

CHAPTER 1 - INTRODUCTION

1.1 Background to the Research

The international diffusion of technology has long been emphasized as representing a short cut to development for developing countries. It had already inspired a large literature by the late 1960s (Contractor et al, 1981). The essence of technology transfer as a learning process is that it allows developing countries or 'latecomer' countries to narrow the technology gap by shifting the emphasis towards innovation, and ultimately to catch up with developed countries (Shin, 1996). In a review of different countries' experiences of catching up, Mathews (2006:314) demonstrates the relative success of East Asia and the relative decline of other regions, such as Latin America. Observing that the East Asian model of economic development has the virtue of success, he stresses that the main factors that have propelled East Asian countries to the cusp of fully developed status are their emphasis on manufacturing and their constant efforts to upgrade their technological capacities. However, he qualifies his view by pointing out those East Asian countries such as Korea and Taiwan industrialized in conditions that were favorable to their respective approaches and that these conditions may no longer apply.

International technology transfer is a central concern for developing countries that lack an indigenous capability to industrialize. The strategies or approaches that East Asian countries have taken to industrialization vary from one country to another (Lall, 2003), and their levels of economic performance are also different (Hernandez, 2004). Technology transfer may occur through numerous mechanisms, such as foreign direct investment (FDI), joint ventures, licensing, import of goods, co-operative alliances, subcontracting, export of goods, mobility of personnel, and development assistance

(Radosevic, 1999). Japan and Korea shunned FDI and relied instead on targeted capital equipment imports, while Taiwan made use of both. Singapore, Hong Kong and Malaysia, on the other hand, were much more open to FDI (Lall, 2003; Kim and Ma, 1997).

Catching up is not a linear process. For example, even though FDI is one of the most important channels by which technology can be transferred between countries, leading to economic growth in the host country (Teece, 1977), the home countries where the technology originates may not want this to happen (Reinert, 2007). In the 1950s and 1960s, the United States was the dominant exporter and direct investor around the world – yet when American multinationals set up export-oriented manufacturing subsidiaries in developing countries, the United States government imposed import duties only on foreign value-added products (Lall, 1978; Lim and Fong; 1982). This action discouraged the subsidiaries from sourcing inputs from the host countries. Consequently, the presence of the multinationals in the host countries created few local linkages (Lim, 1994).

As a result of the low number of linkages developed in the host countries over the years, host countries seeking to attract FDI had to develop export-processing zones or industrial free trade zones for the multinationals to operate in (Kanapathy, 1997). These zones encouraged firms of all nationalities to import their inputs, as they were given duty-free status by the home country. And through these zones, the firms' outputs were also exported.

Despite the actions by home countries that did not want to transfer technology to developing countries (Lall, 1978; Lim and Fong; 1982), and after decades of skepticism in regard to the virtue of FDI (Caves, 1996; Vernon, 1998; UNCTAD, 2001), it is now widely believed that technology transfer through FDI can be an important approach in a

country's development strategy. As a consequence, governments in both advanced and developing countries have wooed multinational corporations (Oman, 2000). This evolution is related to the broader context of liberalization, in which most developing countries have moved to market-oriented strategies with a lesser degree of government intervention. It is also, of course, a result of deepening economic integration stemming from globalization.

FDI has become one of the most dynamic flows of resources, not only to developing countries, but to developed countries as well (Caves, 1996; Vernon, 1998; UNCTAD, 2001). FDI inflows through multinational corporations (MNCs) not only transfer financial resources and foster employment, but also bring with them a broader package that includes new skills and technological knowledge, entrepreneurship, and precious information on foreign markets (Cantwell, 1995; Dunning, 1993). It is considered that some of the main host-country benefits of FDI come from inflows of new technology to affiliates of MNCs – inflows that create a potential for 'spillovers' of technology or of knowledge to the host country's local firms (Caves, 1974; Blomstrom, 1989; Kokko, 1994; Blomstrom and Kokko, 1995). It is therefore important for a host country to adopt policy measures aimed at encouraging MNCs to transfer more technology, so increasing the potential for such spillovers.

