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Seven Unproductive Habits of Thailand's Ineffective Technology and Innovation Policies: Lessons for other Developing Countries

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Abstract: *Though the Thai economy has recorded impressive growth rates over the past 50 years, the country is now in the 'middle-income trap' unable to achieve the status of high-income economy and catch-up with the forerunner countries of Asia in technologically sophisticated industries. At the same time, it is losing out to countries such as Indonesia and Vietnam in labour-intensive and resource-based industries. Passive and slow technological learning behaviour of firms in Thailand are the underlying problems. Apart from deficiencies in technological efforts and the strategic intent to upgrade, several firms have continued to perpetuate ineffective technology and innovation policies. Seven unhealthy habits are outlined here to explain Thailand's ineffective policies. The analysis offers lessons for other developing countries aiming to avoid getting caught in the middle-income trap.*

Keywords: Innovation,Middle-Income Trap,Policy Learning,Technology, Thailand

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1. Introduction

Amsden's (1989) main thesis on the history of industrialisation is that while Britain, Germany and the United States after that shared the distinction of generating new products and processes, some successful late-industrialising economies such as Korea and Taiwan, transformed their productive structures and raised their income through learning. Initially, learners do not invent new technology but compete by offering low wages; they also receive a wide range of government assistance to achieve incremental productivity and quality improvements related to existing products at the shop-floor level. The governments of the late industrialising countries created a set of institutions

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that revolved around the principal of reciprocity to compensate for being in the category of late-industrialising nation. State subsidies were allocated to make manufacturing profitable but recipients were subjected to performance standards that were redistributive and result-oriented. This reciprocal relationship therefore, transformed the inefficiency and venality associated with government intervention into collective goods and minimised government failures (Amsden, 1989, 2001). However, this thesis of Amsden did not emerge in several late industrialising countries that are now stuck in the middle income trap as a consequence. Thailand is one of them. This paper summarises technology and innovation policies of Thailand and draws some comparison with those of successful late-industrialising countries.

Over the past 40 years, Thailand has recorded consistently high GDP growth rates of approximately 7% per annum and has diversified its economy. Although the importance of primary products has declined relative to that of industry, agriculture itself has diversified significantly. Thailand has become one of the world's top exporters of a wide range of primary products, including not just rice, rubber, sugar and cassava but also prawns, canned pineapple, soybean, and frozen sugar. At the same time, the growth and diversification of manufactured exports, in sectors ranging from textiles, to automobiles and parts, to electronic and electrical components, have also been impressive. For example, the share of exports of electronic/electrical and automotive products to GDP increased from 0.04% and 0.25% respectively in in 1970 to 25.20 and 6.68 respectively in 2006 (Yusuf and Nabeshima, 2009). As a result, Thailand's economic status changed from low-income country to upper-middle-income country since 2003. Behind this success lies rather prudent macroeconomic management, early adoption of export and foreign direct investment promotion policies, and investment in physical infrastructure and expansion of school and university enrolment (World Bank, 1993). Thai technocrats under successive military governments since the 1950s should be credited for their long-term and conservative macroeconomic management insulated from vested interests (Warr and Nidhiprabha, 1996).

Nonetheless, growth rates declined substantially between 3% and 4% a year on average. The country's once prominent labour-intensive sectors such as textile, garment, toys and shoes have lost their competitive edge to lower-wage countries, which has caused growing concerns among Thai policymakers, and more recently the general public, that Thailand is stuck in the middle-income trap.[1] More specifically, the concern is about the limited industrial technological development which has contributed to Thailand losing its competitiveness . This has been reflected in a number of key indicators, both at the macro level in trade performance and overall competitiveness rankings, and at the firm level. At the macro level, although Thailand's economic growth rate in the past

40 years is rather impressive, this has been achieved largely by utilisation of factor inputs. The evidence comes from very low growth rate in Total Factor Productivity (TFP). Even in the period of high growth of 1987-1995, when the economy grew at a rate of almost 10% annually, the TFP growth rate was only around 1.5% (NESDB, 2007a).

