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Towards the Detroit of Asia: Empirical research insights of Thailand's OEM strategy

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ABSTRACT

The automotive industry is one of the strategic clusters of Thailand. This study explores Thailand's national innovation system (NIS) strategy and cluster policies in driving the automotive industry towards the Detroit of Asia. The analysis of automotive cluster is based on Porter's Diamond Model and NIS framework. Unlike other Asian countries that competed and moved forward with the own brand manufacture (OBM) strategies, Thailand took a different NIS approach in competition to become the automotive manufacturing hub of Southeast Asia. The results provide lessons and insightful strategic implications for other newly industrialized countries (NICs) attempting to move up the technological ladders.

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1. Introduction

"Thailand is a global green automotive production base with strong domestic supply chains which create high value added for the country."

[Vision of the Thai automotive industry in the year 2021
 Thailand Automotive Institute, Ministry of Industry]

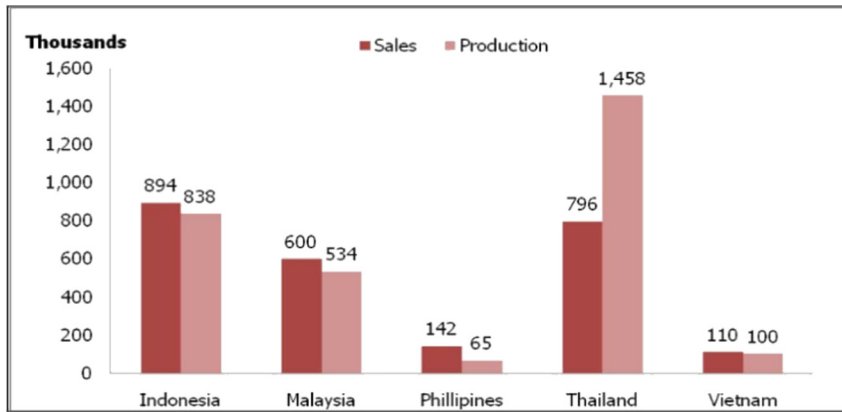
Thailand was ranked in the 30th position according to the International Institute for Management Development (IMD) World competitiveness Yearbook 2015 and 31st according to 2015 World Economic Forum (WEF) global competitiveness index. It is one of Asia's Newly Industrialized Countries (NICs) that is classified as an efficiency-driven economy and has a prospect in moving towards an efficiency-driven economy in the near future. Thailand is a leading global automotive manufacturer. Its automotive industry is one of the strategic clusters of Thailand accounting for 10% of the gross domestic product (GDP).¹ Fig. 1 compares vehicle production and sales volume of Thailand among ASEAN countries in 2012. The automobile production volume, sales to the domestic, and export markets from the years 1996–2012 can be seen in Fig. 2. These figures have shown that Thailand has the strongest growth of auto production base in the Southeast Asian region, driving the country to become the Detroit of Asia.

This study is concerned with Thailand's strategy towards the Detroit of Asia. Following the introductory section, Section 2 reviews the theoretical framework on Porter's Diamond Model, cluster policies, and the national innovation system (NIS). Section 3 explains the methodological framework. Section 4 presents the analyses of findings with a particular focus on exploring the

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¹ Thailand Board of Investment.



Source: ASEAN Automotive Federation (AAF)

Fig. 1. Vehicle production and sales volume of Thailand among ASEAN countries.

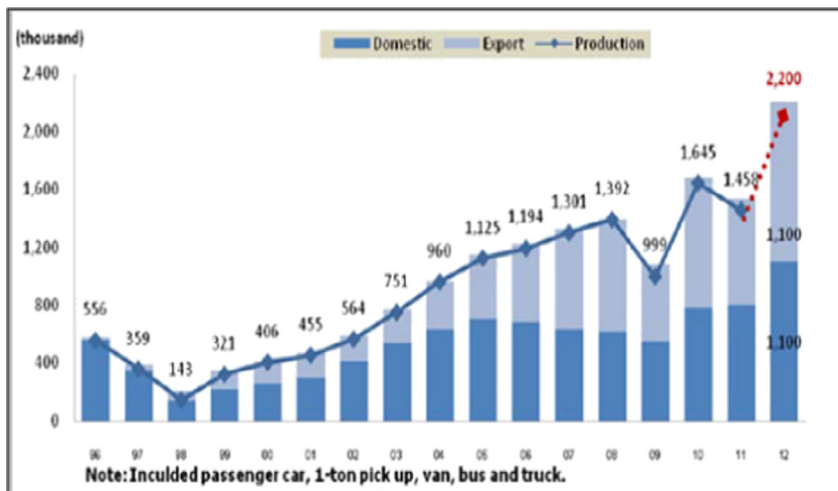
strategic path of Thailand in becoming the automotive manufacturing hub of Southeast Asia and the Detroit of Asia. Policy implications behind Thailand’s NIS strategy and automotive cluster competitiveness as well as conclusions are drawn in Section 5.

