Thailand Automotive Cluster

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Microeconomics of Competitiveness

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Executive Summary

Thailand shows impressive economic growth over the past ten years and is quite stable as an economy both economically as well as in terms of social indicators. Despite some political instability, Thailand has strong fundamental indicators and shows every indication of remaining a vibrant South East Asian Economy, fertile for the growth of future clusters. The largest country level competitiveness issues plaguing Thailand are the problem of innovation and access to technology, a properly skilled and trained workforce, tariff and trade restrictions, and access to credit as a consumer and small business.

The automotive cluster has been the priority sector for the economy of Thailand. It is the third largest sector contributing 12% of the GDP. The cluster contributes massively to international export and trade inflows. With the government-led support, the cluster has evolved from a protectionist model to a liberalized location that has vibrant foreign OEMs competition, an extensive network of related and supporting industries, unique demand condition for light commercial vehicles due to poor rural infrastructure and abundant low-cost, and low skilled labor force. Three Institutions for collaborations (IFC) provide overall direction of the cluster as well as acting as liaisons working in conjunction with the government. Despite its achievements in the past decades, Thailand needs improve its capability, skills and infrastructure to retain its competitive advantage. Both public and private sectors have to collaborate, support, fund, and incentivize players both domestic and foreign to upgrade its innovative capacity and fill in gaps in its cluster environment going forward.
1. Introduction

Located in Southeast Asia and bordered by the Andaman Sea, Gulf of Thailand, Indian Ocean and the countries of Myanmar, Laos, Cambodia and Malaysia, the Kingdom of Thailand (Thailand) houses 67 million people, representing 11.3% of Southeast Asia’s total population. Thais are composed of a highly homogenous society with 75% of the population of Thai ethnic origin, 95% practicing Buddhism and nation-wide usage of the Thai language. With the equivalent size of Spain, the world’s ‘rice bowl’ is endowed with fertile land, a stable tropical climate, and is relatively free of natural disaster. As a member of the Association of Southeast Asian Nations (ASEAN), Thailand belongs to a vibrant economic region that has close proximity to the newly industrialized economies (NICs) of East Asia (i.e. South Korea, Taiwan, Hong Kong and Singapore) and emerging global economic power (i.e. China and India). Well crafted policies and coordinated strategies are vital to strategically positioning Thailand in today’s highly globalised and competitive economy.

2. National Competitiveness Analysis

2.1 Growth Performance and Economic Policies

Thailand’s growth record has been nothing but impressive. Over a thirty year period (1980 to 2009), its economy witnessed an eight fold increased in both, the size of its economy (8.2 times) and income per capita (7.6 times). With average GDP growth of 5.5 percent annually, Thailand’s per capita income rose from $1,048 in 1980 to $8,004 in 2009, placing the nation at the margin of becoming an upper-middle income nation (Figure 1).
Continued growth transformed the nation from a once low-income agriculture-dependent economy to a well diversified low-middle income production-based nation that integrates significantly with the rest of the world. Manufacturing is Thailand’s largest economic sector contributing about 46 percent of its GDP in 2009. This is followed by the services (44%) and agriculture (10%) sectors. Over the years, benefiting from influx of foreign direct investments, Thailand has gradually upgraded its technological capacity and product sophistication. By 2000, nearly 45% of Thailand’s export is classified as SITC 7 products that consist of technologically sophisticated and capital-intensive manufacturing products, reflecting Thailand’s broader export base and deeper industrial structure (Asian Development Bank, 2007). As shown in Figure 2, high-tech products represent 68.1% of all manufactured exports in 2009. Dubbed as Detroit of Asia, Thailand’s recognized success as a global automotive hub is a classic case of a well executed industrial plan.

Figure 1: GDP growth and income per capita

![GDP growth and income per capita](source: Asian Development Bank Key Indicators 2010)

Figure 2: Composition of Thailand's Manufacturing Exports (2009)

![Composition of Thailand's Manufacturing Exports](source: Bank of Thailand)

Similar to most developing nations, Thailand adopted import-substitution policies in its early development stage, imposing high tariffs on imports and offering generous subsidies for import-competitive industries (Brimble and Sibunruang, 2002). In the beginning of the eighties, with an increasing wave of globalization, and like other competing ASEAN nations, Thailand began to look...
outward with a gradual shift towards export promotion policies. Greater force of trade and financial market liberalizations took place in the second-half of the eighties attracting FDIs and capital flows. In 2007, Thailand attracted 15.2% of foreign direct investments (FDIs) net-inflow into the ASEAN region, second after Singapore (ASEAN, 2010). Average net inflow of FDIs increased by 10-fold, from $510 million per year in 1980s to $5,418 million in the 2000s. From 1990 to 1996, the Thai economy grew at an average rate of 8.6% passing the average Asean-5 economies that grew at 6.5% annually, and placing itself as one of the Asian Miracle nations (World Bank, 1993).