In recent years, there have been fundamental changes in the way MNCs organize their international activities. With the removal of trade and investment barriers around the world as a result of liberalization and globalization, and with falling transport and communication costs, they have changed their strategies in order to take advantage of new opportunities for division of labor on a global scale. As a result, studies of MNCs have come to focus on the subsidiary-centered model (Giroud, 2000 and Iguchi, 2007), in which the activities of subsidiaries in host countries are crucial to understanding the

process of spillover generation. Studies have also looked at how the role of subsidiaries might shift over time (Birkinshaw and Hood, 1998).

In these circumstances, it is crucial for host governments to recognize the conditions under which FDI contributes most effectively to technology transfer. Host governments then need to frame the environment within which MNCs operate by introducing various performance requirements for the MNCs, such as requirements for local content and local research and development (R&D) (Kokko and Blomstrom, 1995). Other measures that host governments can take include making sure that MNCs are exposed to local competition and that they themselves support their own domestic firms in their efforts to learn from foreign ones (Wang and Blomstrom, 1992).

However, since MNCs possess technological assets that give them what is known as a 'firm-specific advantage,' they have strategic choices at their disposal to maximize the impact of their entry into a domestic market. Among these choices is the ability to determine their mode of entry into a market – a key strategic decision for an internationalizing firm, since it entails a substantial commitment of resources (Anderson and Gatignon, 1986; Root, 1987). The mode of entry determines the way in which resources are transferred from the home country to the host country (Hennart, 1982; Hill et al., 1990). For example, the transaction-costs model mode of entry argues that the risk of exposure of sensitive knowledge to opportunistic threats from licensees or partners in other contractual modes leads to a higher propensity for firms to choose high-control modes to ensure protection of their knowledge (Anderson and Gatignon, 1986; Buckley and Casson, 1976; Hennart, 1988; Teece, 1981; Williamson, 1975). Firms must choose from a variety of modes of entry, such as exports, licensing, greenfield investments or wholly owned subsidiaries, acquisitions and different types of joint venture. Thus it is important for governments of developing countries that are

designing policies aimed at generating maximum benefits from FDI (UNCTAD, 2001) to understand the relationship between the strategies of MNCs and the local linkage effects, whether direct or indirect.

1.2 Problem Statement

As developing countries have only a limited capacity to generate new technology, technology transfer – the importation of technology from abroad and its combination with domestic human resources and know-how – is crucial for their long-term economic growth (Romer, 1990). The objective of this study is to assess the capacity of firms in a developing country to absorb, generate and diffuse this technological competence (World Bank, 1998; Dunning, 2000; Narula and Dunning, 2000). The study focuses on technology transfer from foreign MNCs through FDI, and from local MNCs through domestic direct investment (DDI)¹, to local manufacturing suppliers in the petrochemical industry in Malaysia.

Once linkages are forged between the foreign affiliates of MNCs and their local suppliers, one important source of technology in-flow which relates to ‘externalities’ or spillovers of knowledge (Hansen and Schaumburg-Muller, 2006; Ivarsson and Alvstam, 2004) helps host-country firms gain access to new technology and management practices (Lall and Mortimore, 2000; UNCTAD, 2001). Since the number of spillovers that local firms acquire is crucial for the development trajectory of the host country, the role of public and private organizations and institutions in fostering spillovers is crucial. Lundvall (1988) and von Hippel (1988) suggested that the accumulation of knowledge would take place not only through local suppliers developing their internal capabilities, but also through learning by interaction with a wide variety of sources in the context of the national innovation system (NIS) – defined

by Freeman as “the network of institutions in the public and private sectors whose activities and interactions initiate, import and diffuse new technologies” (Freeman, 1987:1).