At the firm level, the low level technological and innovative capabilities and passive learning of Thai firms are be illustrated by R&D and Innovation Community Surveys. The surveys have been carried out by the National Science and Technology Development Agency (NSTDA) since 1999. R&D surveys have been carried out every year but the innovation surveys were conducted only three times: in 1999 and 2001 and 2003. The number of R&D-performing and innovating firms both in manufacturing and service sectors was small amounting to around 6% in 2008 (Table 1).

Table 1:Share of R&D-Performing and Innovating Firms,Thailand,1999-2011(%)

Firm	**1999**	**2001**	**2003**	**2008**	**2011**
R&D - performing	12.7	1.7	6.0	2.4	8.0
Innovating	12.9	2.6	5.8	4.2	20.7

Note: Reported from National Innovations Surveys.[2]
Source: Reports on R&D/Innovation Surveys Year 1999, 2001, 2003, 2008 by National Science and Technology Development Agency (NSTDA) and Report on R&D/Innovation Survey by National Science, Technology and Innovation Policy Office.

To further illustrate this point, we compare Thai manufacturing firms with Korean ones that have been successful in technological catch-up (see Table 2). It is quite obvious that companies in Thailand lag far behind companies in Korea with respect to their ability to carry out innovation. Interestingly, relatively a large number of companies in Thailand carry out process innovations only, while this is quite rare in Korea. This may be an indication that Thai companies are at the stage where they rather use their resources to improve production processes rather than the product itself, which in turn could hint towards specialisation in OEM activities.[3]

Having established that Thailand is lagging behind Korea in the technology ladder, this article attempts to explain the weakness of Thai industry and firms by illustrating seven responsible policy habits, which have been embedded and articulated for many years in the Thai policy making arena. Several of them have become a doctrine and mantra chanted by successive generations of policymakers. We classify them as habits because they have been thrusts of policies officially documented in successive five-year National Economic and Social Development Plans, Policy Statement of The Council of Ministers

delivered to the Parliament, and other national plans such as industry master plans, science and technology plans. These policy habits are inherent in various discussions and interviews we had with government officials and industrialists and other stakeholders in the past 15 years, which is shared by several other commentators.

Table 2: Share of innovating companies, Thailand and South Korea (%)

	Thailand	**Korea**
Innovating	6.4	42.8
Product and process innovation	2.9	21.0
Only product innovation	4.1	17.0
Only process innovation	4.3	4.0

Source: Thailand R&D/Innovation Survey 2001 and the Korean Innovation Survey 2002

Policy Habit # 2: Firms Are 'Users' of STI Capabilities Generated by Universities and Public Research Institutes

At the end, it is firms that have to compete internationally, not universities and public research institutes. However, due to the influence of linear model of innovation, the orientation of policy and resource allocation for building technology development capabilities since the 1960s has been on the capabilities and resources of scientific, technological and training institutions that were intended to undertake technological activities 'on behalf of firms'. Conversely, policy measures and resource allocations designed to strengthen the technological learning, technological capabilities and innovative activities 'within firms' and knowledge flow among firms and between firms and other actors in innovation processes were minimal and ineffective (Arnold et. al, 2000: ix). For example, total R&D expenditure by the public sector (including government agencies, public research institutes and universities) was USD262 million in 2005 (NSTDA, 2006). On one project basis, investment to build seven centres of excellence mostly for providing S&T manpower at the postgraduate level was approximately USD22 million per year (Office of Higher Education Commission, 2006). On the other hand, the public subsidy for paying private firms' consultancy fees for the ITAP programme, one of the most outstanding programmes to enhance technological capabilities of private firms and promote firms linkages with other actors, was only less than USD1 million in the same year (Suprattaraprateep, 2007).