2. Theoretical framework

2.1. Porter’s diamond model—cluster policies to strengthen the national innovative capacity

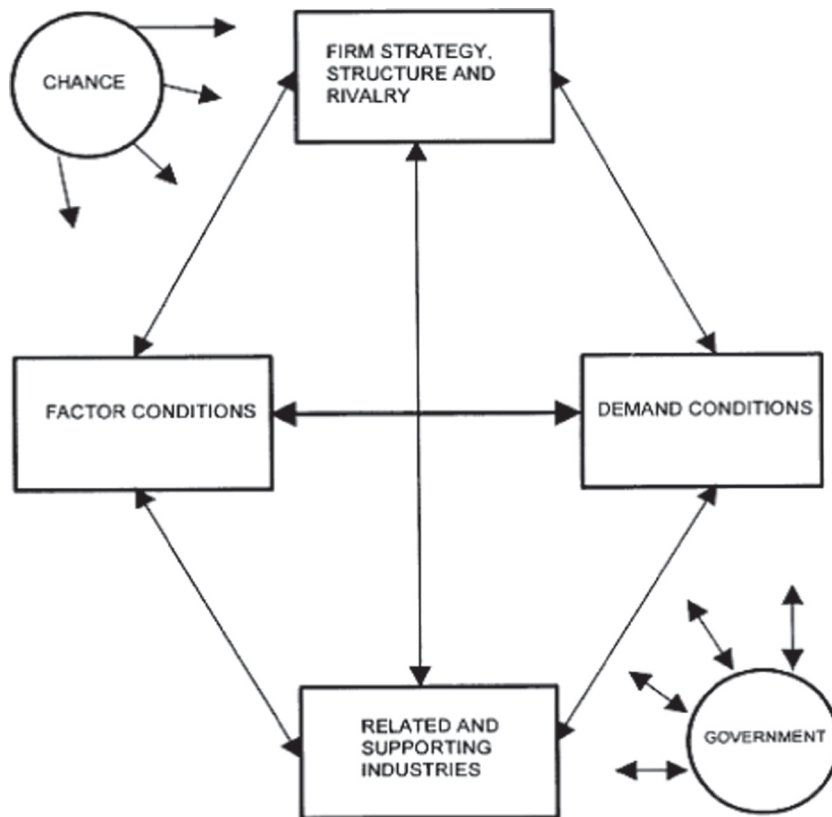
The rise of high technology clusters started with Michael Porter’s ‘Competitive Advantage’ in 1985 (Porter, 1985). Porter, the most influential management analyst of Harvard Business School, who is frequently cited in a conceptual thinking of ‘competitive advantage’, argues that the cluster of collaborating businesses helps in the rapid dissemination of innovations. The cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities (Porter, 1990, 2001). The concept of ‘clusters’ promotes collaboration among institutions to facilitate the exchange of information and technology.

Porter’s Diamond model emphasizes the role of government in creating an environment conducive to national competitive advantage. Porter argued that the interactions between the various agents of the nation help achieve considerable synergy. The underlying benefits of clusters also include collective learning and knowledge spillovers among participating institutions. Porter’s Diamond model (Fig. 3) provides a framework for understanding collaboration/networking between the government and industry sectors in the form of clusters (Porter, 1990, 2001). The four attributes (1—factor conditions, 2—demand conditions, 3—context for



Source: Thailand Automotive Institute, Ministry of Industry

Fig. 2. Automobile production volume, sales to the domestic and export markets.



Source: Porter (1990, 2001)

Fig. 3. Diamond model—the model of cluster determinants.

firm strategy and rivalry, and 4—related and supporting industries) are self-reinforcing and catalyze the process of continuous innovations. The model focuses upon the conditions that drive national innovative capacity (Porter, 1985, 1990, 1998, 2001).