While policy makers and a body of literature anticipate that FDI will indeed have spillover effects in host developing countries, the empirical evidence is rather inconclusive (Javorcik, 2004; Smeets, 2008). The economic literature presents pessimistic results concerning the capacity of foreign affiliates to diffuse technology internationally (Jabbour and Mucchielli, 2007). For example, although et al. (2007) found significant evidence on spillovers to domestic firms in their studies on the United Kingdom, studies by Javorcik (2004) on Lithuania and by Blalock and Gertler (2003) on Indonesia found no evidence that positive spillovers generated by a foreign presence actually existed at the intra-sector level (they did, however, find strong evidence of the presence of vertical spillovers). On the other hand, Giroud (2000) demonstrates the existence of knowledge transfer from Japanese MNCs to their local suppliers in the Malaysian electrical and electronics (E&E) industry sector. In her studies of backward linkages in Malaysia, Iguchi (2008) also finds evidence of significant inter-organizational linkages between MNC subsidiaries and local suppliers in the E&E industry. This knowledge transfer and these linkages between MNC subsidiaries and local suppliers show that foreign technology has in fact been diffused through the Malaysian economy.

Jabbour and Mucchielli point to a lack of absorptive capacity on the part of local firms as a key reason for the low rate of technological spillovers that they encountered in their research. The development of local suppliers’ capacities and absorptive capabilities is therefore a key requirement, both in attracting FDI in the first place and in increasing technological spillovers from subsidiaries (Lall and Narula, 2004; Kokko,

1994; and Konings, 2001). In the case of Spanish manufacturing industry, Jabbour and Mucchielli also found out that technology spillovers were limited to vertical linkages. One plausible explanation for the absence of horizontal linkages is that it is not in the strategic interest of foreign affiliates or subsidiaries to diffuse technology and know-how to their local competitors, especially when technological superiority is the main element of their competitive advantage in the host market. With vertical linkages, by contrast, foreign affiliates may well be interested in upgrading the technology of their suppliers. It follows that backward linkages between foreign affiliates and domestic suppliers may be a more likely channel for transferring technology to the host country through FDI. Forward linkages (between local final-good producers and foreign suppliers) may further help diffuse foreign technology into the host-country economy.

Despite their caveats, the above studies show that FDI can provide knowledge spillovers to local firms through backward linkages. Such linkages exist in almost all commercial activities, but they are probably most common in manufacturing industries. For instance, the pioneering study (Lall, 1980) that defined and outlined backward linkages and vertical inter-firm linkages between MNC subsidiaries and local suppliers focused on subcontracting relationships in two leading truck manufacturers in India. Lall found ten main categories of linkages in the subcontracting relationships. A 1989 study by the International Labor Office (ILO), Axel J. Halbach's *Multinational Enterprises and Subcontracting in the Third World: A Study of Inter-Industrial Linkage* (quoted in Battat et. al, 1996), suggested that industries with the highest prospects for backward linkages included the automobile industry (requiring parts and components constituting 70 percent or more of final sale value); machinery and precision instruments involving primary assembly activities (50 percent or more); and the E&E industries (40 to 50 percent) (Battat et al, 1996). According to these studies, the food processing industry is also highly dependent on backward linkages for its agricultural

inputs. However, industries that process raw materials, such as the metallurgical and petrochemical industries, rank among the lowest in backward linkages.

The low number of backward linkages attributed to resource-based industries has left a mixed impression as to whether developing countries should get involved in such activities. In his discussion of backward and forward integration in the development of resource-based industries, Auty (1987) argued that resource-rich countries should not aim to become involved in processing their natural resources. These countries should instead export them and allow developed countries to conduct the downstream activities. Auty also described resource-rich countries as suffering from the ‘resource curse’ syndrome.ⁱⁱ

In regard to whether resource-rich developing countries should heed the argument of Auty (1987), Mathews (2006) opines that countries such as Malaysia, Russia or Brazil present special challenges in their catch-up strategies in industrial development. According to Mathews (2006:326), “the issue (in these countries) is to utilize the resource wealth in such a way that it does not create a segmented economy, with a resources-driven exchange rate that works against the interests of an emerging sector, or a group of resources-driven MNCs that work against the industrial development of the rest of the economy.”