Policy Habit # 3: Building Indigenous Technological and Innovative Capabilities is Not a Major Economic Policy Objective

Unlike Japan, Korea, and Taiwan, S&T elements were not part of broader economic policies namely, industrial policy, investment policy and trade policy and, to a lesser extent, education policies (see Intarakumnerd et. al., 2002). Ministry of Science and Technology has a bigger role in promoting technology development than economic agencies such as Ministry of Industry (Arnold et.al, 2000: vii). This is very different from NIEs and Japan where economic organisations such as Ministry of International Trade and Industry (MITI) of Japan (Johnson, 1982), Economic Development Board (EDB) of Singapore (Wong, 1999), Economic Planning Board (EPB) of Korea (Chang, 1997) provide an array of policy and institutional support for industrial technology development.

Trade policy, the most important instrument in Thailand being tariff, was not used strategically to promote technological learning like in NIEs (see Amsden, 1989; Chang, 1994; Lall, 1996; Rasiah, 2009). Instead, trade policy was very much influenced by macroeconomic policy, for instance, to reduce domestic demand for imports at the time of balance of payment deficit. The Ministry of Finance, the dominant agency which involved in policy making, had little knowledge or experience of industry and industrial restructuring (Lauridsen, 2002). Industrial policy of Thailand did not pay enough attention to the development of indigenous technological capability as an integral factor in the process of industrialisation (Sripaipan, Vanichseni, and Mukdapitak, 1999: 37). It is very much focused on regulating the setting up of factories, industrial zoning, SME promotion and so on.

Interestingly, with the exception of automobile industry, there were no reciprocal performance-based criteria (such as export and local value added and technological upgrading targets) for providing state incentives like in Korea and Taiwan (Amsden 1989, 2001; Amsden and Chu, 2003). Investment promotion privileges, for example, were provided upon approval to set up businesses.

Policy Habit # 4: Selective Policies for Particular Sectors or Clusters are Market Distortions

Economic policies were heavily influenced by the World Bank's 'market-friendly' approach to industrialisation and given the neo-classical inclination of leading Thai technocrats, it was limited to the so-called 'functional' intervention such as promoting infrastructure building, general education, and export push in general. There were virtually no selective policy measures, such as special credit allocation and special tariff protection, targeting

particular industries or clusters, as they were regarded as market distortion by mainstream economists. The exception was automobile industry. Despite relatively liberal policies governing this industry, Thai government successively raised its local content requirements for the automobile manufacturing sector investors whereby it was 54% for passenger cars in 1987 and 70% for pick-up trucks in 1999. As a result, production of auto parts which were technology-intensive was undertaken in the country (Doner, 1992, 2009, Haraguchi, 2009). Subsequently in 2002, Thailand's Board of Investment (BOI) assigned one-tonne pick-up trucks as 'product champion' for the automotive industry. Tax incentives and other promotions were implemented which resulted in inflow of investment and subsequently exports of this product. Thailand has become the second largest production plant for pick-up trucks after the US. In 2007, economical and ecology-friendly car or 'eco-car' was selected as the second product champion. Preferential treatment and incentives together with strict requirements on producing four out of five engine components locally, were provided to interested carmakers. As a result, Thailand has become the hub of eco-car production in Asia. Nissan March and Honda Brio, for instance, have been manufactured and exported to the global market from production bases in Thailand (Intarakumnerd and Gerdsri, 2014; Natsuda and Thoburn, 2012). One important policy-related factor behind the qualified success of the automobile industry is the role of sector-specific development organisation, Thailand Automotive Institute, which plays the role of intermediary organisation linking firms with government agencies (Intarakumnerd and Gerdsri, 2014). This kind of organisation does not exist in other sectors and if they do, they are evidently ineffective.