Figure 3: Policy Milestones and net-inflow of Foreign Direct Investments

<table>
<thead>
<tr>
<th>Year</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>Import-substitution strategy Investment in infrastructure</td>
</tr>
<tr>
<td>1962</td>
<td>Establish Board of Investment to accommodate automotive FDI inflows</td>
</tr>
<tr>
<td>1970</td>
<td>BoP problems-high imported inputs Export-promotion strategy</td>
</tr>
<tr>
<td>1977</td>
<td>Investment Promotion Law Promotion of regional growth</td>
</tr>
<tr>
<td>1980</td>
<td>Early 80s-small scale industries, resource-based and labor intensive industries.</td>
</tr>
<tr>
<td>1984</td>
<td>Late 80s: Openness Post-Plaza Accord – price competitiveness</td>
</tr>
<tr>
<td>1985</td>
<td>Ad-hoc and lack of long-term strategy</td>
</tr>
<tr>
<td>1990</td>
<td>1999: Trade &amp; financial liberalization-FDI &amp; capital inflows</td>
</tr>
<tr>
<td>1994</td>
<td>Large-scale labor intensive and basic industries</td>
</tr>
<tr>
<td>1996</td>
<td>Electronics, steel, petrochemicals and infrastructure</td>
</tr>
<tr>
<td>1997</td>
<td>2000s: Financial &amp; corporate restructuring</td>
</tr>
<tr>
<td>2002</td>
<td>National Competitiveness Committee</td>
</tr>
<tr>
<td>2006</td>
<td>SME Promotion Office Focus on industrial-base</td>
</tr>
<tr>
<td></td>
<td>Political instability (2006)</td>
</tr>
</tbody>
</table>

2.2 Pre and Post-1997/98 Economic Crisis

The dark-side of the Asian Miracle high-growth era exploded in July 1997. Region-wide removal of barriers to capital flows, deregulation of domestic financial sector, and less restrictive exchange controls siphoned a significant amount of global short-term capital flows into these miracle economies. By 1995, Thailand had a net capital inflow of $14.2 billion, more than 100% increase from the level recorded three years earlier (Laplamwanit, 1999). Rushed dismantling of financial restrictions and lax in monitoring and supervision flooded the Thai economy with external debt, reached its peak of 97.2% of Gross National Income (GNI) in 1997. Speculative short-term foreign debt-financed purchases of properties were exacerbated by high degree of moral hazard, exposing Thailand to a severe balance sheet mismatch and high foreign exchange risk (Sachs and Radelet, 1998 and 1999).

Sustainability of Thailand’s high-speed externally-driven economy was also challenged by the parallel weakening of the export sector. China’s devaluation of Yuan by 35% in early 1994 and aggressive monetary ease by Japan in 1995 to stem its deflationary crisis in 1995 weakened Thailand’s export competitiveness (Makin, 1997). Panic by defaults of Somprasong Land (a Thai property developer) and Finance One (Thailand’s largest finance company) in February 1997, along with sudden and huge withdrawals of foreign financiers, triggered a chain of collapse among Thai financial institutions that in turn led to deep contraction of the bank-dependent Thai economy (Laplamwanit, 1999). Thailand’s GDP contracted by 10.5% in 1998 with inflation and unemployment skyrocketing to 8.1% and 4.4%, respectively.
Despite the V-shaped recovery in 1999, the crisis exerted a lasting impact on Thailand’s growth trajectory. During the post-crisis (1999-2009), GDP growth rate dropped by almost half to 4.7%. The post-crisis period was driven mostly by exports, with an average contribution of 69% of GDP (Figure 4). Private investment declined significantly, by almost half, from 41% to 26%. The post-crisis era also witnessed greater reliance on FDIs. FDI totaled to 13.7% of domestic investment compared to 3.1% prior to crisis. The slower pace of growth momentum, lower level of private investment, and vulnerability to increasing global uncertainty posed challenges in managing Thailand’s economy. Swings in global FDI flows and declining demands in advance economies ignited by global financial crisis in 2008 adversely affected Thailand. Thailand was dragged into recession in 2009 with negative growth of 2.3%.

2.3 Social and Political Trends

Parallel to its growing economy, Thailand has also experienced improving social trends. Today’s Thailand depicts the structure of a modern economy with a low fertility rate, high literacy, and increasing urban population (Table 1). The dependency ratio and fertility rate (children per women) have declined from 76.4% and 3.4 in 1980 to 41.4% and 1.8 in 2009, the lowest compared to its regional peers. At par with its neighbours, 93.5% of people above the age...
of 15 in Thailand are literate. One-third (33.3%) of the population now lives in urban areas, with access to quality education and modern facilities. The level of inequality is trending in the improved direction with average Gini of 44.3 in the 1981 to 42.0 in the 2002 (WIDER). Improving social conditions formed a strong foundation for Thailand’s competitiveness.

Table 1: Social Trend and Governance Indicators

<table>
<thead>
<tr>
<th></th>
<th>Thailand</th>
<th>Indonesia</th>
<th>Malaysia</th>
<th>Philippines</th>
<th>Vietnam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita GDP, PPP (current international $)</td>
<td>47.3</td>
<td>67.8</td>
<td>230.0</td>
<td>27.5</td>
<td>92.0</td>
</tr>
<tr>
<td>Population growth rate (% p.a.)</td>
<td>1,064</td>
<td>7,995</td>
<td>4,199</td>
<td>14,012</td>
<td>3,542</td>
</tr>
<tr>
<td>Dependency ratio (% working age population)</td>
<td>2.22</td>
<td>0.56</td>
<td>1.15</td>
<td>1.66</td>
<td>1.79</td>
</tr>
<tr>
<td>Urban Population (% to total population)</td>
<td>67.4</td>
<td>41.4</td>
<td>49.2</td>
<td>52.0</td>
<td>61.5</td>
</tr>
<tr>
<td>Human Development Index</td>
<td>26.8</td>
<td>33.3</td>
<td>51.5</td>
<td>70.4</td>
<td>64.9</td>
</tr>
<tr>
<td>Expenditure per student, tertiary (% of GDP per capita)</td>
<td>0.48</td>
<td>0.65</td>
<td>0.60</td>
<td>0.74</td>
<td>0.64</td>
</tr>
<tr>
<td>Literacy (% of people age 15 and above)</td>
<td>NA</td>
<td>23.0</td>
<td>16.1</td>
<td>49.4</td>
<td>11.6</td>
</tr>
<tr>
<td>Life expectancy at birth (total years)</td>
<td>88.0</td>
<td>93.5</td>
<td>92.0</td>
<td>92.1</td>
<td>93.6</td>
</tr>
<tr>
<td>Infant mortality (per 1000 birth)</td>
<td>65.9</td>
<td>68.9</td>
<td>70.8</td>
<td>74.4</td>
<td>71.8</td>
</tr>
<tr>
<td>Fertility (child per woman)</td>
<td>12.0</td>
<td>12.0</td>
<td>29.8</td>
<td>5.7</td>
<td>26.2</td>
</tr>
<tr>
<td>Political Stability Worldbank WGI</td>
<td>46.4</td>
<td>14.6</td>
<td>24.1</td>
<td>46.7</td>
<td>10.8</td>
</tr>
<tr>
<td>Rule of Law Worldbank WGI</td>
<td>3.4</td>
<td>1.8</td>
<td>2.1</td>
<td>2.5</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Source: World Development Indicators (WDI), World Bank (WDI), Gap Minder (https://www.gapminder.org), and Worldwide Governance Indicators, World Bank (http://info.worldbank.org/governance/wgi/index.asp). Note: Reported data are for 1980, 2009 or closest years available to each.

