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DO MNCS' HIGH QUALITY AND STANDARD REQUIREMENTS MATTER? A CHANNEL FOR VERTICAL SPILLOVERS

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ABSTRACT

This study attempts to investigate how Multinational Corporations (MNC) transfer their knowledge and technology to local firms through backward linkages established between both of firms. The objective was to fill a research gap, where the channels through which technology and knowledge were transferred remained unexplored in the existing Foreign Direct Investment (FDI) spillover literature. A case study method was adopted as it is appropriate for exploring the complex process of technology transfer. It would have been effective in order to conduct in-depth analysis on the effect of linkages, which would have been difficult to achieve using quantitative analysis. The findings highlight that FDI and innovation activities from MNCs may represent a source of knowledge and technology know-how. Hence, local suppliers may gain a number of advantages from establishing linkages with MNCs. The findings not only provide benefit to the academic circle but also to local businesses, especially small and medium industries, as well as policy makers. The managerial and policy implications derived from the findings are relevant, not only to Malaysia, but also to other developing countries, particularly Malaysia's neighbouring countries.

Keywords: FDI Spillovers; Backward Linkages; Technology and Knowledge Transfer; Malaysia; MNC.

1. INTRODUCTION

It is well documented that Foreign Direct Investment (FDI) have been regarded as the main vehicle for technology and knowledge spillovers from Multinational Corporations (MNC) to local firms (Branstetter, 2000; Keller and Yeaple, 2003; Giroud, 2003; Ivarsson and Alvstam, 2005; Liu and Buck, 2007; Blalock and Simon, 2009; Liu, Wang and Wei, 2009). However,

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the channels through which technology and knowledge were transferred remain unexplored in the available FDI spillover literature. In this paper, an MNC is regarded as the firm that has headquarters in its own country and having production activities in more than one country (Porter, 1990). Most of the prior studies on FDI spillovers were based on secondary data analysis and used FDI inflows, exports and imports, as proxies of spillovers from foreign firms to local firms at industry level and firm level in various countries. Therefore, these factors were regarded as the main channels of technology spillovers in many previous studies (see meta-analysis study by Gorg and Greenaway, 2004). Moreover, many studies have also investigated and confirmed that vertical linkages between Multinational Corporations (MNC) and domestic suppliers are regarded as a channel for the diffusion of technology (Rodriguez-Clare, 1996; Markusen and Venables, 1999; Javorcik, 2004; Ivarsson and Alvstam, 2005; Liu, Wang and Wei, 2009), based on secondary data analysis.

Advance technology and knowledge know-how from FDI to developing countries like Malaysia may spillover to other firms in the sectors in recipient host country. A study by Sjöholm 1999 suggests that when the technology and knowledge is transferred from the parent firm to their local affiliates, it leaks to the host country firms. The technology transfer to firms subsequently may create knowledge spillover in countries where it is considered as unintentional transfer of technology or knowledge that is exchanged outside the intended boundary. The technology introduced by foreign firms may spillover horizontally or vertically to local firms.

Despite the growing body of research on the topic and the belief that FDI may act as catalyst for technology and knowledge transfers are still treated as a 'black box'. There is little evidence on how and in what ways technology and knowledge are diffused. Hence, this study goes beyond the existing research in the area of FDI spillovers by opening the black box of Multinational Corporation's (MNC) technology and knowledge spillovers in Malaysia. This study focuses on MNCs as the generators of spillovers and local suppliers as receivers through vertical linkages and business relationships. In doing so, this study is able to make an important contribution to the FDI spillover literature by exploring the channels through which technology and knowledge could be transferred to the host country. In particular, by using a qualitative methods, this study goes beyond the 'black box' treatment of spillovers in previous studies.

Many empirical studies have examined the effect of firms' R&D and technology diffusion from FDI to domestic innovation and have found that inward FDI has a positive effect on local firms' innovation (Kinoshita, 2000; Branstetter, 2000; Hu and Jefferson, 2002; Cheung and Lin 2004). Some studies have also focused on the issue of wider technology spillovers by multinational firms in host economies (eg. Blomström and Kokko, 2001; Blomström *et al*., 2001; Görg and Strobl, 2001; Günther, 2005; Javorcik, 2004; Sjoholm, 1999). Liu and Buck (2007) studied how the various sources of international technology spillovers, in addition to internal factors, including investment in domestic R&D and absorptive capacity, jointly affect the innovation performance of Chinese high-tech industries. Their empirical study, however, focused on the industry level and excluded the effect of vertical spillovers through backward and forward linkages when business transactions between foreign affiliates

and both domestic suppliers and their customers take place. Javorcik (2004) points out that vertical spillovers are more likely to be positive, as multinationals have no incentive to prevent technology diffusion to upstream sectors, as they may benefit from the improved performance of intermediate input suppliers. Moreover, vertical linkages between multinational companies and domestic suppliers are increasingly regarded as an important channel for the diffusion of technology As a result, if FDI were to generate spillovers, they are more likely to happen through vertical relationships rather than through horizontal relationships. Rodriguez-Clare (1996) has developed a theoretical model that studies the MNC effect on host-country firms through the generation of backward and forward linkages, particularly the externalities created from FDI via vertical linkages. The study revealed that MNCs create backward linkages and thereby lead to the production of a larger variety of intermediate goods which allows the economy to gain a comparative advantage in the production of more sophisticated final goods. In addition, there are various empirical studies of intra-industry spillovers for host-country firms from manufacturing activities by subsidiaries and most of the studies have found positive inter-industry spillovers (see, for instance, Blalock (2001) for Indonesia, Schoors and van der Tol (2001) for Hungary, López-Córdova (2003) for Mexico, Javorcik (2004) for Lithuania, Blalock and Gertler, (2003) for Indonesia).