A major change in policy took place under the Thaksin government (2001-2006). It was the first time the Thai government introduced serious "selective" policies to address specific sectors and clusters. The government declared five strategic sectors which Thailand should pursue: automobile, food, tourism, fashion, and software. The government provided support to these five sectors: Kitchen of the World (food cluster), Detroit of Asia (automobile cluster), Asia Tropical Fashion, World Graphic Design and Animation Centre (software cluster), and Asia Tourism Capital. Cluster concept was introduced. It goes beyond the linear model of innovation, since it focuses on interactive and collective learning among firms and between firms and other actors in close geographical proximity. Thailand was divided into 19 geographical areas. Each area had to plan and implement its own cluster strategy focusing on a few strategic products or services. It was supervised by the so-called 'CEO Governors', who are given authorities by the central government to act like provincial Chief Executive Officers (CEOs). At the local level, the cluster concept was introduced to increase the capacity of grass-root economy in the

name of 'community-based clusters', especially to help the 'One-Tambon-One Product' succeed. Nonetheless, the actual implementation of the concept has mixed results because of the misinterpretation of the concept of policy practitioners at the implementation level, policy discontinuity, inadequate trust and participation of concerned actors and lack of champions in the private sector in several cases (Intarakumnerd, 2006). Further, the Thaksin government did not pay enough attention to long-term industrial upgrading beyond short-term and politically-branded schemes. For example, it scraped the most ambitious upgrading plan, Industrial Restructuring Project (IRP), which was initiated by the previous government and went through extensive consultation processes with the private sector. The IRP aimed at upgrading 13 sectors with eight sets of measures ranging from equipment modernisation, to labour skills, to product design (Doner, 2009).

Due to the lack of selective policies, there are very few institutions founded to support development of indigenous technological and innovative capabilities of firms in specific sectors. Most research institutes in the country are jack of all trades but master of none'. They have several and overlapping missions: assisting industry, building up STI manpower, educating general public on S&T, helping disadvantaged groups of society and so on. They usually cover a broad range of technologies with no specific targets for particular industries and their linkages with the industry are rather weak. Further, sector-based institutes under the Ministry of Industry such as Textiles Institute, Automotive Institute and Food Institute are preoccupied with their own financial survival since due to short-sighted policy design, they have to be financially independent after being initially set up as a public organisation for five years. As a result, they need to rely on activities like training to generate quick income at the expense of long-term capability development of firms in the sector. The situation in Thailand is quite different from countries such as Taiwan and Korea where there are many government research institutes with clear-cut missions dedicated to strengthening technological capabilities of firms in particular sectors and sub-sectors or even specific products.

Policy Habit # 5: Transnational Corporations (TNC) should be Left Alone

Policy makers believe the main target of government policies should be Thai-owned firms, especially SMEs. Beyond providing tax incentives to attract investment to bring in foreign exchanges and generate employment, TNCs should be left alone as they confine R&D and innovative product designs at home and all their important decisions are made at their headquarters. These assumptions are less true these days. Unlike portfolio equity investment, TNCs are considered less "footloose" (Rasiah, 1995).

Local conditions such as availability of knowledge workers and skilled labour, capabilities of local suppliers, size of the local market and sophistication of local demand and working environment vary from country to country and it is not that easy to imitate. Moreover, the world largest TNCs are engaging more and more in R&D and innovative activities outside their home countries. More interestingly, TNCs are now setting up R&D facilities outside developed countries that go beyond adaptation for local markets. Increasingly, in some developing countries, R&D of TNC affiliates targets global markets and is integrated into the core innovation efforts of TNCs (Patel and Pavitt, 2000; Rasiah, Yap and Yap, 2015). Between 1994 and 2002, the developing country share of all overseas R&D (US TNCs) increased from 7.5% to 13%. There are about 700 foreign-own R&D laboratories in China (UNCTAD, 2005).