Malerba (2002) proposed the concept of sectoral innovation system to explain the performance of clusters or specific industrial sectors. Saxenian (1990, 1994, 2007) coined a similar concept of regional advantage to promote the clusters/regional networks or network-based industrial system. Taking into account the role of cluster polices, clusters drive innovation and innovation drives productivity, which in turn have influences on economic development and national competitiveness (Broekel, Fornahl, & Morrison, 2015; Lai, Hsu, Lin, Chen, & Lin, 2014; Porter, 1985, 1990, 1998, 2001).

2.2. National innovation system

The concept of national innovation system (NIS) stresses the importance of networking among the actors and institutions. In other words, NIS is the interactive system of existing institutions, private and public firms (either large or small), universities, and government agencies, aiming at the production, diffusion, and exploitation of knowledge within national borders (Freeman, 1987; Lundvall, 1992, 1998, 1999, 2003; Mahroum & Al-Saleh, 2013; Nelson, 1988, 1993; Samara, Georgiadis, & Bakouros, 2012). Interactions can be achieved by both market mechanism and non-market mechanisms such as collaboration and long-term network arrangements. The NIS concept is a dynamic tool to investigate, formulate, plan, and position the national economic and social development by using technology and innovation as the main driving force (Lundvall, 1992, 1998, 1999, 2003).

An understanding of NIS can help policy makers develop approaches to enhance the nation's innovation performance. The NIS studies explore the interrelations between technological development and the institutional embeddedness of innovative organizations (Freeman, 1987, 1988, 1992; Lundvall, 1992, 1993, 1998, 1999, 2003; Nelson, 1988, 1993; Samara et al., 2012; Mahroum & Al-Saleh, 2013 among others). The level of resources devoted by each nation to research and development (R&D) and innovative activities represents a basic characteristic of the NIS (Lundvall, 1992; Mjøset, 1992; Nelson, 1993). Determinants of national economic performance and technological capabilities are the size of a country, R&D intensity, and market structure (Archibugi & Michie, 1997; Freeman, 1987).

In the innovation management practice, Schumpeter (1939, 1967) provides a theoretical basis to understand the S-curves of innovation or trajectories of technological development. Freeman (1987, 1988, 1992) and Lundvall (1992, 1993, 1998, 1999,

2003) are the pioneers in the field arguing that the progress of NIS among developed and developing countries differs in terms of specialization in innovative capabilities, production, knowledge sharing, and learning process. The NIS comprises specific institutional frameworks and interlinkages with financial markets, government agencies, institutions, regulatory authorities, and research organizations to support innovation activities and strengthen technological capabilities at sectoral and national levels (Archibugi, Howells, & Michie, 1999; Iyer, 2016; Keller, Markmann, & von der Gracht, 2015; Malerba, 2002; Patel & Pavitt, 1994; Pavitt, 1984). The concepts of Porter's cluster or Diamond model (Porter, 1985, 1990, 1998, 2001) and NIS are thus similar as they provide essential tools to understand the structure and dynamics of an innovation system.

3. Research methodology

While the research in strategies and innovation system are already voluminous, there is a dearth of study focusing on the links between the cluster policies and their impacts on the progress and development of the national innovation system. Therefore, this study attempts to fill a gap in this neglected area with a focus on the cluster policy in driving Thailand's automotive industry towards the Detroit of Asia. This research employs a case study methodology (Eisenhardt, 1989; Yin, 2013). The analysis is based on the construct of Porter's Diamond model.

The study attempts to answer the research question: What are the strategies/policies in driving the automotive industry of Thailand? The analyses of findings provide insights behind Thailand's adoption of the different approach to compete in the automotive industry. The research employed semi-structured questionnaire and conducted 28 in-depth interviews. The interviews were carried out with companies in the automotive industry, government agencies, research institutes, and professors in the field. The interview data were supported by an examination of secondary data in order to provide a cross check on the validity of research (Yin, 2013). The research findings provide evidence-based lessons and experiences that can be applied to other developing economies under varying implementation environments.

4. Analyses of findings—Thailand's strategies towards the Detroit of Asia

4.1. Automotive industry of Thailand

The automobile production in Thailand began in 1961 when the Thai government attempted to transform the country from agriculture-based to industrial-based economy. The government placed emphasis on automobile manufacturing under import substitution regime. In Thailand, the automotive industry (vehicle and auto parts) is one of the key sectors generating export revenues. Fig. 4 lists top 10 global automobile manufacturers in 2013. It can be seen that Thailand was ranked the 9th position among the top car manufacturers worldwide.