Through case study analysis at firm level, this research focuses on knowledge transfer through backward linkages established between multinational corporations (MNCs) and their local suppliers. Hence, forward linkages spillovers are not in the scope of this thesis. The in-depth case study is used in order to generate a deeper understanding of the significance of the assistance provided by the MNCs. Case study analysis can be used to provide a deeper and richer insight into causal relationship than mere statistical correlations (King, Keohane and Verba 1994; George and Bennett 2005). Although a number of surveys exist on the role of technology transfer between foreign MNCs and their local suppliers in developing countries, many of these are either theoretical contributions, e.g. identifying various types of technology linkages (for reviews, see Dunning 1993; UNCTAD 2001, 2002), or empirical analyses focusing on FDI spillover effects on host-economies using aggregate industry-level data (see Blomström *et al*. 2001). Thus, the aim of this study is to add to this small number of empirical analyses and contribute to an increased understanding of the extent to which MNCs' local business relationships facilitate innovation activities among domestic suppliers in a developing country. Moreover, it analyses to what extent, and in what ways, MNCs provide their local suppliers with different types of assistance, and discusses to what extent the linkage has a beneficial impact upon the innovation activities of their domestic suppliers.

Malaysia is an exciting starting-point from which to investigate the issues defined above because inward FDI by MNCs has grown without precedent recently. Despite the increasing global competition, Malaysia continues to attract global foreign investment outflow, reflecting the country's cost-competitiveness as a manufacturing and export base. Studying the impact of FDI on an emerging economy such as Malaysia, which has received substantial flows of foreign investment, could therefore provide useful insights into foreign firms' relationships with local suppliers.

The research is organised as follows: We first review the literature where relevant theoretical of MNCs' strategies and the impact of FDI on host-country is discussed. Further, we discuss the methodology process with explanation of data collections, measurements, validity, reliability, case selections and data analysis. Next, we present the results of the interviews from the MNCs for the firm level study with detailed evidence concerning technology transfers. Finally we conclude with the discussions of the findings, develop theoretical proposition and their implications for academic circle, local businesses, well as policy makers.

2. LITERATURE REVIEW

2.1. Foreign Direct Investment And International Trade

The early theory that examined FDI effects was the industrial organisation theory (Hymer, 1976; Caves, 1971 and 1974). This theory provides important theoretical contributions upon the effects of FDI on host-countries. The industrial organisation theory discusses how FDI affects local firms in a host country. The theoretical arguments suggest that a foreign investor may generate positive spillover effects on local firms through its knowledge and technologies. FDI is also considered an important external source for the diffusion of knowledge as the influence of MNCs can intensify competition (Buckley and Casson, 1976; Caves, 1971 and 1974; Hymer, 1976; Markusen, 1995). Additionally, there is a convincing argument that MNCs, when investing abroad, normally bring with them advanced productive knowledge that can be transferred to firms in host nations. When a firm invests in a foreign country, it often comes with its proprietary technology to compete successfully with indigenous firms (Markusen, 1995).

It is clearly recognised that multinational firms are widely acknowledged as having firm-specific advantages that allow them to overcome a potentially disadvantageous position with respect to domestic counterparts in foreign markets (Blomström and Sjöholm, 1999). Such advantages typically take the form of knowledge-based assets such as proprietorial information relating to product or process technology, managerial know-how, the quality of the workforce, the company culture, use marketing and branding and so on. It has been also widely acknowledged that such inward-investment offers potential indirect benefits to domestic firms, via enhanced productivity levels and/or productivity growth (see, for example, Blomström, 1986; Haddad and Harrison, 1993). However, MNCs can also take on local firms with superior knowledge of local markets, consumer preferences and business practices because they possess superior intangible productive assets, such as managerial skills, reputation, or technological know-how (Blomström and Sjöholm, 1999). Foreign investors affect local firms in their industry in numerous ways. It is beneficial to consider the various channels through which international technology transfers occur and many studies have recognised the important routes through which inward FDI can benefit productivity and the innovation activity of domestic firms in a host-country (Blomström and Kokko, 1998; Görg and Greenaway, 2004).

Domestic firms can learn MNC technology because standard models of MNCs generally have a far superior technology to domestic firms (Markusen, 2002). Thus, MNCs, through their investment in the domestic market, may transfer their technology to domestic firms. Generally,

MNCs have firm specific advantages which might be related to the production methods they use, the way they organise their activities and the way they market their products and services. Foreign firms that invest in the host- country will bring to it their resources, including capital, technology, management skills and R&D. In return, the host country's indigenous firms may learn from or imitate these processes. One of the important aspects that domestic firms can learn from MNCs is their technology, which is an important element if domestic firms are to innovate their products.