There are therefore a number of challenges for Malaysia in developing its resource-based industry, especially in the case of oil and gas. Malaysia’s oil reserves as at January 2005 stood at 4.1 billion barrels (One Petro, 2005), and the country produces on average around 693,700 barrels of oil per day (CIA World Fact book, 2010). Malaysia is also endowed with comparatively large reserves of natural gas, with estimated recoverable reserves at 53 trillion cubic feet (TCF), equivalent to almost three times its oil reserves (One Petro, 2005). Given the size of these reserves, Malaysia

could easily confine itself to earning its foreign exchange by selling raw commodities. However, the country's favorable status as a net exporter of oil could be reversed in the not-too-distant future (One Petro, 2005).

Malaysia's national oil company (NOC), Petronas, established in 1974, has the responsibility of developing and adding value to these resources (Gale, 1981). Under the Petroleum Development Act of that year, the corporation is vested with authority over all of Malaysia's oil and gas resources – the building blocks for the petrochemical industry. It is engaged today in a wide range of activities, including upstream operation and production to downstream oil refining, petrochemicals, retail business, trading, gas processing and liquefaction, as well as logistics and maritime activities (Von der Mehden and Troner, 2007).

Malaysia's oil and gas reserves have attracted significant foreign investment in oil and gas, and in the petrochemical industry. Investments in the petroleum and petrochemical industries in Malaysia for 2008 were in the region of RM57.2 billion (*Petronas Prospectus*, 1 November 2010). The largest source of foreign investment was the United States, with 40 percent of the total foreign investment in the industry, followed by Germany (22.8 percent) and Japan (14 percent). In 2007, the major investors among foreign firms were Dow Chemical, BP Amoco, Shell, BASF, Eastern Chemicals, Toray, Mitsubishi, Idemitsu, Polyplastic, Kaneka, Dairen and the Titan Group (MIDA, 2007). As acknowledged in the Industrial Master Plan 3 (IMP 3), Malaysia needs to diversify its manufacturing activities into capital- and technology-intensive activities, and into a strategic petrochemical industry. This petrochemical industry will in turn create downstream activities that will further boost manufacturing activities in the country.

Foreign investment in Malaysia was intensive in the 1980s. It was at this time that Japan decided to become a major source of FDI, rather than relying solely on exports (Nakamura, 1991). As an alternative source of FDI Japan began to rival the United States, a development that led to some resentment and fear in both the United States and Europe (Osland et al., 2001). In addition, the second oil shock of the early 1980s and the rising price of raw materials led multinational firms (particularly petrochemical companies) to relocate their production to developing countries (Auty, 1984; Stobaugh, 1971).

As more MNCs invested in their economies, many developing countries found that they contributed less domestic added value than their own local firms (Lim and Fong, 1982). As a result, these countries introduced policies to encourage greater local purchasing by foreign firms (UNCTAD, 2001). They hoped that the MNCs would create local linkages over time. But, as a 1989 study by Halbach indicated, such linkages vary according to the type of industry. Halbach found that industries that process raw materials, such as the metallurgical and petrochemical industries, rank among the lowest in backward linkages.

There is no study of linkages in the petrochemical industry in Malaysia. The present study is an exploratory one that fills the knowledge gap in the area of how linkages are built between MNC subsidiaries and local firms. It analyzes the intended upgrading effects of linkage collaboration (Hansen and Schaumberg-Muller, 2006:13) and the strength of the linkages forged between foreign and local MNCs with their local supplier firms in Malaysia's petrochemical industry.