Fig. 5 gives an overall picture of the roadmap to drive the automotive industry of Thailand. Fig. 6 depicts the structure of the Thai automotive industry comprising assembly companies, Tier 1 and Tier 2 companies.² Currently, Thailand has 709 Tier 1 auto parts suppliers, 1700 Tier 2 and 3 suppliers, and is one of the world's largest manufacturers of one-ton pickup trucks.³ It is argued that the success of the Thai automotive cluster is not accidental but is instead a result of continually conscientious efforts of the government through phased National Economic and Social Development Plans.

The Ministry of Industry has formulated the Master Plan for Automotive Industry to guide the direction of the Thai automobile sector for the years 2012–2016. The government has set out Thailand vision 2021 to be a global production base, to build the supply chain, and to generate value-added and environmentally friendly production. The government aims to achieve this vision by pursuing the following strategies:

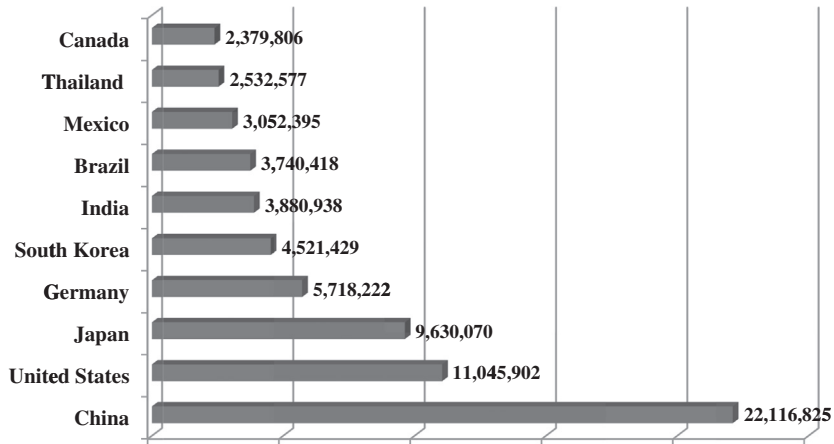
- Strategy 1 Excellence in research and technology development
- Strategy 2 Excellence in human resource development
- Strategy 3 Fostering entrepreneurship
- Strategy 4 Creating an appropriate infrastructure
- Strategy 5 Creating a positive environment through public policies and policy integration

The Thai government plans to achieve the following key goals which are set out in the Master Plan for Automotive Industry (Thailand Automotive Institute, 2012):

- To be the center of automotive manufacturing in the world
- To be the center of good automotive business environment
- To be one of the main industries breaking out the country's middle income trap

² Tier one companies are original equipment manufacture (OEM) suppliers. Tier two companies are suppliers of auto parts to tier one suppliers. Tier three companies are suppliers to Tier two firms.

³ Thailand Board of Investment.



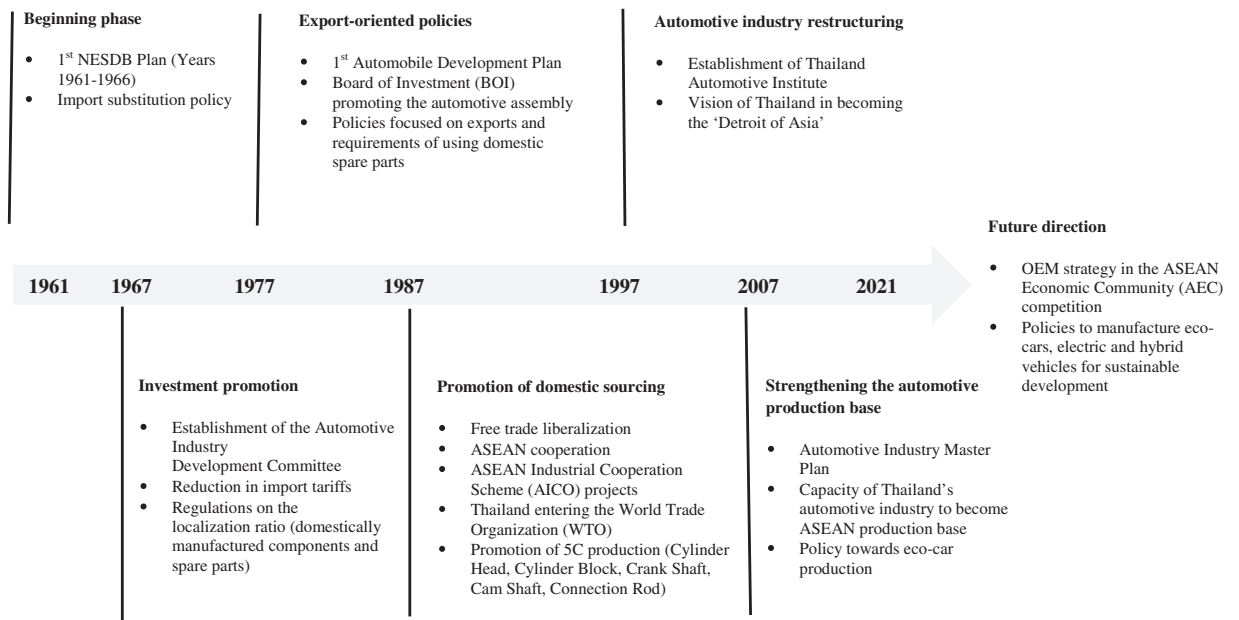
Source: International Organization of Motor Vehicle Manufacturers