Through linkages, spillovers may take place vertically from foreign firms to their local suppliers by means of technological know-how transfers, staff training, standard quality requirements, cost leadership and so on. A theoretical study on the impact of FDI externalities on host-country economic growth suggests that it most probably arises at inter-industry rather than intra-industry level (Rodriguez-Clare, 1996; Markusen and Venables, 1999). Multinationals are beneficial to the host-country in creating demand for local inputs, increasing the specialisation and efficiency of upstream and downstream activities and generating positive externalities for local industries (Rodriguez-Clare, 1996; Markusen and Venables, 1999). Rodriguez-Clare (1996) has developed a theoretical model that studies MNC effects on host-country firms through the generation of backward and forward linkages, particularly the externalities created from FDI via vertical linkages. The model shows that MNCs create backward linkages and thereby lead to the production of a greater variety of intermediate goods, which allows the economy to gain a comparative advantage in the production of more sophisticated final goods. Similarly, Markusen and Venables (1999) studied the effects of multinational companies on the development of domestic firms in the host-economy. They suggest that it is possible for FDI to act as a catalyst that can lead to the development of local industry through linkage effects. Their study shows theoretically that multinationals, through the creation of linkages with indigenous suppliers, can exert a positive influence on the development of indigenous firms. They also link vertical spillovers to market structure. They argue that multinationals can change the structure of imperfectly competitive industries in the host-country by fostering the development of domestic intermediate goods- producing firms, which, in turn may have positive effects on the development of domestic final goods-producing firms.

As inter-industry spillover may take place primarily through customer-supplier relationships which develop between foreign and indigenous firms, many domestic firms have increased their productivity through the impact of spillovers from the presence of FDI (Dunning, 1993). In these instances, spillovers may take place through knowledge transfers from MNCs who act as customers to local firms while the local firms act as suppliers. Local firms have incentives to upgrade their performance because there are higher requirements for product quality and they are under pressure to 'prove themselves' to their customer, i.e. the MNCs. According to Lall (1996) the most important linkages are those established with local suppliers of components and services. Linkages have positive effects on the firms involved through spillovers (Görg and Ruane, 2001). From linkages established between MNCs and local suppliers, the former can bring not only technical, but also informational, financial, organisational and managerial externalities (Crone and Roper, 2001; Ivarsson and Alvstam, 2005; Lim and Fong, 1982; UNCTAD, 2001). Lall (1978) finds that MNCs improve the productivity of indigenous firms by providing technical assistance and training, by assisting them in purchasing raw materials

and by pressuring suppliers to meet high standards of reliability and speed of delivery. These vertical spillovers can then enhance the innovation capability of local suppliers. Recent case studies by Ivarsson and Alvstam (2005) have explained that a substantial proportion of domestic suppliers, with the exception of Mexico, have been provided with technological assistance by Volvo as part of a mutual business relationship.

2.2. Vertical FDI Spillovers

Vertical linkages between multinational companies and domestic suppliers are increasingly regarded as an important channel for the diffusion of technology. If FDI were to generate spillovers, they are more likely to happen through vertical relationships than through horizontal (Rodriguez-Clare, 1996; Markusen and Venables, 1999; Javorcik, 2004). MNCs can produce positive externalities that benefit host country firms with the creation of linkages (Rodriguez-Clare, 1996; Javorcik, 2004; Ivarsson and Alvstam, 2005).

The studies on linkages have received more attention, with increasing numbers of studies addressing the issue of spillovers generated through vertical linkages (Blomstrom, Kokko and Zejan, 2000; UNCTAD, 2001; Giroud, 2003; Javorcik, 2004; Blalock and Gertler, 2008). Moreover, some recent studies have proved that vertical spillover is more likely to be positive as multinationals have no incentive to prevent technology diffusion to upstream sectors. They may benefit from improved performance of intermediate input suppliers (Javorcik, 2004; Kugler, 2006). Using a new data set on the growth of large industries in 170 American cities between 1956 and 1987, Glaeser, Kallal, Scheinkman and Shleifer (1992) found that local competition and urban variety, but not regional specialisation, encourage employment growth in industries. The evidence suggests that important knowledge spillovers might occur between, rather than within, industries.

There are various empirical studies of intra-industry spillovers for host-country firms from manufacturing activities by subsidiaries, and most of the studies found positive inter-industry spillovers (see, for example, Blalock, 2001; Javorcik, 2004; Ivarsson and Alvstam, 2005; Blalock and Gertler, 2008; Liu, Wang, and Wei 2009; Yang, Xu, Wang, Lai, and Wei, 2009; Motohashi and Yuan, 2010). Numerous empirical studies have been conducted on these topics. For example, studies have considered how vertical linkages impact on specific industries (Dries and Swinnen, 2004; Kelegama and Foley, 1999), and the issue of MNE-supplier technology and knowledge transfer (Halbach, 1989; UNCTAD, 2001; Blalock and Gertler, 2003; Giroud, 2003; Ivarsson and Alvstam, 2005).