Based on the above background, this study poses the following problem statement:

How do MNCs promote the development of backward linkages in Malaysia's petrochemical industry and to what degree do they aim at providing technological assistance that can contribute to upgrading and quality improvements among local suppliers?

To drive the study, as well as to guide the exploration of the problem statement, three key research questions have been developed, as below. They are discussed further in Chapter 2.

Research Question 1:

How do different types of MNC ownership structure affect the development of local suppliers?

Research Question 2:

Do local suppliers' technological capabilities affect the forms of backward linkages (such as product, process, innovation, training, and management linkages) established between the two entities?

Research Question 3:

- i) How do backward linkages promote the upgrading of local suppliers' technological capabilities?
- ii) To what extent and in which ways does an MNC provide its local suppliers with technological assistance as part of a regular and ongoing business relationship?

1.3 Objectives of the Study

The purpose of this study is to examine how MNCs can contribute to technology transfer and the upgrading of their local suppliers through backward linkages in Malaysia's petrochemical industry. The focus is on the different linkage effects that FDI creates in the host country. The study is conducted in a two-phase, sequential mixed methods process (Creswell, 2003). Statistical, quantitative results from a sample are obtained and followed up with interviews from individual firms to probe or explore the quantitative results in more depth. In the first phase, quantitative research questions address the relationship between i) subsidiaries' strategy and local suppliers' capability upgrading; ii) different forms of backward linkages and local suppliers' capability upgrading; iii) types of suppliers and their upgrading capability; and iv) involvement of local institutions and backward linkages. In the second phase, qualitative interviews are used to probe significant upgrading capability of local suppliers through backward linkages by exploring aspects of technological upgrading with a few local firms in the study.

Hence, the objectives of this study are:

- i) To identify different modes of entry for MNC investments in the Malaysian petrochemical industry,
- ii) To assess forms of backward linkage in the industry that are linked with MNCs,
- iii) To identify types of suppliers in the petrochemical industry,
- iv) To explore how backward linkages promote the upgrading of local suppliers; and
- v) To examine organizations and institutions those have an impact on backward linkages.

1.4 Significance of the Study

This study makes a number of contributions to the body of knowledge. Its primary contribution lies in the development of an analytical framework for the study of the development of resource-based industry in Malaysia. The study of linkages capabilities will identify the taxonomy of local suppliers and their technological trajectories. It will also identify the types of MNC investment in the petrochemical industry in the country. By introducing these two sets of typology (the MNC and the suppliers), the study aims to examine how different types of investment strategy helped develop the industry.

The second contribution lies in an in-depth case study on one of the components of technological capability which is linkage capability. Through the case studies different forms of backward linkages that exist between MNCs and suppliers are examined.

Thirdly the study analyzes the influence and role of organizations and institutions in strengthening coordination and connection among the petrochemical industry players in Malaysia. This study is important as it explores the mechanisms by which technology is transferred from MNCs to local suppliers in the petrochemical industry in Malaysia, and how Malaysia upgrades its technological capability in the industry.

Last and most importantly, the analysis and findings of the study are very important for both theory and policy recommendations as it helps explain the role of firm characteristics (in this case ownership structure) and backward linkages for technological capability building of local suppliers in an oligopoly industry. The study makes policy recommendations as to the implications for the future of the industry.