Worsening political instability smeared Thailand’s attractiveness as destination for investment (Bloomberg, 2010). Since the end of absolute monarchy in 1932, Thailand has been governed by series of military governments interspersed with brief periods of democracy. The country has witnessed five Prime Ministers in power since the last military coup in 2006. The current Prime Minister, Abhisit Vejjajiva took office in December 15, 2008. Short-lived government is prone to frequent policy revisions, imposing greater uncertainty that voids long-term investments. Left
unchecked, further deterioration in political stability potentially penalizes Thailand’s long term competitiveness.

2.4 Macroeconomic Competitiveness

Thailand displays a stable and strong macroeconomic competitiveness. Risky macrostructure and subsequent crisis-related macro uncertainty dissipated, posing no inherent macro risks for the nation. Thailand’s macrocompetitiveness is ranked highly at 18 (out of 139 countries) by the Global Competitiveness Index (GCI). As shown in Figure 5, except for two fiscal pump priming episodes during the dot.com crisis (2002) and recent global financial crisis (2009),

Thailand’s fiscal balance has remained at a sound level. Excluding the two fiscal injections, average fiscal balance stood at 0.8% of GDP from 2000-2009. Similar improvements are noted for the inflation and unemployment where both measures averaged at the low levels of 2.5% and 2.1% percent, respectively since 2000 (Figure 6). Thailand’s external account has also improved. Current account deficit turned surplus during post-crisis
years with an improved position in the stock of international reserves which reached $138,417 million, five times greater than its lowest point in 1997. The country is no longer burdened by high external debt. External debt declined steadily from its peak in 1997 (97.2% of GNI) to a low level of 32% in 2008.

After the 1997 crisis, Thai banks have operated with high risk adversity, shifting their loan portfolios from business (long-term) to consumer loans (short-term), constraining access to firms especially those of small and medium enterprises (Figure 9). In addition to being obstacle to recovery in private investment, financial constraints further curtail Thailand’s SMEs to upgrade their innovation and technological capabilities (Wattanapruttipaisan (2003) and Habaradas (2009)).

Thailand’s sound macro competitiveness provides a strong ground for Thailand to strengthen its attractiveness as preferred destination for new investments. Realization of a competitive business environment will be a critical challenge in advancing Thailand to next stage of development.
3. Thailand Country Diamond: Business Environment Analysis

There are four qualities of a nation that work individually as well as together systematically to determine a location’s competitiveness. These conditions form the four points of Michael E Porter’s “Diamond of National Competitiveness,” outlining the “essential ingredients for achieving international competitive success” (Porter, 1998). Together, factor conditions, firm strategy, structure, and rivalry, demand conditions, and related and supporting industries together support the success of the business environment.

Thailand’s overall ranking in the Global Competitive Index out of 139 countries is 49. Factor conditions are rated the highest at 42 while demand conditions are rated the lowest at 58. An overview of issues and strengths on each corner of Thailand’s Diamond of National Advantage is outlined below in Figure 9.

Each of the above mentioned corners of Thailand’s Business Environment Assessment are described in detail below along with issues that hinder Thailand’s advancement to the next level competitively.
3.1 Factor (Input) Conditions

Thailand possesses the basic inputs that are critical for its positioning as a competitive player in Asia and the rest of the World. Yet, some high quality or specialized inputs are lacking.

Thailand’s Infrastructure

Thailand’s logistical infrastructure (35 out of 139 countries) is satisfactory. Yet, the area for improvement remains the Quality of railroad infrastructure (61 out of 139 countries) which scores the poorest in that sub-category (GCI, 2011). Airport: with 28 commercial airports, all Thailand’s regions are about an hour’s flight from Bangkok. Road Network: 98.5% is concrete or asphalt paved. Seaport: 122 ports, including eight international deep sea ports open to international trade. Rail and Mass Transit Systems: 4,044 kilometers on three lines, intersecting in Bangkok. The system connects with Malaysia’s national system, providing direct linkages down to Singapore, and a railway link to across the Mekong is under construction at Nong Khai (BOI, 2010).