Fig. 4. Top 10 global automobile sales in 2013 (units).

4.2. A different approach towards competitiveness of Thailand

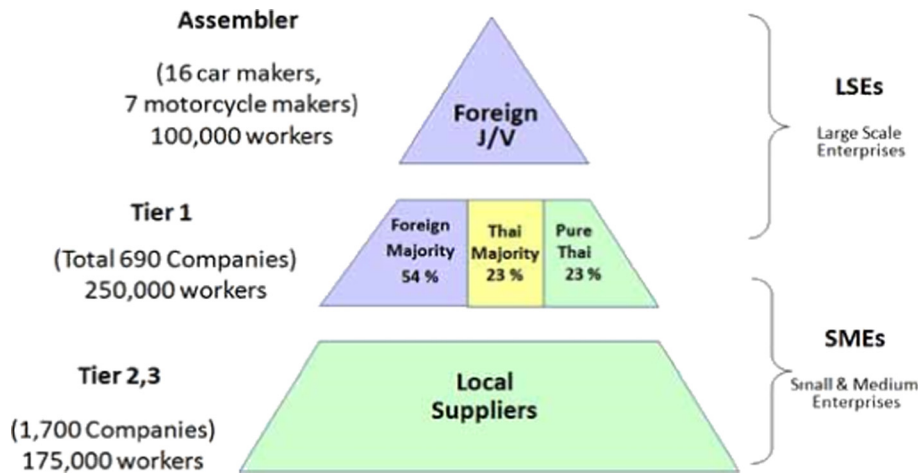
The analyses of the national capacity of Thailand's auto industry (Fig. 7) are based on Porter's Diamond Model (Porter, 1990, 2001). The Thai government pursued a different national innovation system (NIS) strategy in market competition. The government has promoted the establishment of industrial clusters covering the production base of pickup trucks, passenger cars, and eco-cars. The public policy is focused on original equipment manufacture (OEM), whereby the government has introduced various policies and incentive schemes to strengthen the automotive cluster. The ASEAN Free Trade Area (AFTA) agreement and the ASEAN Economic Community (AEC) integration offer new challenges and export opportunities for Thailand to compete in wider markets of Asian countries.

The Thai government pursued the clustering strategy in moving towards the automotive manufacturing hub of Southeast Asia and the Detroit of Asia (following the flourishing automotive industry of Detroit in the United States) (Fig. 8). Seeing the



Source: The author's design, based on Thailand Automotive Institute, Ministry of Industry

Fig. 5. Roadmap to drive the automotive industry of Thailand.



Source: Thai Autoparts Manufacturers Association

Fig. 6. Structure of the Thai automotive industry.

automotive industry as a strategic cluster that can strengthen the national innovation system (NIS), the government enacted policies focused on attracting multinational car manufacturing companies to set up plants in Thailand. The car production base is mainly clustered in the eastern Bangkok (Ayudhaya, Chonburi, Rayong, Chachoengsoa, Samutprakarn, Samutsakorn, and Patumthani). The automotive cluster comprises major automobile assembly and automotive manufacturing companies such as General Motors, Ford, Toyota, Isuzu, Mitsubishi, Nissan, BMW, Fiat, Honda Automobile, Hino, Suzuki, Mazda, Mitsubishi, Chevrolet, Volvo, Mercedes-Benz, and Tata Motors.