1.5 A Brief Summary of the Research Methodology

The thesis takes an empirical approach, using a firm-level survey method. The research design is shown in Figure 1.1. It indicates the process of the study, which involves Step I, Step II and Step III. These steps are explained further in Chapter 4. The survey result is backed up by several case studies with a strong interview questionnaire instrument aimed at providing deeper insights into the underlying issues observed in the survey findings. Following the research questions mentioned above, the study contains the following blocks, where each is designed to examine a theme:

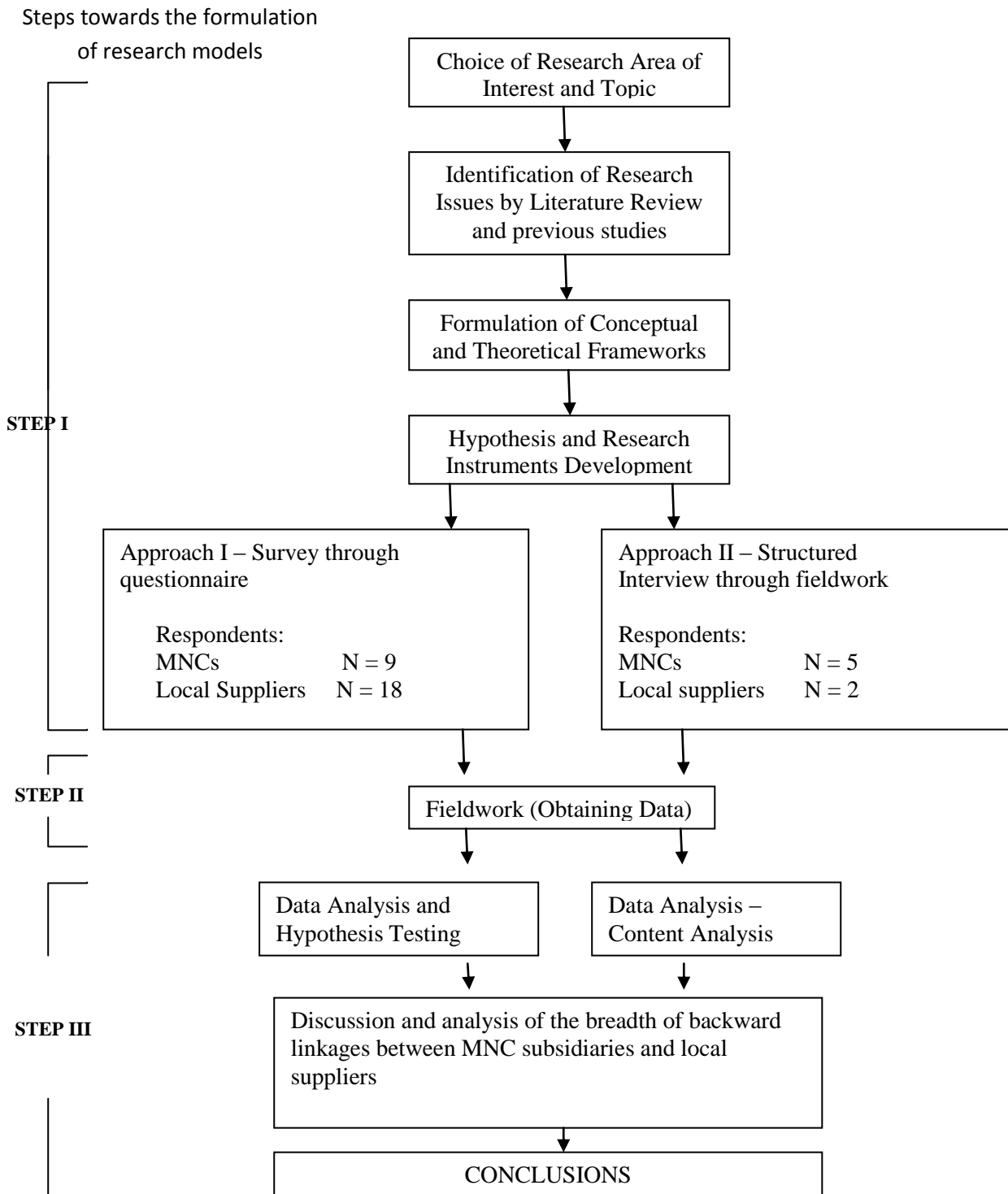
- i) to identify different modes of entry of foreign and local MNCs for transmitting petrochemical technology;
- ii) to identify forms of backward linkages;
- iii) to identify types of suppliers in the petrochemical industry; and
- iv) to explore how backward linkages promote the upgrading of local suppliers.

