CHAPTER 1

INTRODUCTION

1.1 Importance of FDI and Its Effects on Technological Progress of Local Suppliers

The literature suggests that cross-country differences in economic development (measured by per capita income) are driven by differences in technological progress (Romer, 2001; and Barro and Martin; 2004). As a result, the countries generating new technologies have faster economic growth and productivity than the poor countries (Lederman and Maloney; 2003).

Over the past three decades, governments in developing countries have realized importance of technological progress that drives economic development. They have changed their attitude from local industrial protection toward foreign direct investment (FDI), specifically through multinational enterprises (MNEs), because FDI can facilitate the industrialization process of host countries by bringing in not only capital, but also technology transfers, which are necessary for developments in manufacturing and agriculture (Hill and Athukorala; 1998, Lederman and Maloney; 2003, Brooks et. al. 2004, and Kohpaiboon; 2005).

According to previous studies (Hill and Athukorala, 2001; Belderbos et. al., 2001; and Kohpaiboon, 2005), entries of MNEs generate the linkage effect[1] on host countries. The linkage effect is creations of interrelationships between MNEs and local suppliers. The creations of upstream and downstream relationships mean that local suppliers have more opportunities to obtain new technologies from MNEs. However, previous studies emphasize on backward linkages because they generate technological benefits to local suppliers (Hill and Athukorala; 1998, Techakanont, 2002; Lederman and Maloney; 2003, and Brooks et. al. 2004).

[1] Linkages can take several forms, which are backward, forward, and horizontal linkages. Backward linkages occur when MNEs acquire goods or services from local suppliers. Forward linkages occur when MNEs sell goods or services to local suppliers. Horizontal linkages occur when MNEs interact with local suppliers engaged in competing activities (United Nations Economic Commission for Europe, 2001).

The direct effect of backward linkages raises output and employment in linked local suppliers. However, indirect effects on supplier capabilities are more important. Backward linkages can be powerful channels for diffusing knowledge and skills between firms. Besides, strong backward linkages can promote production efficiency, productivity growth, and technological and managerial capabilities in local suppliers. The strengthening of local suppliers can in turn lead to technological spillovers for the rest of the host countries (Markusen and Venables, 1998; United Nations Economic Commission for Europe, 2001; Brooks and Hill, 2004; and Kohpaiboon, 2005).

Theoretically, backward linkages create intra- and inter-firm technology transfers. Intra-firm technology transfers can be defined as a situation in which technology is intentionally transferred by the technology source, a foreign-parent company, to its foreign affiliates. The transferor of technology is paid a monetary benefit from transferring technology as profit or dividends (Capanelli, 1997; and Techakanont, 2002).

On the other hand, inter-firm technology transfer is defined as the relationship between an input buyer and an input supplier in which both parties have no equity relationship. A special characteristic of inter-firm technology transfer is that the transferor receives productivity or cost-reduction by suppliers instead of monetary benefit (Capanelli, 1997; and Techakanont, 2002).

According to previous studies (Capanelli, 1997; and Techakanont, 2002), intra-firm technology transfers are less focused than inter-firm technology transfers because foreign affiliates will receive full support from their parent companies. In contrast, at the inter-firm level it is much more complicated in terms of technological supports.

Unfortunately, there are few studies that provide an understanding of the practice of inter-firm technology transfers. So, this study aims to provide an understanding in that area.

1.2 Importance of Inter-firm Technology Transfers in the Thai Automotive Industry

The Thai automotive industry began in the 1960s when the Industrial Promotion Act (IPA) was enacted in 1960. They were promoted under an import substitution strategy that aimed to enforce local content and protect them from foreign competition. In the first three decades, automakers had mainly locally assembled automobiles to serve the domestic market even though it had been perceived as experiencing the partial liberalization[2] in 1991, but there were only a few locally assembled automobiles that were exported.

However, the financial crisis in 1997 has changed the Thai automotive and part industry to be more export-orientated[3]. MNE automakers have used Thailand as a regional hub for automobile exports for two main reasons. Firstly, MNE automakers could access low cost materials used in assembly because of the depreciation of the Thai baht. Thus, relying on local materials was beneficial to automakers in terms of price competitiveness in export markets. Secondly, there was excess capacity in automobile assembly because domestic demand had dropped sharply because of the crisis. As a result, automakers had to emphasize automobile exports.

The transition to an export orientation has encouraged automakers to expect that first-tier suppliers[4] must be able to produce auto parts with a high quality and be cost-effective in meeting international standards. As a result, the automakers need to transfer technologies to first-tier suppliers in order to improve their production processes and management practices.