More interestingly, several studies (Rasiah, 1995; Ariffin and Bell, 1999; Marin and Bell 2006; Hobday and Rush 2007) point out that subsidiaries of TNCs in several countries such as the electronics industry in Malaysia and Thailand, have more autonomy in decision making than popularly believed. If rightly formulated and implemented, policies of host countries can influence TNCs to invest in technologically sophisticated activities to create positive impacts on local economies. Like Malaysia and Thailand, Singapore is another country where TNCs have figured prominently in economic development. However, the Singapore government has put in place specific measures to attract FDI and encourage TNCs via incentives to assist in the development of local technological capabilities. Started as early as 1970s, Local Industry Upgrading Programme implemented by Singapore's Economic Development Board (EDB), for instance, specifically aims at exploiting TNCs' knowledgeable and experienced engineers to train employees of local firms in developing skills considered 'critical' for technologically upgrading of high-priority industrial sectors (see Wong, 1999). As an incentive, the EDB subsidised a percentage of the salary of managers sent by TNCs to work in local enterprises for two years. As of 2010, more than 200 TNCs and 1000 local suppliers have been involved in this programme (Wong and Singh, 2012).

Singapore has also attempted to attract TNCs to set up regional R&D centres since the 1980s. Unfortunately, partially due to conventional belief on the role of TNCs, there was no such explicit and pro-active link between promoting TNCs and upgrading of local technological capability like that in Thailand. Until as late as 2004, the Board of Investment launched the 'Skill, Technology and Innovation' or STI policy incentive for firms investing in R&D, employing university graduates in S&T, and training their personnel and those of suppliers. Even so, the number of projects approved under the STI scheme has been relatively small, while incentives for training of employees, the most deliberate attempt to generate spill-over impacts from TNCs, have been abolished (Kaewsang, 2007).

Policy Habit # 6: Government Grants and Direct Subsidies to Promote Firms' Technological Learning should be Restricted

Different incentives – tax concessions, loans, and grants – have inherent advantages and disadvantages. Tax incentives have the benefit of being non-discriminatory: open to all firms that meet stated criteria, and administration is relatively simple. On the other hand, grants are generally more effective in promoting activities prioritised by government, and, unlike tax incentives, it is less likely to subsidise activity that would have occurred in any case (Turpin et al, 2002).

In several countries, grants have been used effectively to promote 'specific' activities (see Rasiah, Yap and Yap, 2015). In Taiwan, for example, the Development of Targeted Leading Products (DTLP) programme was initiated in 1991. The programme was aimed at encouraging firms to engage in development of new industrial products in 10 newly emerging industries targeted by government. The government provided firms with grant of 50% of total product development expenses to exceed the productivity level of firms in Taiwan. Another scheme, the Development of Critical Components and Products (DCCP) Programme, was approved in 1992 to develop crucial components and products that have high value-added and development potential and that would improve industrial structure and substantially enhance the competitiveness of downstream industries. A total of 66 components and parts were selected (Lauridsen, 1999).

Singapore also offered different grant schemes targeting all activities in the value chain and to improve the technological capability levels and needs of firms. As mentioned earlier, during the 1970s and 1980s when the Singapore government wanted to promote technological diffusion from transnational corporations to local enterprises, schemes like the Local Industry Upgrading Programme (LIUP) were initiated. There were also grant schemes for individuals and companies to promote critical skills such as ICT. In the 1990s, when firms in the country needed to increase their R&D capability, the government had a grant scheme to leverage Israel's R&D capability by funding feasible R&D projects under collaborations of firms in the two countries. Since the late 1990s, the government began to promote high-tech entrepreneurship and basic R&D by providing various grant schemes. For example, the Technology Innovation Programme (TIP) covers 50%-70% of equipment, materials, manpower, software and IP costs of projects operated by both individual SMEs and consortia. The Innovation Voucher Scheme (IVS) provides SMEs with grants to pay for consultancy and technical services provided by local and reputable overseas universities and research institutes. The government also uses this scheme to promote inter-firm collaboration by allowing up to 10 SMEs to