The research survey was designed to be conducted in three stages, as below.

Stage 1: Survey of the Malaysian Petrochemical Industry

This part of the study serves as an introductory background for the subsequent research on petrochemical companies. The method used is mainly from secondary data on the general development of the Malaysian economy and the petrochemical industry, and from the technological development of the petrochemical industry. The data were gathered from the relevant public and private organizations (ministries, research institutes, universities and associations) and firms. In addition, interviews were conducted to map out the general scenario of the petrochemical industry.

Figure 1.1: The Research Design



Stage 2: Survey of Interviews and Questionnaires

Stage 2a:

As shown in Figure 3.3, two different locations – Pasir Gudang in Johor and Gebeng in Pahang – were selected in which to conduct a study on the technological capability of MNCs. The MNCs were approached for interviews via their Corporate Affairs Divisions. The questionnaire survey interviews involve various personnel in the firms: directors, technical staff, and the financial, planning and sales divisions, as well as shop-floor workers. To conduct the interviews, a questionnaire was used which addressed the three main research questions involving the MNCs and their suppliers. These firm-level interviews are intended to give the firm's perspective (the inside-out perspective).

Stage 2b:

Using the MNCs as my starting firms, a snowballing research technique was used to conduct questionnaire surveys of the traced suppliers in the two regions. The questionnaire survey for Stage 2a and Stage 2b was conducted based on one-to-one interviews, as the number of firms in the industry is not large.

Stage 3: MNC and Supplier Company Case Studies

Based on the results of the MNC and supplier questionnaires, further in-depth case studies were conducted to clarify many aspects of what happened in these firms, and how and why it happened. The firm case studies show in detail how MNCs help in the upgrading process of local suppliers. In addition to the interviews, I also carried out a study of each firm's archival material, such as annual reports and statistical data.

1.6 Definition of Terms

The following terms are used in this study:

A **Multinational Corporation (MNC)** is an enterprise that engages in foreign direct investment (FDI) and owns or controls value-adding activities in more than one country (Dunning, 1992a:3). **Petroleum Nasional Berhad (Petronas)**, a national oil company (NOC), is a Malaysian government-linked company (GLC). It has subsidiaries in Malaysia, and also in Vietnam, Indonesia, United Arab Emirates, Iraq and Sudan. Petronas, a player in the petrochemical industry as well as a regulator of the industry, is used in this study in order to compare foreign-owned and locally owned MNCs in terms of linkages formed between MNC subsidiaries and locally owned suppliers. Since there are not many local MNCs in Malaysia's petrochemical industry, local MNCs in this study include subsidiaries that either belong to big corporations or were once subsidiaries of such a corporation. For simplicity of terminology, all these local corporations are termed as MNCs.

As the study focuses on firm-to-firm linkages, it uses a broad definition of 'linkages' to include the whole range of direct and indirect relationships by which the presence of MNCs affects the development of other firms in the host country. The term 'linkage' refers to the economic relationship between two or more industrial sectors due to the demand-supply effect (Hirshman, 1958). An industrial activity can generate 'forward' linkages if its production output is used as the input of further industries. And an industrial activity can generate 'backward' linkages if its production input requirements induce the setting up of supplying industries. Between forward and backward linkages, the most commonly researched linkages formed between MNCs and local suppliers are backward linkages (Altenburg, 2000), and these are the focus of this study. The firms

considered do also have linkages with competitors and technology partners, but these are not touched on in detail.

To give an overall view of linkages, the types of linkage that take place when an MNC enters a host country are as follows (Altenburg, 2000:5-6):

Backward linkages – The MNC usually sources parts, components and services from suppliers in the host country. The effect of such linkages on local firms will depend on the quantity and types of supplied input, the terms of procurement, and the willingness of the MNC to transfer knowledge and build a long-term relationship.