Human Resources:

Thailand spends 28.3% of its yearly expenditures on education which is a higher percentage than most countries (Visual Economics, 2010). Yet, a major impediment in the Factor (Input) Conditions remains the pool of skills needed to upgrade the country’s business environment quality. Due to shortages of quality teachers, curriculum and pedagogy, and lack of policy coherence, secondary education is weak is Thailand (MOE, 2011). Thailand is ranked at 50th out of 65 countries surveyed in mathematics and sciences and 48th in reading abilities (OECD
PISA, 2010). As can be seen in Table 2, the top universities in Asia do not include a single university from Thailand, and the countries’ top universities are not globally competitive.

Table 2: Thailand Universities Compared to Asia and the World

<table>
<thead>
<tr>
<th>Institution</th>
<th>Country/Region</th>
<th>Region Rank</th>
<th>World Rank</th>
<th>Institution</th>
<th>Towns</th>
<th>Thai Rank</th>
<th>World Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Univ. of Hong Kong</td>
<td>Hong Kong</td>
<td>1</td>
<td>21</td>
<td>Kasetsart University</td>
<td>Bangkok</td>
<td>1</td>
<td>199</td>
</tr>
<tr>
<td>Univ. of Tokyo</td>
<td>Japan</td>
<td>2</td>
<td>26</td>
<td>Chulalongkorn University</td>
<td>Bangkok</td>
<td>2</td>
<td>201</td>
</tr>
<tr>
<td>Pohang Univ. of Science &amp; Tech</td>
<td>Rep of Korea</td>
<td>3</td>
<td>28</td>
<td>Mahidol University</td>
<td>Nakhon</td>
<td>3</td>
<td>273</td>
</tr>
<tr>
<td>National Univ. of Singapore</td>
<td>Singapore</td>
<td>4</td>
<td>34</td>
<td>Thammasat University</td>
<td>Klong Luang</td>
<td>4</td>
<td>364</td>
</tr>
<tr>
<td>Peking Univ.</td>
<td>China</td>
<td>5</td>
<td>37</td>
<td>Asian Institute of Technology</td>
<td>Klong Luang</td>
<td>5</td>
<td>486</td>
</tr>
<tr>
<td>Hong Kong Univ. of Sci &amp; Tech</td>
<td>Hong Kong</td>
<td>6</td>
<td>41</td>
<td>Prince of Songkla University</td>
<td>Hat Yai</td>
<td>6</td>
<td>607</td>
</tr>
<tr>
<td>Univ. of Science &amp; Techn of China</td>
<td>China</td>
<td>7</td>
<td>49</td>
<td>Ramkhamhaeng University</td>
<td>Bangkok</td>
<td>7</td>
<td>794</td>
</tr>
<tr>
<td>Kyoto University</td>
<td>Japan</td>
<td>8</td>
<td>57</td>
<td>Khon Kaen University</td>
<td>Khon Kaen</td>
<td>8</td>
<td>828</td>
</tr>
<tr>
<td>Tsinghua University</td>
<td>China</td>
<td>9</td>
<td>58</td>
<td>King Mongkut's Institute of Technology</td>
<td>LADKRABANG</td>
<td>Bangkok</td>
<td>9</td>
</tr>
<tr>
<td>Korea Advanced Inst. of Sc &amp; Tech</td>
<td>Rep of Korea</td>
<td>10</td>
<td>79</td>
<td>Bangkok University</td>
<td>Bangkok</td>
<td>10</td>
<td>1026</td>
</tr>
</tbody>
</table>

Source: (TSL Education Ltd, 2010), (4ICU.org, 2010)

Development of Science Technology in Thailand

Thailand has a history of investing in specialized skills. Yet, the issue remains the inadequacy between their supply and demand. In 1956, the National Research Council was created as one of the first institutions to lead science and technology (S&T) policies in Thailand (Memariani, 2011). In March 1979, the Ministry of Science and Technology and Environment (MOSTE) was established. Currently, fifteen (15) different S&T agencies report to MOSTE. In 1991, the National Science and Technology Agency (NSTDA) came to operation (MOSTE, 2011). In 2002, The Thailand Science Park (TSP) came into operation as the country's leading integrated R&D hub. The Thailand Science Park is a critical component in Thailand's efforts to strengthen its capabilities in research and innovation. TSP helps to promote collaboration between
universities, public agencies and Industries, in term of joint-research, contract research, and technology transfer (TSP, 2011).

**Thailand's labor market**

In regards to its labor regulations (employing workers: score 49\(^1\)) Thailand scores well in Doing Business 2008 in 178 Economies compare to neighboring countries but Malaysia (Score: 43). There is no difficulty to fire a worker (Difficulty of Firing Index = 0) and some level of difficulty to hire one (Difficulty of Hiring Index = 33). Yet, the cost of firing a worker is relatively high. The Firing costs (weeks of wages = 54) (World Bank, 2008).

**Access to Finance: Domestic Investment**

As previously discussed access to finance remains a major obstacle to Thai’s SME development even though the government has established a number of initiatives such as the creation of the SME Bank, the Small Industry Credit Guarantee Corporation, the Venture Capital Fund Management, the Central Credit Information Service Company Limited and the Thai Credit Bureau Company Limited were established to collect and facilitate information sharing for SME. Those efforts are hampered by factors such as the high level of NPL and bank officers’ poor skills (College of Agriculture Banking Reserve bank of India, 2008). Thai performance is poor 86 out of 139 countries (GCI, 2011) in the “the Doing Business, Getting Credit Legal rights index (WB ).

**3.2 Firm Strategy, Structure, and Rivalry**

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\(^1\) employment index (0=no rigidity, 100=maximum rigidity)
Thailand ranks 49 in New Global Competitiveness Index (GCI, 2011) and its business environment is better compare to that of other South East Asian Countries and advanced / medium income countries. Yet, more effort is needed in term of Tariff rate, IP protection and of trade barriers. While it only takes 32 days to start a business in Thailand, it takes on average 156 days to deal with Construction Permits.