Empirical studies focusing on case studies and firm-level data have shown that, with time, linkages assist in upgrading domestic suppliers, through increased technological and other capabilities and subsequent spillover effects on the rest of the economy (Giroud, 2003; Kelegama and Foley, 1999; Scott-Kennel, 2004; UNCTAD, 2001). McAleese and McDonald (1978) found that vertical linkages increased over time in Ireland, not only because of the various production processing stages within foreign affiliates, but also because foreign firms were keen to attract and develop local suppliers, local industrial policy, and autonomous developments arising out of the growth of the entire manufacturing industry. Lall (1980), in his empirical study of vertical technology transfer in the Indian trucking industry, revealed

that vertical technology transfer can take place through the assistance of multinational firms through various methods: in setting up prospective suppliers' production capacities, in providing technical assistance or information to raise the quality of suppliers' products or to facilitate innovations and in providing training and help in management and organisation. His study finds positive backward linkage effects of foreign firms on the Indian trucking industry.

In the study by Lorentzen and Mollgaard (2000) of the automobile sector in Central and Eastern Europe, they found that technological competence is diffused along the automotive value chain, especially among upper-tier suppliers and assemblers, and that firms are organised in networks. So the East European car component sector reflects the key technological and organisational trends, including probably the presence of the new breed of so-called 0.5 tier suppliers that characterise the world's automotive industry. It has also been suggested that investments in the East European automotive sector will lead to technological spillovers with the potential to upgrade local productive capabilities. Unfortunately, the findings show that exclusivity and technology transfer are relatively weakly linked. The study also found weak evidence that the presence of exclusivity requested by the customer decreases the likelihood of gaining technology from customers.

Several studies of vertical spillover also find evidence that is consistent with knowledge transfer through vertical linkages. For example, Blalock (2001) for Indonesia, Schoors and van der Tol (2001) for Hungary, López-Córdova (2003) for Mexico, Javorcik (2004) for Lithuania, Blalock and Gertler (2003) for Indonesia Liu, Wang, and Wei (2009), Yang, Xu, Wang, Lai, and Wei (2009) and Motohashi and Yuan (2010) for China all find evidence of positive spillovers through linkages between local firms and MNCs. Blalock (2001) measured the effect of downstream FDI on the growth of local firm productivity in Indonesia and found strong evidence that suppliers learn from multinational customers. This result suggests that vertical supply chains are a channel for technology transfer from FDI. Using plant-level data for manufacturing firms in Mexico from 1993 to 2000, López-Córdova (2003) demonstrated that foreign capital improves total factor productivity (TFP), with positive inter-industry externalities prevailing over a negative intra-industry effect. By using panel data for Lithuania from 1996 to 2000, Javorcik (2004) examined whether the productivity of domestic firms is correlated with the presence of multinationals in downstream sectors (potential customers). The empirical results are consistent with the existence of productivity externalities from FDI taking place through contacts between foreign affiliates and their local suppliers in upstream sectors. They also find that downstream FDI increases output and firm value-added while decreasing prices and market concentration.

There is also a study that used case-study methods to identify spillovers through vertical relationships. Ivarsson and Alvstam (2005) discussed in great depth how MNCs engage in transfer activities that benefit local suppliers. They carried out a study on international technology transfer through business linkages established between MNCs and local suppliers. In the case study they investigated Volvo and its local suppliers in India. The findings show that Volvo seems to give its suppliers more assistance related to product technology than to production technology. Depending on their absorptive capacity and their commitment to learn, some suppliers gained advantages, while those failing to learn risked losing their business

with Volvo. Another interesting finding is that the most substantial differences in technological assistance and its effect upon supplier operations are related to the fact that Volvo seems to provide more technological assistance to suppliers with the lowest supplier evaluation manual (SEM) score than to other suppliers. In order to determine which suppliers deserve technological assistance, Volvo utilise a supplier evaluation manual (SEM), where each individual supplier is regularly assessed within a number of key areas that indicate their internal capacity, e.g. their ownership profile, global ability, management structure, quality systems, logistics, after-market services, product and process competence, product development and finance (see e.g. Edström & Ifwarsson 2001). Therefore, those suppliers with the lowest SEM score will be provided relevant technological assistance in order for them to remain a long-term approved supplier to Volvo.

Liu, Wang, and Wei (2009) examined the linkage effects of FDI on firm-level productivity in Chinese manufacturing. They found that FDI generates positive vertical linkage effects in Chinese manufacturing not only at national level but also at regional levels. However, they found limited positive horizontal spillovers at the regional level. Another study by Lin, Liu and Zhang (2009) on China presents strong evidence that FDI has generated beneficial vertical spillover effects on Chinese domestic firms. The study produces support that regardless of the motivation of FDI there is strong evidence of forward spillovers from all types of FDI. Moreover, the study also demonstrates strong evidence of backward spillovers. In related study, Motohashi and Yuan (2010) compared the impact of the innovative activities of multinationals and local firms on local suppliers in China's automobile and electronics industries. Their study suggests that in the automobile industry, both multinationals and local firms in the assembly industry have vertical spillover effects on local suppliers. However, the study finds vertical spillover effects only from local firms in the assembly industry to local suppliers in the electronics industry. In addition, they failed to find any horizontal spillover effects from multinationals or local firms in either the automobile industry or the electronics industry.