pool their vouchers. In this regard, the Singaporean government has cleverly used government schemes to tackle the weaknesses inherent in their national innovation systems, i.e. linkages among local SMEs and those between local SMEs and public research institutes and universities (Wong & Singh, 2012). In Japan, the government tried to create "intellectual clusters", i.e., regional-based clusters of universities, public R&D institutions, relevant institutes and knowledge-intensive core companies. The central government provided five-year financial subsidy to the cluster plans that were initiated by local governments together with local universities and local firms. The aim was to foster interaction between the original technological seeds of the public research organisations and universities and business needs of regional companies to create a chain of technological innovations and new industries (see MEXT, 2002).

In Thailand on the other hand, grant schemes to promote specific or targeted activities aimed at enhancing technological learning of firms were rather limited due to market distortion and rigid government regulations to stem corruption and cronyism. Therefore, Thailand is missing the opportunity to use effective and more-targeted policy tool to promote technological catch-ups and has to rely only on tax incentives, a blunt but easier to handle instrument.

Policy Habit # 7: Increasing the Number of Graduates at the Post-Graduate Level is the Most Critical STI Human Resource Development Issue

Policy makers, especially those trained in the science disciplines at universities, strongly believe the most critical issue in STI human resource development is to increase the numbers of Masters and PhD graduates. This may be true for teaching and basic research at universities and public research institutes, but several studies (TDRI 2004; Chalamwong, 2007; NESDB, 2007b) have confirmed that local and foreign firms in Thailand do not need high number of employees with postgraduate qualification. Their main concern instead, is on the number of 'qualified' bachelors' degrees and vocational-certificate holders. Not only production-based firms but those conducting design-oriented R&D require only first degree graduates.

An interesting example is Toyota Motors, which began design and development work in Thailand by setting up the Technical Centre of Toyota Motors Asia Pacific Engineering & Manufacturing (TMAP-EM) in August 2003 at Samutprakarn Province. The centre focuses on material development, design and engineering to fit local needs, and testing of parts and vehicle. The difference between the centre and production subsidiaries is that the former employs engineers more than technicians. Notably, more than 90% of the engineers are bachelor-degree holders. Less than 10% are Masters' graduates

and only two have Ph.D qualification. The management at the centre is of the view first degree holders are qualified enough to conduct development work and hence, there wasn't a need to increase the number of postgraduate engineers in the future. More interestingly, engineers, regardless of educational background, have to perform the same tasks and need to undergo in-house training locally and in Japan for one and a half year. Thai engineers, in their opinion, lack language proficiency, creativity, and group discussion ability, which are indispensable qualifications for research engineers (Omura et al., 2008).

The overemphasis on postgraduate qualification is at the expense of others. What has been largely neglected by policy makers is the quality of vocational education. As a late-comer in terms of industrialisation, Thailand has a window of opportunity to exploit and upgrade technologies already developed by forerunner countries. Nonetheless, to seize such an opportunity, engineers and technicians at the shop-floor level are necessary for the firms' technological absorption capacity and 'incremental' innovation at the time of technological catching up. Even though the Vocational Education Act and relevant laws exist, lack of focus and negative societal perception of vocational education has led to few vocational graduates and technicians in the manufacturing sector. Vocational graduates are perceived as inferior human resources to university graduates. This is very different from Japan, Taiwan and Korea where vocational education and qualification is highly valued and regarded by their governments as well as viewed positively by their societies, especially during their technological catching-up period when innovations were mostly incremental and emerged from factories' shop floor and 'project-execution' capabilities were important for latecomer firms to enter new industries (Amsden and Hikino, 1993).

