation and dialogues between partner countries and organizations to build IP-based human can institutional capabilities, including fostering greater public awareness of IPR issues and their implications.

With the acceleration of ASEAN economic integration and the impending formation of the ASEAN Economic Community (AEC) in 2015, the AWGIPC has started work on developing a AEC Blueprint that is targeted at establishing an ASEAN IP System taking account of the different levels of capacity of the member countries to address problems associated with access and protection of IPRs, and to meet existing needs and demands of the global IP system. The AWGIPC should be supported closely by ASEAN members to provide eventually a common institutional environment for the establishing and functioning of R&D operatives, as well as, other innovation activities in the ASEAN region.

Given that the role of government will still be important, especially so when elections bring governments to power in most of them, and in Laos and Vietnam because of single party expectations and in Brunei through the leadership of the monarchy, the AWGIPC cannot be expected to go beyond its coordination role to engage in the promotion of structural change. However, the more developed members should provide support to the less developed members when help is sought to strengthen the capabilities of the latter. The spirit of cooperation through constructive engagement should be used to fortify the processes of technological upgrading in the less developed ASEAN members.

5. Conclusions

This paper started with the development of a stylized framework of technological capability development through pursuing Keynesian-Kaleckian style demand management strategies to assist developing economies to stimulate technological upgrading of firms at the bottom to the top of the technology ladder with a focus on innovation.

Focused on a neo-Keynesian, Kaleckian and Schumpeterian strategy the paper targeted focus on essential consumption, learning, creative destruction and eventually creative accumulation approaches. Drawing on the evidence expounded by Veblen (1915), Gershenkron (1952) and Abramovitz (1956), the paper called for the pursuit of learning and innovation strategies to reach the technology frontier, but one that is

molded by evolutionary tenets (Nelson, 2008) that emphasize industrial, locational and timing specificities.

In doing so the paper first offered typologies to locate firms technologically by taxonomies and trajectories, and subsequently a policy framework to be coordinated interactively with the macro-instruments, meso-organizations and micro-agents (firms) as countries upgrade to transform from developing to developed status. The paper also provided arguments on what the members should do to promote technology dissemination, foster R&D collaboration, promote clustering and business networks, and attract financing to support innovation and R&D activities as countries engender the conditions to achieve rapid economic growth.

Finally, the paper discussed the importance of IPRs, and the varying capacities characterizing ASEAN members. Instead of seeking a two speed framework to differentiate the LDCs from others, it is better that a common platform IPR be developed but the more developed members assist the ASEAN LDCs to quicken their technological progress. The OECD countries actually have implemented plans to assist these countries to achieve this goal, though, Myanmar's progress has been hampered by democracy issues.

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ENDNOTES

[1] See Corden and Neary (1982) for the economic argument on Dutch disease.

[2] Kalecki's early works was inaccessible to many because they were published in the Polish language.

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