3. RESEARCH APPROACHES

In support of the research objectives, a case study method is adopted because it is appropriate for exploring the complex process of technology transfer. It would have been effective in order to conduct in-depth analysis on the effect of linkages, which would have been difficult to achieve using quantitative analysis. Therefore, in order to have an in-depth understanding of the matter, interviews and first person accounts need to be heard from the people involved in order to get valuable information. Therefore, by using detailed firm-level case evidence, this research is able to provide new case evidence and contribute to an increased understanding as to the extent to which MNCs (through business relationships with local firms) facilitate technological upgrading among domestic firms in a developing country.

3.1. Validity & Reliability

It is crucial in all research that careful consideration be given to construct validity, internal validity, external validity and reliability (Yin, 1989). Yin (1994) suggested using multiple sources of evidence as the way to ensure construct validity. Yin (1994) listed six sources of evidence for data collection in the case study protocol: documentation, archival records,

interviews, direct observation, participant observation, and physical artefacts. Not all sources are essential in every case study but the importance of multiple sources of data to the reliability of the study is well established (Stake, 1995; Yin, 1994). Several past studies have used different types of data sources. Sutton and Callahan (1987) relied exclusively on qualitative data in their study of bankruptcy in Silicon Valley; Mintzberg and McHugh (1985) used qualitative data supplemented by frequency counts in their work on the National Film Board of Canada, and Eisenhardt and Bourgeois (1988) combined quantitative data from questionnaires with qualitative evidence from interviews and observations. The last three types of sources are not relevant to this study and therefore, they are not used. Following the suggestion by Yin (1994), this study uses multiple sources of evidence such as interviews, company reports and archival records. The goal of using these three sources is to obtain a rich set of data.

3.2. Data Collection Process

The data was collected through semi-structured personal interviews with top level management. The relevant information was collected in order to have an in-depth understanding on the extent to which MNCs provide for their local suppliers in Malaysia, the domestic companies' management know-how and how domestic suppliers can improve their technological capability through a transfer of both product and production technology. When considering participants, the choice was to interview MNCs' representatives who have real experience, in order to enable the gathering of rich data. A total of 9 interviews were conducted: two interviews with an American firm, five interviews with three different Japanese firms and two interviews with a European firm. In order to achieve information-richness of the case selected, this study uses three important criteria in selecting the cases. Firstly, the firm must have already operated in Malaysia for a relatively long period in which their presence has already had a significant contribution to the economic growth of the country. In addition, firms which have already had a long period of operation are more likely to have linkages/business links with domestic firms. Secondly, the selected firms must be among the largest in terms of output in the selected industries. Thirdly, the firms will be from the main industries in Malaysia which have attracted a substantial amount of FDI: that is, in this case, the electrical and electronics industry. The selection of the Electrical and Electronics industry is motivated by the fact that business relationships between local suppliers and MNCs are very significant in terms of potential technology linkages. In addition, the electrical & electronics (E&E) industry is Malaysia's leading industrial sector, contributing significantly to the country's manufacturing output, exports and employment. American, European and Japanese MNCs were selected for this case study because they are the major sources of FDI in Malaysia. Therefore, an analysis of the backward linkages between American, European and Japanese MNCs and local suppliers in the electrical and electronics industry in Malaysia will give a very good picture of vertical FDI spillovers in Malaysia.

3.3. The Interview Process

Initially, and most importantly, in order to guarantee reliability, the details of the procedures followed in the interview process were constructed. Firstly, in order to secure the interviews, we wrote to the CEO of respecting firms and asked them for permission to conduct an interview with a suitable person. The letter also confirmed that all answers and responses in the interview

would be kept confidential and results would be used only for academic purposes with no specific individuals identified. All interviews took place at the respondent's offices, and each interview lasted between forty five minutes to one hour and was conducted in English. The interviewees were assisted with some guiding questions, and interviewer made notes in order to capture some crucial points. A semi-structured in-depth interview format was used where a list of pre-prepared open-ended questions were asked. These open-ended pre-prepared questions were designed to extract detailed and crucial information on how technology transfer occurs. Moreover, this approach enabled the researcher to focus on the main topic rather than a more general one and address more specific questions. Obviously, in the interview process, the interviewer did not attempt to influence the responses of interviewees. Each respondent explained the topics asked according to their own conscience and understanding. It is important to stress that a triangulation strategy was used in the interview process, where in each case, two separate interviews were conducted. In each firm, we had selected two very important or senior people as interviewees who are responsible for handling matters with suppliers and dealing with the production process. In order to keep the research results confidential and use them solely for academic purposes, no specific individuals or names of companies will be identified. Hence, the study uses pseudonyms in place of the names of companies and only refers to the position or job title of the respondents. The interviews were conducted one-to-one, digitally recorded and subsequently transcribed. As for data preparation and analysis, a systematic approach was undertaken which involved a process of organising, coding and interpreting all inputs from the interviews. As a crucial proof that all respondents were actually talked to the author, all quotations were direct quotes and not be edited and therefore, it was an authentic material which contains grammar mistakes. It was facilitated by the use of text-analysis programmes which are known as Nvivo, a systematic analysis programme which deals with qualitative data analysis.

4. REULTS

4.1. Knowledge Diffusion through High Quality & Standard Requirements

The evidence obtained from the interviews shows that MNCs in this study played an important role in demonstrating the importance of quality improvement strategies by imposing stringent quality requirements on their inputs supplied by local firms. They have also played an important role in demonstrating the importance of quality improvement by outlining a clear strategy as to how local suppliers can increase the quality of their products. The strategy includes giving a high priority to the quality of goods produced.