It is interesting to see that Thailand took a different approach in attaining and sustaining competitiveness of its automotive industry. Thailand's NIS approach and clustering strategies diverged from the patterns of other major Asian countries in their technological catch-up paths (Fig. 9). Taking into account the case of South Korea, the government has moved beyond 'copy and development' in attempts to transition to the industrialized economy. The auto industry benefitted from the government Chaebol policy (cluster policy) and various incentive mechanisms supporting technology transfer and assimilation of foreign technologies. Hyundai successfully moved from an assembler for Ford Motors and became a producer of its own brand auto (Kim, 1997). The process of technological catch-up has shown the path of moving away from original equipment manufacture (OEM) to own design and manufacture (ODM) and own brand manufacture (OBM). Currently, Hyundai Motors is one of leading automobile manufacturers worldwide who competes head-on with leaders in the global automotive industry.

The process of technological catch-up is similar in South Korea's electronics industry. Samsung initially carried out OEM manufacturing but later improved its R&D and progressed to ODM and OBM. In the case of Taiwan, the government pursued a similar path of technological catch-up. The Taiwanese government has transformed Taiwan's research capability from a 'follower' to a 'pioneer' through assimilating foreign technologies and deepening local technological capabilities. The success of Taiwan's electronics industry is mainly attributed to the establishment of the Industrial Technology Research Institute (ITRI), Hsinchu Science and Industrial Park and the reversed brain drain of high-tech engineers. Taiwan now competes globally in the electronics market under its own brand like Acer, HTC.

In the neighboring country like Malaysia, this path has just begun. The Malaysian government introduced National Automotive Policy (NAP) to support the national car projects of Proton and Perodua. In pursuing the OBM strategy, the government has enacted preferential tax policies by increasing import duty and taxes up to 300% in order to protect its national car projects (Jayasankaran, 1998).

The empirical analysis has shown that the government policy of Thailand in early years is similar to other Asian countries. That is to say, the public policies of South Korea, Taiwan, Malaysia, and Thailand focus on foreign direct investment (FDI) inflows and export-oriented industrialization in the initial stages of economic development. Nevertheless, while the NIS strategies of other Asian countries followed the path from original equipment manufacture (OEM) to own design and manufacture (ODM) and finally own brand manufacture (OBM), Thailand moved forward in its own way. The Thai government has decided not to move forward to the third stage—the own brand manufacture (OBM) in the catch-up process.

Taking into account the different NIS approach of Thailand in competing in the automotive industry, its strategic direction is different from South Korea and Malaysia. The Thai government has decided to place emphasis on attracting foreign investors to set up their production bases in Thailand but not to create a 'national car program' in the same way as South Korea and Malaysia do. Thailand uses the OEM strategy to attract foreign automotive companies so as to build vehicle assembly and automobile production plants in the country. Nevertheless, whether it is the right time for Thailand to pursue an OBM strategy like its competitors, there are many considerations that the Thai government needs to take into account. Table 1 provides insights into Thailand's NIS approach in driving its automotive industry.

Chance

- ASEAN Economic Community (AEC) integration opens up a wider market opportunity
- Trade liberalization under ASEAN Free Trade Area (AFTA) agreement

Factor conditions

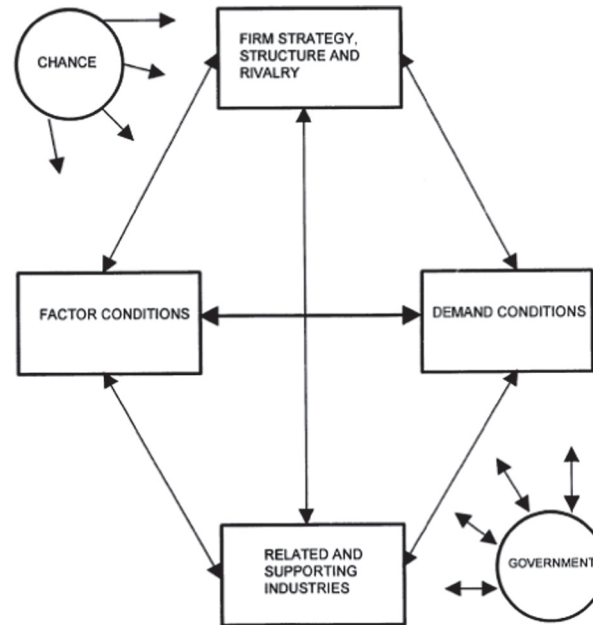
- Strategic location of Thailand at the centre of Southeast Asia
- Sound infrastructure support
- High dependency on auto parts imports due to a lack of domestic upstream industries to supply raw materials and parts