Why are these seven habits persistent in Thailand? The answer lies in the perceptions of Thai policymakers. Two groups of Thai policymakers dominate science, technology and innovation policies, and industrial development policies. One is the neoclassical economists-cum-bureaucrats, the so-called 'technocrats', in key economic ministries, who strongly opposed state intervention (especially selective and vertical industrial upgrading policies). The emergence and empowerment of technocrats have been very much shaped by socio-political circumstances in Thailand. Technocrats gained authority in policymaking during years of successive military and semi-democratic regimes. It started with the military coup by the Field Marshall Sarit Thanarat in 1957. Several macroeconomic agencies dominated by technocrats were set up shortly afterwards, namely Budget Bureau, Office of the Fiscal Policy, Board of Investment, and National Economic and Social Development Board (Doner, 1994). Members of the first cadre of technocrats in the 1950s were mostly educated in Europe. During the 1960s and early 1970s when the US was heavily involved in the politics and economics of Thailand (the so-called

'American Era'), more technocrats were educated in the US. They believed in liberal economic policy with limited role of the state in providing prudent macro-economic management and creating favourable conditions for private investment. Together with military generals, they dominated policy making. Successive elected governments later were too short-lived to initiate any long-lasting policies which were different from those of the technocrats. The military returned to power again in 1976 and the technocrats enjoyed heydays during General Prem administration (1980-1988). They became more powerful because their skills were in demand and because they had strong backing from international institutions such as the World Bank and the International Monetary Fund. The elected government afterwards were also short lived, though the influence of technocrats reduced. A major change came after the 1997 Constitution empowering elected governments and brought the Thaksin administration into power with an unprecedented overwhelming majority in the parliament. As noted above, the Thaksin regime initiated several policies which were obviously different from those of the technocrats. The two military coups of 2006 and 2014 were attempts of the establishment including the technocrats to regain authority in policy making process (Phongpaichit and Baker, 2014).

Another powerful group are the scientists-cum-policy makers who were in charge of formulating science and technology policies. Many of them were well-known university professors and executives who later became administrators of national-level public research institutes and funding agencies. They had an amicable relationship with the economic technocrats and also gained authority during military and semi-democratic regimes. They strongly believed in the linear model of innovation and promoted polices that emphasised on R&D and S&T human resource development. This is different from Japan and successful East Asian NIEs such as Korea and Taiwan where policy making is done engineering and economic development 'technocrats' who believe in the importance of industrial and technology upgrading (Amsden 1989, Johnson, 1992, Lauridsen, L. 1999, 2008).

Conclusion

It is challenging for a country to sustain its competitiveness. It requires continuous upgrading and sometimes, major transformation. Factors that underpinned competitiveness in the past may turn out to be major hindrances for the economy in the future. Therefore, ability of the country to learn to create new competitive edge or improve it is very important in maintaining its position in the global competition. Alice Amsden's seminal works conclude that successful late-industrialising countries evolved as learners. Thailand's learning abilities are doubtful. At the same time, new competitors such as China, India, Vietnam and transitional economies of Eastern Europe are trying their

best to enhance their learning abilities. Thailand needs to shift to a faster gear. Nonetheless, the seven policy habits are detrimental for Thailand to survive, let alone prosper, in the Learning Economy. It is very important to break away from these habits and think alternatively, as suggested earlier. Changing of the mind set of policy makers is an essential prerequisite.

Notes

1. By analysing historical income transitions, one can calculate the threshold number of years a country spends in the middle-income category. This cut-off is the median number of years that countries spend in the lower middle-income and in the upper middle-income groups. Felipe et al., (2012) calculated a threshold of 14 years to cross the upper middle-income to high income (USD5, 000 to USD11, 750).
2. Like previous surveys, the survey in 2011 also followed the definitions of the Oslo Manual. However, description of different types of innovation was provided. Therefore, surveyed firms could recognise better whether they had innovation. This may explain why the figure of innovating firms was higher than previous surveys.
3. OEM is a specific form of subcontracting. Under Original Equipment Manufacture, a subcontracted firm produces a finished product to the precise specification of a foreign transnational corporation, which will market under brand name via its own distribution channels.

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