**Intellectual Property (IP) Protection**

The IP protection remains a major issue even though many Thai agencies such as the Department of Intellectual Property, the Central Intellectual Property and International Trade Court, and the Office of the Attorney General are in charge in order to enhance trade competition through intellectual Property. In October 2006, Thailand has established an Intellectual Property Center (DIP, 2011) as part of an effort to promote ties with other Asian countries and with the rest of the world.

**Thailand’s trade liberalization**

The Kingdom of Thailand has been a WTO member since January 1995, and has made steady progress in recent years towards trade liberalization, as well as restructuring its public sector and strengthening its financial system. With an average customs tariff-rate of 27%, Thailand remains
a comparatively high-tariff country compared with 14% for Malaysia, 11% for Australia, 9% for South Korea, and 4% for the US (CID, 2003).

**Investor Protection**

In addition to weak IP protection, Thai demonstrates a high distortive effect of taxes and subsidies on competition (83 out of 139 countries), significant prevalence of trade barriers (83 out of 139 countries), a high market dominance by business groups (83 out of 139 countries), and high tariff rate (99 out of 139 countries) (GCI, 2011).

### 3.3 Demand Conditions

Thailand’s GDP per capita has increased significantly and steadily since the late 1990’s demonstrating potential for increased internal demand (World Bank, 2011). Consumers are becoming more sophisticated as well with employment in agriculture down almost seven percentage points from 48.5% in 2000 to 41.7% in 2008 (World Bank, 2011)

Additionally, as can also be seen in Figure 12, the urban population has increased and household consumption expenditure per capita increased by 30% from 2000 to 2008 (World Bank, 2011). Yet while these increases to sophistication are significant they do not set Thailand apart from its neighbors. While internet
subscribers and mobile users have increased by large numbers over the last 10 years they remain behind the levels of Malaysia, and do not show growth rates as high as Indonesia (World Bank, 2011). In order for Thailand to emerge as a competitive location within the ASEAN region, domestic demand needs to grow in sophistication not only overall, but comparatively to its neighbors and other international competition.

3.4 Related and Supporting Industries

Out of 139 countries in the GCI index, Thailand is ranked 34 in the Related and Supporting Industries category. Within this RSI corner of the diamond, two specific contributing factors are lagging far behind the strength of the collaboration in clusters and cluster policy indicators. Thailand lacks availability of the latest technology as well as specialized research and training services, and the poor performance scores in these categories constrain the overall score of the category in the GCI. As mentioned above in section 2, this lack of finance and technical support hinders the related and supporting industries contributing to Thailand’s clusters in general.

Furthermore, a great barrier to the competitive environment of Thailand lies in its demonstrated innovation. Reflected in the patents filed by Thailand from 2001 – 2010 both in the U.S. as recorded by the United
States Patent and Trademark Office (USPTO) as well as internationally as recorded by the United Nations World Intellectual Property Organization (WIPO), Thailand lags behind neighbors and the world in demonstrated innovation. Related and supporting industries can work to improve this innovative capacity because “companies can more readily influence their suppliers’ technical efforts and serve as test sites for new developments, accelerating the pace of innovation” (Porter, 1998). As can be clearly seen in Figure 13, the average number of patents applied for by Thailand from USPTO since 2002 have remained constant while those of neighbors Singapore, Malaysia, and even the Philippines are steadily increasing (USPTO, 2011). WIPO patents are far below Malaysia, Singapore, and India since 2001 (WIPO, 2011). But Thailand started a positive trend in WIPO patents in 2008, and reinforced that trend by joining the WIPO PCT in order to facilitate the application of international patents (WIPO, 2011). This trend suggests that with environmental support for the organizations already filing patents; The Thailand Research Fund, Isuzu Motors Company Limited, Seiko Precision Inc, and Hoya Corporation, Thailand can take advantage of the current spark of innovation.

3.5 Country Level Recommendations

Recommendations to enhance Thailand’s competitive environment can be prioritized into two groups, short term recommendations that leverage existing strengths and potential, and medium to long term recommendations that build on some of the short term factors.

Short Term Recommendations

Stemming from the issues of workforce preparation highlighted in the factor conditions corner of the diamond, Thailand can make a few changes in the short term. These changes would include fostering collaboration between national and international industries and universities as well as
increasing training both at the secondary and tertiary level. These partnerships should foster collaboration between industry and academia, opening

**Table 3: Short Term Recommendations**

<table>
<thead>
<tr>
<th>Category</th>
<th>Recommendation</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>Incentivize companies to devote resources to training staff</td>
<td>Federation of Thai industries, Ministry of Education, Universities</td>
</tr>
<tr>
<td></td>
<td>Strengthen English and ICT skills at the secondary and vocational level</td>
<td></td>
</tr>
<tr>
<td>Collaboration</td>
<td>Intensify collaboration between national universities, industries, and foreign</td>
<td>National Economic Social Development Board (NESDB) Ministry of Education, Federation of Thai industries</td>
</tr>
<tr>
<td></td>
<td>universities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Incentivize local industry players to partner with global industry players</td>
<td></td>
</tr>
<tr>
<td>Credit</td>
<td>Encourage greater domestic consumption through sales promotion and greater</td>
<td>Ministry of Finance, Ministry of Commerce, Office of Small and Medium Businesses, Commercial banks</td>
</tr>
<tr>
<td></td>
<td>access to consumer credit</td>
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<tr>
<td></td>
<td>Increase VC available to fund SMEs</td>
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</tbody>
</table>

communication lines about skills shortages and increasing the expectations of national institutions. Additionally demand sophistication can be spurred in the short term through increased access to consumer credit. This would additionally work to ease financial constraints for domestic investment, an additional issue raised in the factor conditions section. This increase in training will improve the RSI conditions improving and supporting that corner of the competitive diamond. Equally important as these short term recommendations are their implementation and therefore in Table 2 responsible parties and priority levels have been set for each recommendation.