Related and supporting industries

- The Thai Automotive Industry Association and the Thai-German Institute help support the development of automobile industry
- The universities cannot produce graduates with high skills to meet the demand of the auto industry
- Lack of research institutes specialized in automotive industry in terms of R&D, design, and production to lower costs and improve quality

Firm strategy, structure and rivalry

- Fierce competition in the OEM market as the global car manufacturers locate their production bases in Thailand
- Increasing competition between domestic auto parts manufacturers and low cost competitors from foreign countries like China, India



Demand conditions

- High growth of domestic and foreign markets
- The first tier (Tier 1) suppliers place a greater emphasis on product and service quality, thereby raising the production

Government

- Export-oriented policy to reduce imports
- Policy measures to support the automotive industry through the Thai Automotive Master Plan
- First-car tax rebate policy helps expand the growth of the automotive industry

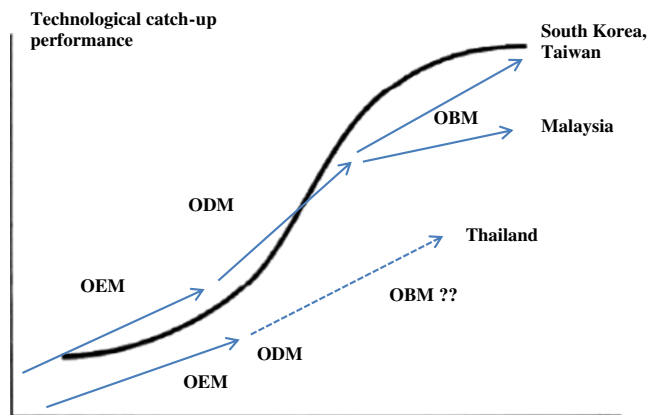
Source: The author's design, based on the framework by Porter (1990, 2001)

Fig. 7. Analysis of the national capacity of Thailand's auto industry.



Source: The author’s design, based on Thailand Automotive Institute, Ministry of Industry

Fig. 8. Clustering strategy in driving Thailand towards the Detroit of Asia.



Source: The author’s design

Fig. 9. Patterns of technological catch-up process in some Asian countries.

Table 1
Summary of interviews

Empirical research insights of Thailand's OEM strategy
<p>- National innovation system (NIS) policies and strategies It is recommended that if Thailand would pursue an own brand manufacture (OBM) strategy to build its own auto, the government needs to introduce policy measures that restrict competition from abroad. The government needs to use direct and indirect measures to lower taxes imposed on domestic cars, encourage technology transfer, provide R&D incentives and financial assistance to firms in the automotive supply chains, and improve the investment environment. However, the interviewees suggest that the Thai government should take careful consideration in protecting its market from competitors. They point out the case of Malaysia whereby the government protection strategy does not lead to innovation nor quality improvement of Proton car.</p>
<p>- Focus on R&D investments Almost all interviewees including experts in the Thai automotive industry stated that Thailand needs to, in a first step, improve its technological capabilities through R&D investments. In encouraging R&D activities, the Thai government should provide reduced interest rates on loans to automotive producers, especially small- and medium-sized enterprises (SMEs), either as suppliers of automotive parts or components to the Thai auto industry.</p>
<p>- Automotive manufacturing costs The Thai automotive industry at present has to import 90% parts from overseas. The situation has indicated that it seems almost impossible for Thailand to pursue an OBM strategy effectively. To stay competitive in the marketplace, Thailand needs to undertake R&D investments focused on lowering automotive manufacturing costs. The interviewees pointed out that in current market competition, no auto companies can compete with Toyota in terms of lowest manufacturing and production costs even they have followed the Toyota production system.</p>
<p>- Difficulties in market competition It seems difficult for Thailand to enter the auto market without the capacity to reduce the automotive manufacturing costs. Given that the automotive industry is a high value-added cluster, the quality improvement is important to achieve market acceptance. To compete successfully in the market, it means that the government should pay attention to creating a differentiated car. However, it may not be easy to persuade the consumers in the market to move from a well-established brand to Thai brand even the Thais themselves. Some interviewees raised a case of Proton in the Malaysian automotive industry. Proton is still not able to compete with the foreign auto companies since it is perceived as low-quality car.</p>
<p>- Human capital formation Thailand needs to firstly invest in education in order to produce more highly skilled workers for the automotive industry. As a middle-income trap country, the government policy should focus on training unskilled labor to have required knowledge and skills for the high-technology industry like the auto industry (in the same way like what South Korea has done in the past).</p>
<p>- Interactions among academia, public, and private sectors There are some universities offering automotive engineering and other mechanical engineering degree courses in Thailand. However, this is not enough in terms of quantity and quality. At present, the universities cannot produce graduates with high skills to meet the industry demand. The universities should undertake R&D in collaboration with the industries. The capacity of the Thai automotive industry depends on effective interactions among the universities, public research institutes and private sectors to support technology transfer and R&D industrialization.</p>
<p>- Political instability Although Thailand is located at the centre of Southeast Asia, the country cannot take advantage of its location to grow GDP and its economy. Thailand's economy suffers from chronic political unrest which has caused foreign companies to withdraw investments. In promoting the automotive industry, it is recommended that Thailand needs to stabilize the political situation. It is important to provide a safe economic environment with enabling political environment to attract FDIs.</p>