Where quality and high standard requirements are concerned, both American and Japanese MNCs are very similar in nature in this study. American MNCs require suppliers to meet all requirements set up by the company and they put high pressure to local suppliers in order for them to improve. The company will inform the local suppliers of their requirements and will ask local suppliers whether they can fulfil these demands. This is evidenced below, as the Production Manager pointed out:

> *We will definitely tell them. For example, if they need a higher tarnish machine for bigger parts so we will talk to local suppliers we know that next year we need bigger parts, so they need to invest in higher tarnish machine to make a bigger parts whether they are willing to invest. (US co. 1)*

Similarly the Procurement & Logistics Manager said:

> *We continue to give them pressure they will improve to 90 percent of course so indirectly they save and all these savings they pass it to us. We help you to improve, so you don't waste money. (US co. 1)*

As for Japanese MNCs, the quality requirements are set by the top management. The Japanese believe quality control should start from the top. Top management initiates all quality programmes and supports these down the line. They believe if the top management fails to support the programmes, it will have poor prospects. The company made it clear to management that most of the quality problems that exist in a company cannot be controlled by employees. It is therefore imperative for the top management to give quality improvement objectives the highest priority in organisational policies and strategies. The head of production department of Japan co. 1 said:

> *We provide them with an agreement, in terms of quality wise, set by top management. You have to meet everything. (Japan co. 1)*

Satisfying consumers' quality requirements has always played a major role in determining the destiny of any organisation. The Japanese apparently understood this point and have continuously directed their efforts to achieve the highest possible quality. One of the priorities is to improve the quality of incoming materials by improving vendor management. Local suppliers have to produce based on specifications. Suppliers have to meet all specifications in terms of quantity, quality, delivery and costs. In order to ensure that suppliers meet all requirements for quality, people from the company will visit the supplier's production site and observe and inspect the quality of their products. This emerged clearly from an interview with the Head of the Production Department of Japan co. 1:

> *They have to produce based on the specifications that we provide. (Japan co. 1)*

Similarly the Production Manager of Japan co. 3 said:

> *We are very specific with our suppliers; they have to be able to produce the parts that we want in terms of specifications, quantity, unit price, delivery and of course in terms of quality. (Japan co. 3)*

The statement was echoed by the Assistant Manager of Purchasing and Administration of Japan co. 3:

> *We went to visit the suppliers' premises in order to verify that the products ordered will be produced according to our specifications. (Japan co. 3)*

Japanese MNCs believe that customer satisfaction is, quite simply, the primary goal of management. Therefore, constant efforts are needed to enhance customer satisfaction. They believe product excellence is paramount for customer satisfaction and should be a primary management objective. In order to achieve this, Japanese MNCs constantly check supplier's quality systems. The supplier has to supply products based on all specifications as agreed in the contract. Suppliers always have to prepare to supply products to the highest quality which has been specified in the agreement. The Assistant Manager of Purchasing and Administration of Japan co. 3 pointed out:

> *We are very specific and precise on parts, components and raw material that we get from our suppliers. We are in part of the supply chain and we aim to please our buyer. Because of that we always ask for prototype before we decide on anything. Right about halfway through, 75% completed and at the final stage. (Japan co. 3)*

The Production Manager of Japan co. 3 added:

> *We do have constant checks on the quality systems and the suppliers' ability to supply products in accordance with the requirements and within the specified time frame is always regarded highly by our company. (Japan co. 3)*

4.2. Quality Compliances

Local suppliers also have to meet and comply with all quality standards determined by MNC, who will give support in order for suppliers to get quality compliance. The findings from the case study show that local suppliers must have all quality systems in place. In relation to quality compliances, MNCs in this study require local suppliers to achieve quality compliance by obtaining International Standards Organization (ISO) quality certifications as a quality benchmark. They always monitor suppliers' quality, and inspections of suppliers' quality systems are always of paramount importance. They have their annual evaluation of supplier's quality performance and always work together with suppliers to resolve any quality issues. They also have annual assessments of suppliers' quality performance and they even have an agreement between themselves and suppliers regarding quality. Some of them will have regular assessments of suppliers' quality and evaluations of the suppliers' ability to provide the products in accordance with the MNC requirements.

American MNCs place a great emphasis on product quality. They require local suppliers to adhere to their quality compliance measures. American MNCs always monitor supplier's quality and make inspections of suppliers' quality systems, which are always top of their agenda. They always ask local suppliers about their plans to get quality compliance certificates such as the ISO and require all certificates to be in place if they want to do business. Local suppliers are considered unfit to be their suppliers if they are not quality compliant. They reiterated:

> *Every supplier that doing business with us must have a quality system in place such as the IS, or the TL. (US co. 1)*
>
> *We look at quality system; we look at the technology; we look at human capital, business. We need to do some background financial check. (US co. 1)*

American MNCs also require local suppliers to be punctual in terms of delivery. They must have all quality systems in place. They evaluate their supplier's delivery and quality performance every year or every two years. Their outsourcing quality team will work together with suppliers in order to resolve whatever quality or delivery issues occur with them. The Procurement & Logistics Manager stressed