Forward linkages – An MNC mainly develops three types of linkages with customers: marketing outlets, industrial buyers and secondary processing. This type of linkage is not part of this study.

Linkages with competitors – An MNC's subsidiary often faces some competition from local firms. As MNCs often hold a strong market position, they may also have a strong impact on local firms.

Linkages with technology partners – MNCs may initiate common projects with local partners. These projects may take various forms of equity or non-equity linkages, including joint ventures, licensing agreements and strategic alliances.

Finally, a definition is necessary for **small and medium enterprises (SMEs)**. This term has no generally accepted definition, but the study uses a definition by Malaysia's Ministry of International Trade and Industry (MITI). See Table 3.9 for the definition of SMEs in Malaysia.

1.7 The Limitations of the Study

There are at least three forms of technological capability building (Lall, 1993). Since time and resource constraints preclude consideration of every possible kind of technological capability, the study focuses on only one of these forms: linkages capability. Furthermore, as the petrochemical industry is a global industry, only domestic linkages through backward linkages are considered in the development of linkages capability in this industry.

In this research, only institutional structures and linkages among firms are considered. Institutional structures and linkages outside firms are not considered due to time constraints and the difficulty of obtaining data.

1.8 Organization of the Thesis

The thesis is organized as follows:

Chapter 1 presents the thesis background, outlines the study objectives and states the research problem. The chapter presents the justification and limitations of the study and provides a summary of the data collection methods. The research methods to be employed and the theoretical approach used in the study are also highlighted.

Chapter 2 presents an analysis of the literature on technological capability building from the FDI perspective. The chapter commences with a brief discussion of international technology transfer. This is followed by a detailed analysis of FDI, MNC, technological capability building and backward linkages. Following these discussions of FDI and technology transfer, an analytical framework, a research question and a hypothesis for the study are presented.

Chapter 3 considers the various industrial phases in Malaysia from the period before independence (pre-1957) to the time the interviews were conducted (2008/2009). It presents the development of the petrochemical industry in the world and also in Malaysia. The chapter also presents the roles of MNCs, government institutions and other factors in creating backward linkages that helped to facilitate technological capability building by local suppliers, especially in the petrochemical industry.

Chapter 4 presents a discussion of sample techniques and the methodology of the sample collection through quantitative and qualitative methods. It describes the methods used in data analysis for both the quantitative and qualitative methods. The chapter also describes the characteristics and preliminary findings of the study.

Chapter 5 and 6 analyze the results from the data collected during the interview process. Chapter 5 presents the empirical results of the quantitative methods. In this chapter data from descriptive statistics is analyzed. Chapter 6 then presents an analysis of the quantitative and qualitative methods of linkage collaboration between MNCs and local suppliers of the petrochemical industry.

Chapter 7 presents the conclusions made on the findings of the study. It gives policy recommendations and some suggestions for areas of future research.

1.9 Conclusion

The chapter provides the foundation to this study by stating the research problem and the three research questions. The significance of the study and the methodology used is then outlined, followed by statements on the limitations of the scope of the study.

Lastly, an outline of the structure of the entire thesis is presented.

ⁱ DDI is domestic investment by local companies in the domestic market.

ⁱⁱ The ‘resource curse’ theory argues that natural resource abundance may negatively impact the development of a society through various channels. For example, it could inhibit the formation of a solid industrial base and also induce rent-seeking behavior. The lack of developing a diversified industrial base is linked to what has been called the ‘Dutch disease,’ named after the effect of the Netherlands’ investment in gas exploration in the 1970s (Stevens, 2003). The ‘Dutch disease’ model suggests that the increasing profitability in the primary sector induces a flow of resources into it. This negatively affects the development of the secondary sector (Martin, 2002, Auty, 1987).