Source: The author's design (summarized from interview data).

The analysis has shown insightful implications of the NIS approach. Thailand has been successful in its automotive development. The country has been recognized as 'the Detroit of Asia' where the major car manufacturers have already established and set up subsidiaries in Thailand. Given the strength of the automotive industry in Thailand, the government is reluctant to follow the same path like other Asian countries in the process of technological catch-up. The political tension in Thailand would obstruct the technological catch-up path if Thailand would like to follow South Korea or Malaysia.

Given that the Thai automotive industry depends largely on imports of machinery, equipment and production technologies, the future path in building a car of its own seems difficult. One of the problems is that the country lacks low cost inputs to compete with cost advantage. Moreover, its low level of R&D investments and passive learning would discourage the country from pursuing OBM strategy (the percentage of R&D investments to GDP in the past 20 years ranged from 0.20 to 0.25). Even though the Thai government, through the 12th Economic and Social Development Plan, aims to increase R&D investments to 1% of GDP in the year 2016, it might take some time to realize the impacts of R&D investments. Many interviewees mentioned the success case of Singapore, one of the developed countries in the world, with regard to its public policy implementation. Singapore herself is more ready than Thailand in terms of R&D investments, human capital, and developed infrastructure. The Singaporean government has not followed an OBM strategy but still become very successful.

A policy analysis perspective reveals that the direction of Thailand's NIS is changing slowly. At present, the Thai government is focused on a near vision of the ASEAN Economic Community (AEC) market, which allows free trade and a growing market opportunity. As the automotive industry is moving towards the trend of eco-car manufacturing, the Thai government plans to focus on quality improvement in auto production. Thailand is continuing to pursue the OEM manufacturing strategy to attract more investors in attempts to stay competitive in the automotive market after AEC integration.

5. Policy implications and conclusions

The automotive cluster plays a strategic role in the economic growth of Thailand. The central message in this paper is that Thailand has pursued a different national innovation system (NIS) approach in competition to be the automotive manufacturing hub of Southeast Asia. The study analyses the NIS strategy and cluster policies in driving the Thai automotive industry towards the Detroit of Asia. The empirical analyses are based on Porter's Diamond Model and NIS framework. The analysis reveals Thailand's

different strategy in the process of technological catch-up. While other Asian countries competed and moved forward with the own brand manufacture (OBM) strategies, Thailand took a different approach in attaining and sustaining competitiveness of its automotive industry.

This research attempts to fill a gap in existing literature concerning the links between the cluster policies and their impacts on the progress and development of NIS. The study provides important insights of Thailand's NIS approach. Arguably, the success of the automotive cluster of Thailand is not accidental but results from continually conscientious efforts of the government through phased National Economic and Social Development Plans. The NIS of Thailand is currently changing slowly as the country aims to continue the OEM strategy under AEC market integration. The study offers policy lessons and insightful strategic implications for other newly industrialized countries (NICs) in moving up the technological ladders to strengthen their NIS.

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