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[2] See more details about the partial liberalization in chapter 3.

[3] Before the financial crisis in 1997, Thailand was perceived as one of the most attractive automotive markets because of a high domestic demand and the aim of abolishing the local content requirement (LCR) in 2000. As a result, many new automakers, specifically a few years before the crisis the US big three (Daimler Chrysler, Ford, and GM,), came to establish their assembly plants in Thailand. However, the crisis made domestic demand shrink. As a result, MNE automakers in Thailand had to rely heavily on export markets (Terdudomtham, 1997; and Terdudomtham et al., 2002).

[4] First-tier supplier is a supplier directly supplying automakers with auto parts requiring high technology in production. On the other hand, lower tier supplier does not directly supply auto parts to automakers, but they supply auto parts to first-tier suppliers. Besides, they mainly produce fragmentary auto parts requiring simple techniques for production.

According to previous studies (Techakanont; 2002, and Techakanont and Terdudomtham; 2004), inter-firm technology transfers in the Thai automotive industry has begun since the early stages of the introduction of local content requirement (LCR) regulations (after 1970). Over the past three decades, inter-firm technology transfers have been developed in terms of the degree of difficulty and intensity of the transfers. According to Takayasu and Mori (2004), in recent years technology transfers in the Thai automotive industry have been developed in areas from production to product development and process engineering As a result, first-tier suppliers are able to improve and develop their technological capabilities.

In addition, in order to retain the competitiveness of automakers, it does not only mean that first-tier suppliers must be competitive, but it also includes lower tier suppliers that must be competitive as well because they have been employed to co-operate in auto part production by first-tier suppliers. Thus, first-tier suppliers need to transfer technologies to lower tier suppliers in order to retain competitive.

Unfortunately, there have been few studies that investigate the patterns of inter-firm technology transfer in the Thai automotive industry in depth. So, this study aims to investigate the patterns of inter-firm technology transfer in the Thai automotive industry. Besides, there have been few studies that investigate inter-firm technology transfers between first-tier and lower tier suppliers. So, this study also aims to investigate the factors influencing technologies transferred to lower tier suppliers and visualize which channel that first-tier suppliers rely on transferring technologies to lower tier suppliers.

1.3 Objectives of the Study

1. To investigate and compare the patterns of inter-firm technology transfer between Japanese automakers - first-tier suppliers and first-tier - lower tier suppliers.

2. To examine "what the factors are influencing inter-firm technology transfers to lower tier suppliers?" The second objective is intended to test the first hypothesis in section 1.4.

3. To examine channels of inter-firm technology transfers between first-tier and lower tier suppliers. The third objective is intended to test the second hypothesis in section 1.4.

1.4 Hypothesis of the Study

1. **Hypothesis:** It is anticipated that a competitive environment and stringent requirements from automakers directly influence first-tier suppliers to provide technological assistance to lower tier suppliers.

2. **Hypothesis:** In order to transfer tacit knowledge to lower tier suppliers who have low absorptive capacity, it is anticipated that first-tier suppliers have to invest more effort by employing a channel that allows them to provide close supervision, technical advice, and problem-solving on a case-by-case basis.

1.5 Scope of the Study

In this study the term technology transfer is defined as knowledge (know-how) or technical advice transferred from transferor to transferee for the purpose of improving its performance such as quality improvements and cost effectiveness.

In this study, a first-tier supplier is defined as a supplier that directly supplies auto parts to automakers. In contrast, a lower tier supplier is defined as second- and third-tier suppliers, who do not directly supply auto parts to automakers.

Furthermore, intra- and inter-firm technology transfers are defined according to Techakanont (2002). Intra-firm technology transfer is defined as a situation in which

technology is intentionally transferred by the technology source, a foreign-parent company, to its foreign affiliates. The transferor of technology is paid as a monetary benefit from transferring technology as a profit or dividends. On the other hand, inter-firm technology transfer is defined as the relationship between an input buyer and an input supplier in which both parties have no equity relationship. Inter-firm technology transfer is that the transferor improves productivity or achieves cost reductions by suppliers instead of monetary benefit.

1.6 Method of the Study

In the study, sending questionnaires and firm interviews are employed as the sources of information used in investigating inter-firm technology transfers in the Thai automotive industry. Data collection from sending questionnaires and firm interviews are very important to the study because they allow the author to ask questions and observe the interactions between each party.