**Medium to Long Term Recommendations**

In order to foster innovation and the related and supporting industries a further recommendation on collaboration will encourage partnerships between universities and the private sector and continue the upward trend of patents coming from recent years. This will strengthen related and
supporting industries both through increased access to the latest technologies as well as by
spurring additional innovation. Finally, government participation will need to be restructured
including regulatory reforms to ease regulations, and alignment of research activities and funding
with competitiveness initiatives. These improvements will increase regulation problems in the
strategy, structure, and rivalry corner of the diamond. In order to bring

Table 4: Medium to Long Term Recommendations by order of priority

<table>
<thead>
<tr>
<th>Category</th>
<th>Recommendation</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>Encourage local universities to collaborate with international universities to incubate frontier technologies funded by the private sector for future tax breaks</td>
<td>National Economic Social Development Board (NESDB) Ministry of Education, Federation of Thai industries</td>
</tr>
<tr>
<td>Government Structure and Policy</td>
<td>Establish a public-private implementation task force to separately address EODB issues; Ease regulation to allow for foreign private equity and venture capital firms; Align government research activities and funding with competitiveness initiatives</td>
<td>National Economic Social Development Board, Ministry of Commerce, Thailand, Thailand Productivity Institute, Ministry of Finance, Social Development Board</td>
</tr>
<tr>
<td>Technical Support</td>
<td>Establishment of regional technology upgrading centers offering technological support, shared facilities, and also specialized grants for SMEs to upgrade their innovation and technological capabilities.</td>
<td>Ministry of Industry, Office of Small and Medium Enterprises, Board of Investment, Federation of Thai Industry</td>
</tr>
</tbody>
</table>

The automotive industry in Thailand has for several decades been a priority sector, and for many years it has been supported and encouraged by the government. Today the automotive industry is the third largest industry in Thailand ($28.34 Bn or 12% of GDP), employing a workforce of more than 300,000 employees (Ernst & Young, 2008). Thailand produced 1,645,304 vehicles in 2010, a 100% growth since 2005 (Thai Automotive Institute, 2011). Thailand is relatively small in terms of global market but as a member of ASEAN, Thailand benefits from the 0-5% tariff effective throughout AFTA in 2010 (Ernst & Young, 2008), enlarging the potential market available to local automotive producers to 500 million consumers. More than 50% of production is exported as Thailand is considered the export base for foreign assemblers for the ASEAN region, which are clustered around Samut, Prakan, and Rayong (Board of Investment, 2007).

There are 3 major segments in vehicle production 1) 4 wheelers 2) 2 wheelers and 3) trucks, which are supported by a network of component suppliers. In terms of overall direction, there are 3 main IFCs working in conjunction with the government agencies mainly Ministry of Industry (MOI) and Board of Investment (BOI). These are other major parts of the cluster are further explained in Figure 14.

Figure 14: Cluster Map

Source: Team Analysis
Three main IFCs collaborate to provide overall direction and support for the Thai automotive industry – Thai Automotive Institute (TAI), Thai automotive Industry Association (TAIA), Thai Auto parts Manufacturer associations (TAPMA), and Federation of Thai Industries (FTI). In 2005, TAI worked with Ministry of Industry to formulate a 5-year plan for the automotive industry. Together with various government agencies, TAI came up with the vision below for Auto Thailand 2011 (Thai Automotive Institute, 2005) (Thai Autoparts Manufacturer Association, 2011)

"Thailand is the automotive production base in Asia that adds value to the country with strong domestic supplier base"

Implementation wise, TAI has been assigned to undertake the master plan for the Thai automotive sector by 1) creating a predictable environment for business operations, including, business intelligence, HR development and local demand stimulation and 2) enhancing competitiveness of the auto parts industry including standardization development, cluster based development, and manufacturing upgrade

The Thai Auto-Parts Manufacturers Association (TAPMA) was created in 1978. It is a union of auto parts manufacturing companies from the private sector to protect, support, and develop Thai industries. It is divided into 7 main functions – planning, academic, economic/tax, export, PR, SMEs cluster and HRD forum.

Passenger cars
The key players in the cluster are 15 foreign assemblers, dominated by Japanese (7) American (4) and European (4). In 2010, Thailand produced 554,267 passenger cars, doubling the 2005 figure (Thai Automotive Institute, 2011). Approximately 300,000 were domestic sales and export accounts for 40% of total passenger car production. Main markets for exports are located in Asia namely the Philippines, Indonesia and Singapore. Emerging demand comes from Australia, the Middle East, and Latin America.

**Motorcycles**

In 2009, there were 7 motorcycle manufacturers in Thailand. The production of motorcycles in Thailand is significant at 1.6 million vehicles per year in 2008. However, the production is decreasing as penetration rate declines. This trend is possibly driven by consumers shifting towards 4-wheelers especially pick-up trucks, as purchasing power increases and car prices drop. Almost a 100 percent of 2 wheeler parts can be produced in Thailand (Ernst & Young, 2008).