> *We are very straight forward. We tell them we want them to ship by Friday they will send it on Friday. (US co. 1)*

Japanese MNCs place great stress on the importance of high quality production in establishing and maintaining their global competitive position. In order to achieve this objective, they have to satisfy their customers and really understand the real requirements of customers. Because of this, they require their suppliers to supply components of the highest quality. They insist on local suppliers adopting total quality management (TQM) programmes of their own. The importance of TQM for local suppliers is paramount in order to improve their current business practices as well as the quality of their products and to ensure long-term survival. The successful implementation and adoption of TQM in business organisations therefore requires careful planning and an enormous amount of time and effort from local suppliers. The importance of maintaining high quality production from suppliers is vital as the section Head of Production of Japan co. 2 reiterated:

> *Suppliers have to conduct process quality control, machine's parameter control and they must have machine's preventive material schedule and outgoing quality control to check data. They have to have samples, and sometimes they have to prepare good dummy set that will be sent to us. They must have all the meters. They must be able to make sure that their workers are capable of producing all the components that we required. (Japan co. 2)*

While suppliers also have to meet and comply with all quality standards determined by MNCs, MNCs will give support in order for suppliers to reach quality compliance. The certification process is compulsory for all suppliers. This includes supplier's quality control system. All suppliers have to comply, not only in terms of the company quality practices but also regarding the standard quality requirements such as ISO and QUASE (quality, safety and environment). All this must be in place before the MNC agrees to do business with suppliers. This is because the company is carrying its image and reputation, and they have to satisfy their final customers. The company supports the suppliers complying with the quality standards and even provides training to suppliers' quality team. The company's support is important because there are several barriers to the effective implementation of quality in small companies, such as a lack of business experience and knowledge, and limitation of financial and human resources. The

commitment to quality compliance set up by Japanese MNCs is elucidated by the Assistant Manager of Purchasing and Administration of Japan co. 3, who stressed:

> *When we select our vendors, we have to consider whether they have complied all quality standards. We have a team that ensures that production is systematic by abiding to the guidelines by SIRIM. We managed to achieve our ISO-certification of ISO 9001 in the years 2000 and 2002. We do share this policy with our suppliers and we hope that suppliers will adhere to this guideline in order to be more systematic. (Japan co. 3)*

Similarly the Head of the Production Department of Japan co. 1 said:

> *They must be able to supply the quantity and the quality to meet our requirement. Our suppliers have also to comply with our practice. Our local suppliers have to comply many things, not only ISO but also QUASE (Quality, safety and environment). We will support them in order for them to comply with this practise. (Japan co. 1)*

4.3. Controlling the Standard Requirements

From this study, it is obvious that MNCs are transferring their ideas on inventory and quality control to their local suppliers where they have constant checking of suppliers' quality systems. Moreover, they have consultations and verification of quality issues with suppliers. They also have a monthly quality review with suppliers, where detailed assessments of the supplier's quality systems are conducted by the MNC quality team. They also do testing of suppliers' quality plans and undertake auditing of the suppliers' quality systems. Additionally, local suppliers have to supply products based on all specifications as established in the agreement. They also have pre and post inspections of supplier's product quality daily, based on batches of products. The inspections normally take place in supplier's premises. When doing this, they have a special team to deal with supplier's quality system. They insist that all suppliers have to meet all the requirements set up by the company, and they put high pressure to local suppliers to achieve the requirements. They call for local suppliers to be punctual in terms of delivery. As far as decision-making is concerned, the decision is determined by their top management where local suppliers have to produce goods based on specifications made by the top management of MNCs. Local suppliers have to meet all specifications in terms of quantity, quality, delivery and costs. MNCs do not simply place high standard requirements upon suppliers, but also place strict assessments on the suppliers' products.

Japanese MNCs conduct pre and post-inspections on suppliers' product quality on a daily basis, based on batches. They sometimes even send their quality control staff to the suppliers' factories to educate employees about quality. In fact, Japanese MNCs believe the education and training of suppliers should be the highest priority where improving suppliers' management is concerned. This is to ensure the improvement of the quality of incoming materials by improving vendor management. The company believes undetected defects in incoming raw materials will create problems somewhere down the line. It is crucial to have a proactive identification and correction of problems at the early stages of the production process otherwise it could affect

company performance if it is discovered at a later stage of production. Therefore, it is of the utmost importance to detect the defective item right at the source, which is, in this case, the vendor (supplier). The inspections normally take place in supplier's premises. In doing so, they have a special team to deal with suppliers' quality system. The team conducts a test on all aspects of the products. As pointed out by the section Head of Production of Japan co. 2 and Head of the Production department of Japan co. 1:

> *Every year, people who are in charge will test and find which suppliers can provide us with the best supplies in terms of quality, process, and costs. (Japan co. 2)*

> *We have inspections where Part Quality Assurance (PQA) Department will play the role. Whatever parts that supplied to us PQA Department will set certain standard for suppliers to meet. (Japan co. 1)*