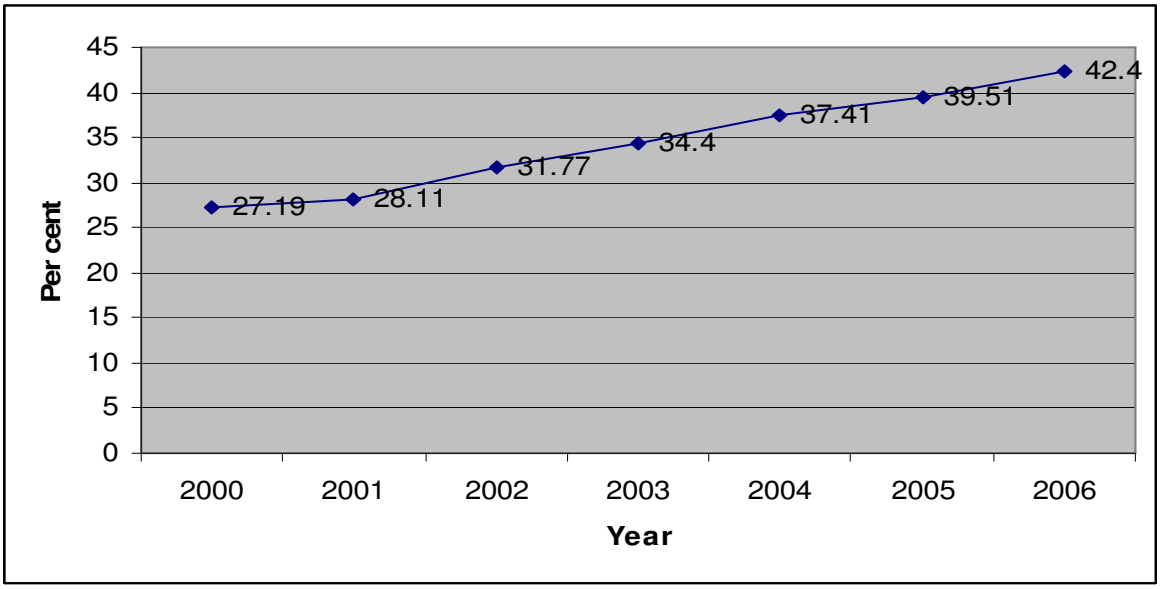
In order to investigate inter-firm technology transfers at the upper level, firm interviews are employed by interviewing The Toyota Motor Asia Pacific Engineering and Manufacturing (TMAP-EM)[5]. Because Toyota is one of the most popular automobiles in Thailand and its market share has been continually growing (see figure 1.1), so personal interview at TMAP-EM can provide very precise information and capture the main ideas of technology transfers at the upper level.

Besides, in order to investigate inter-firm technology transfers at the lower level, sending questionnaires is employed as the source of information. The 400 questionnaires are sent to query first-tier suppliers. The questionnaire can be separated into three parts. The first part is a firm identification. The second part is an evaluation of the firm's capabilities in auto parts production. And the last part is the technology transfers from the first-tier to lower tier suppliers.

[5] TMAP-EM is interviewed because TMAP-EM is in charge of the purchasing department dealing with first-tier suppliers.

Figure 1.1

Toyota Market Share in Thailand



Source: Toyota Co-operation Club Annual Book (2007)

1.7 Organization of the Study

The study is organized into six chapters. Chapter one is an introduction, which is intended to describe importance of inter-firm technology transfers in the Thai automotive industry. Besides, the objectives, scope and method of the study are also included.

Chapter two is the conceptual background and analytical framework. It is intended to provide an understanding of technology transfer. There are definitions, intra- and inter-firm, channels, processes, and barriers and solutions to technology transfers. Furthermore, an analysis of inter-firm technology transfers in both bilateral and multilateral relationships are also provided.

Chapter three is the current situation of the Thai automotive and parts industry. Besides, it also describes developments in the Thai automotive and parts industry under all government policies and private actions.

Chapter four is inter-firm technology transfer between Japanese automakers and first-tier suppliers. It provides the reasons why Japanese automakers have to transfer technologies to first-tier suppliers. In addition, it aims to investigate content, pattern, and processes of technology transfer.

Chapter five is inter-firm technology transfer between first-tier and lower tier suppliers. It aims to investigate the factors influencing technologies transferred to lower tier suppliers. Besides, it aims to investigate the channels of technology transfer that first-tier suppliers rely on transferring technologies to lower tier suppliers.

Finally, chapter six is about conclusion. All results from the study will be concluded to answer all hypotheses.