**Trucks**

In 2010, Thailand produced 1,090,445 pick-up trucks (66% of total production). Thailand is world’s largest exporter of pick-up trucks (Thai Automotive Institute, 2011). The pick-up truck segment is selected as a focus of favorable government policies. For example, the excise tax for trucks is 3% as opposed to 30-50% for passenger cars in order to boost local consumption. Moreover, there is a natural domestic demand as pick-up trucks offer flexible uses especially in the rural areas where both large families and agriculture products can be transported as the rural road and rail infrastructure are poor. In 2007, Toyota (39% market share) was marginally ahead
of its main competitor Isuzu (36%) and followed by Nissan (4.5%) for pick-up production (Ernst & Young, 2008).

**Component producers**

There are approximately 1,800 components producers in Thailand. The industry is segmented into 3 tiers where tier 1 producers (700) are mainly captive suppliers for the Japanese parent group. The majority of tier 2 and 3 (1,100) are pure Thai owned focusing on replacement parts. According to Japan Automobile Manufacturers Association (JAMA), the quality of automotive parts in Thailand is rated as the best among ASEAN countries. The local part manufacturers supply approximately 80% of all parts used for assembly of pick-up trucks, approximately 55% for passenger cars, and nearly 100% for motorcycles (Office of Industrial Economics, 2006). The value of auto parts exported from Thailand was more than US$4 billion in 2007, a 55% increase over the previous year.

**Thailand Automotive Cluster – Diamond Model Analysis**

We now move on to assess the business environment surrounding the Thailand automotive cluster, as can be seen from Figure 15 below and look deeper at the cluster’s competitiveness using the diamond framework. Here, we will analytically provide an assessment...
into the four broad attributes of the automotive cluster in Thailand that shapes the local business environment in which automotive assemblers and auto-parts manufacturers compete. On each of these factors we would attempt to analyze both the positives and negatives that either promote or consequently impede the competitive advantage of the cluster.

4.1 Demand Conditions

The automotive sector in Thailand continues to show robust growth in demand, partly fueled by the strong economic performance of the Thailand economy as highlighted in the earlier part of this paper (Thai Automotive Institute, 2011). There was a significant leap in domestic demand for passenger cars for the year 2010 when sales picked up by 53.4% as compared to the previous year as illustrated in Figure 16. Thailand was the leading automotive growth market for Southeast Asia in total vehicle sales in 2010 with 800,357 units, compared with Indonesia's 764,088 and Malaysia's 605,156 (Ploy Ten Kate, 2011). The figure topped a previous all-time sales peak of 703,432 vehicles in 2005. From 2005 onwards, domestic sales have been on a steady decline to 238,773 units in 2009 but rising to 362,561 units in 2010 (Thai Automotive Institute, 2011). The remarkable growth in 2010 was due in part to the reduction in excise duties for small passenger cars. The added advantage of credit availability was also instrumental in increasing demand through credit sales (~80% Hire-Purchase or Leasing).
Furthermore, the domestic automotive market is assisted by the improving levels of personal income and decent road infrastructure in parts of the country. As can be seen in Figure 17, Thailand has the highest number of per capita car density in ASEAN excluding Singapore, of 62 passenger cars in use per 1000 people in 2009, ahead of China, Indonesia and India. Nonetheless, the domestic market is not as mature as countries like Malaysia, where vehicle ownership is quite high.

The strong demand on the automotive assembly side is also fueling the growth for auto-parts manufacturers. Demand for auto-parts has been very strong and is expected to continue to rise to meet domestic as well as export demand.

4.2 Related and Supporting Industries

Main auto part related endowments such as rubber, plastic, and metal are available in Thailand. According to a study done by National Economic and Social Development Board, Thailand is relatively competitive in rubber and plastics but not metal. Thailand also possesses a wide network of part producers. The most dominant company that illustrates Thai network comprehensiveness is Thai Summit Group

**Thai Summit Group**
Thai Summit group (TSG) is a leading auto parts maker, as it supplies to leading OEMs ranging from Toyota and Mitsubishi to Mercedes Benz and Volvo. TSG works not only in Thailand but also Malaysia, India, China, and Japan through its 20 subsidiaries in most automotive product categories such as press parts, injection parts, aluminum die casting for passenger cars, 2 wheelers and pick-up trucks. In 2006, TSG made an aggressive investment on Thai Eco-car project opportunities as guided by BOI incentives to make Thailand a production hub for fuel-efficient cars. In 2010, the consolidated revenue (non equity adjusted) of TGS was almost USD 2 billion at 2011 exchange rate (The Nation, 2011).

Despite the success of TSG, there are certain component parts that Thailand is lacking or is uncompetitive. The government, especially BOI is aware of this gap and has indicated that Thailand will attract more players specifically in moulds & dies, fuel injection pumps, transmissions, injection nozzles, anti-lock braking systems, and central locking systems, among numerous other products. More R&D, design, and testing centers are also needed.

Many banks including Thanachart, Toyota leasing, and SCB leasing are visibly targeting auto loans boosting the demand for automotive manufacturing. In 2009, it is estimated that the market for auto financing in Thailand was $1 Billion.

In terms of logistical infrastructure, Thailand has a deep-sea port in Rayong, located near industrial estate hosting Ford/ Mazda and BMW plants for ease of exporting heavy products including automotive components.
4.3 Factor Input Conditions

Thailand has a well-established transport infrastructure that enables high-density vehicles on its roads. For The World Economic Forum’s Global Competitiveness Report 2010-2011, Thailand was ranked 36th with a score of 5.1 over 7 on Quality of Roads, ahead of China (56th) and Indonesia (84th). Where roads were not so developed, 1-ton pick-up trucks are the more popular choice.

While Thailand has an adequate low skilled labor force, it faces an acute shortage of highly skilled automotive engineers. There are also a limited number of higher education programs and courses available from local universities in Thailand whilst there are sufficient vocational training courses provided by vocational training schools in the greater Bangkok area. It is expected in 2010 that there would be a critical shortage of 10,300 automotive engineers while the educational institutes will only meet this shortage with 3,360 graduates, as illustrated in Figure 18 (Federation of Thai Industries, 2009). There will still be a shortfall of 6,940 automotive engineers to meet industry needs in Thailand. This shortfall is further exuberated by the long lead-time taken to fill a skilled production worker. This has resulted in a lack of capable skilled manpower in Thailand in recent years – we anticipate this gap to further widen in the near future and automotive companies will have to hire more expensive foreign skilled workers from neighboring countries like Malaysia and Indonesia, increasing their labor cost.
There is also a lack of innovation capacity in the automotive cluster in Thailand due to the lack of knowledgeable and trained personnel as illustrated in Figure 19. 42.7% of the companies cited this as their primary reason while 43.6% cited high cost of financing for innovative activities as another factor (World Bank, 2007).

4.4 Context for Firm Strategy and Rivalry

The Thai automotive cluster has been moving towards more open policies. Since 1962, the cluster started based on protectionism and local content requirements. It was in the 1980s that the country saw gradual liberalization in trade and FDI as part of the ASEAN and AFTA integration. Currently, there is no restriction foreign ownership and the tariff was brought down to 0-5% on auto parts. The top 3 selected competitors in Thai automotive are 1) Toyota 2) Auto Alliance and 3) Honda Thailand.

Toyota Motors Thailand

Toyota Thailand was established in 1962, the same year as Nissan Thailand. In 2009, Toyota had the production capacity of 392,000 vehicles per year, with the expansion plan to raise capacity up to 550,000 vehicles per year in 2011. Toyota dominates the Thai market both in the passenger car and truck segments. It does not produce any 2 wheelers (Ernst & Young, 2008).
Auto Alliance (Ford and Mazda Thailand)

The auto alliance of Ford and Mazda is the latecomer into the Thai market, arriving in 1995, but is growing capacity rapidly. In 2009, its production figure of 116,000 vehicles per year in 2009, with a plan to increase capacity to 425,000 vehicles per year in 2011, surpassed Honda, Mitsubishi, and Isuzu to be the second largest assembler in the market (Ernst & Young, 2008).

Honda Thailand

Honda Thailand was established in 1984. The company has been visibly focusing on passenger cars and 2 wheelers more than pick-up trucks. In 2009, Honda produced 160,000 vehicles per year and expected to increase capacity to 240,000 vehicles per year in 2011. Honda has the highest market share of 70% in motorcycle market in Thailand (Ernst & Young, 2008).

Issues and Future Challenges.

Thailand's auto industry faces some challenges in the future. Despite constant influx of FDI and favorable government policies, Thailand has a market share of about 1% both in auto assembly and parts in 2007. The growth in the world market share has been lower than 1%. Moreover, the competition from its regional neighbors including Vietnam and Indonesia is a major challenge. The automotive industry ought to increase quality of locally made components to enhance productivity and boost its innovative capacity.
4.5 Recommendations

The Thai Automotive Cluster has developed significantly over the past two decades, when the government began opening up the industry and welcoming competition. This has boosted the cluster with significant direct investment. Nonetheless to move forward we recommend that the government implement the following:

Table 5: Short Term Recommendations by order of Priority

<table>
<thead>
<tr>
<th>Focus Areas</th>
<th>Recommendations</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address the acute shortage of Specialized Skilled Manpower and close of gap of mismatch between manpower skills and company needs</td>
<td>Increase University-Level Automotive Engineering Programs with specialized expertise in corporation with manufacturers</td>
<td>Ministry of Industry&lt;br&gt;Ministry of Education</td>
</tr>
<tr>
<td></td>
<td>Intensive collaboration between national universities, industries, and foreign universities</td>
<td>Ministry of Industry&lt;br&gt;Ministry of Education&lt;br&gt;Federation of Thai Industries</td>
</tr>
<tr>
<td>Spur immediate (mid- impact) Innovation within Automotive Cluster</td>
<td>Provide grants and tax credits for innovation related activities in the Automotive Sector</td>
<td>Ministry of Finance&lt;br&gt;Ministry of Industry</td>
</tr>
<tr>
<td></td>
<td>‘Parachute’ (and incentivize adequately) world-class research scientist into local research institutions.</td>
<td>Ministry of Foreign Affairs&lt;br&gt;Ministry of Education&lt;br&gt;Thai Association of Automotive</td>
</tr>
</tbody>
</table>

Table 6: Long Term Recommendations by order of Priority

<table>
<thead>
<tr>
<th>Focus Areas</th>
<th>Recommendations</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build world-class testing center to support quality control of new innovation</td>
<td>Public – private ownership to build a comprehensive testing center that cluster now lacks</td>
<td>3 IFCs&lt;br&gt;Ministry of Industry</td>
</tr>
<tr>
<td>Financing availability for innovation driven activities within the Automotive cluster</td>
<td>Allocation of government funding for ‘incubator’ early stage capital for automotive start-ups</td>
<td>Ministry of Finance&lt;br&gt;Ministry of Industry&lt;br&gt;Stock Exchange</td>
</tr>
</tbody>
</table>
**Required Disclosures:**
One team member, Pita Limjaroenrat, is a national of Thailand.
Non-public information has been used in the preparation of this report. Information from some slides come from a previous consultant report to BCG knowledge management group.
No member of the team has travelled to Thailand during the project period.


**References:**


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