Although most of the time, local suppliers are being awarded supplying contracts for components, the selection criteria remain stringent. Steps have been taken in order to check for product quality ranges from random quality checks and detailed records to descriptions of incoming components and damage control procedures. Other pertinent steps are also taken to ensure that quality of the products is up to par. Suppliers who are found to be lacking in terms of product quality will be made to pay for costs and are removed temporarily from the suppliers' list until the company is satisfied that the suppliers are back on track. This emerged clearly from an interview with the Director of Procurement of Europe co. 1:

> *We have a set of procedure, mainly based on capability, price, establishment, etc when selecting our suppliers. (Europe co. 1)*

Similarly the Purchasing Section Manager said:

> *The company imposes very strict quality control process. Every single incoming product has a batch lot where it will record everything for example, manufactured dates of the parts, so that once production has a problem we will trace back by the batch lot, so we can trace everything back. (Europe co. 1)*

Strict quality controls guarantee that desired products are produced as specified. A product will go through several rounds of inspection until it is deemed to fulfill the required specifications and possess the desired quality standards. Only then will it be supplied to the company. Although the strict quality checks take time and effort from both the local suppliers and company, failing to ensure the quality control would pose potential high losses for the company and suppliers in terms of covering the costs of rejected products, strained business relationships and more time spent on corrective actions. The commitment to ensuring that each product is manufactured according to the stringent quality specifications set by this company is manifested below where the Purchasing Section Manager of Europe co. 1 reiterated:

> *If suppliers do not meet the specification they will have the discussion among them on how to improve the process. Once everything is fine, they will start shipment then we have random quality check at in coming. We will do quality check, and they have to pass the quality check. (Europe co. 1)*

The Director of Procurement added:

> *They have to have the corrective action plan and have to give everything, then they will come up with recovery plans, such as how to recover quality issues. If the products were rejected in the production, we have to decide on who has to pay for the rejected products. (Europe co. 1)*

In order to ensure the local suppliers deliver the products as required, the staff of the company regularly visits the suppliers' sites to run the production process together and anticipate any production glitches that could disrupt production and, in turn, create a chain reaction that could affect the principal companies' production target. The company believes prior visits to the suppliers' factories could be a better way to gauge the capabilities of potential suppliers in order to produce goods as instructed and to develop a good working relationship between the suppliers and the company. This emerged clearly from an interview with Europe co. 1 Purchasing Section Manager:

> *Yes, we do engineering and sourcing. For example, gerber file, we will go over to their site to see their process and see how they do the parts and everything to make sure orientation is all correct. (Europe co. 1)*

She added:

> *QA, engineering, CPE will actually visit them, then suppliers have to show them the flow of the process building, and then they will see whether it meets the criteria based on specifications. (Europe co. 1)*

The company operates a two-way communication process with its local suppliers. Whenever relevant, views from the suppliers are taken into consideration if the points raised are proven to be valid and would be of interest in maintaining or increasing the product quality. Audits are run through in order to ensure that the company has some form of control over the production process. The company's willingness to accept the suppliers' views is shown below where the Purchasing Section Manager pointed out:

> *When QA go and evaluate the supplier, the supplier will definitely present how they do quality process, then we will tell them our standard and how we do it, and whether they can meet our standard or not. (Europe co. 1)*

The Director of Procurement added:

> *We have an audit system as well as discussion in support of suppliers' quality management (Europe co. 1)*

In order to ensure the consistent availability of products, inventory control is used predominantly to guarantee there is a rational number of stock in store and ready stock at the supplier's site at a compromised quantity that is not financially burdening to either the supplier or the principal companies. The Purchasing Section Manager said;

We give them the forecasting sometimes six month forecast, 12 month forecast so it is the rolling forecast that we give them based on that we will keep about 11/2 to 2 month of inventory at one time based on customer forecast. (Europe co. 1)

4.4. High Quality and Standard Requirements as a Channel of Spillovers.

The present results from the interviews on knowledge diffusion through high quality requirements and quality demonstration are important in at least two major respects. Firstly, when MNCs develop business relationships with local suppliers, they created buyer-supplier relationships which involve not only transactions of physical inputs but also flows of intangible inputs from foreign buyers to their suppliers. Through business linkages with local suppliers, MNCs potentially will offer local suppliers with benefits in terms of technology or management know-how. Dries and Swinnen (2004) confirms that MNCs can enhance local suppliers' ability with the introduction of focused assistance programmes. Some of these intangible inputs or focused assisted programmes could entail assistance in terms of financing, management techniques, quality control, just in time procedures, workers training, and production standard requirements (Ivarsson and Alvstam, 2005; Javorcik, 2004; Crone and Roper, 2001; UNCTAD, 2001; Lim and Fong, 1982; Lall, 1980). The superior knowledge brought into the economy through FDI may leak to domestic firms; therefore MNCs may benefit from improved performance of local suppliers when imposing higher requirements for product quality as they have no incentive to prevent technology diffusion to upstream sectors (Javorcik, 2004). While MNCs have a strong incentive to prevent knowledge leakage to their competitors, they may want to transfer expertise and know-how to their suppliers for their own interests. Passing on information about new technologies or business practices (such as quality control processes or inventory management techniques) to suppliers helps to reduce input costs, increase input quality, and thus benefit MNCs (Javorcik, 2008). Moreover, Grossman and Helpman (1991) stress that interaction between a domestic producer and its international agent contributes to the enhancement of the knowledge of domestic producers. All this knowledge could be diffused from MNCs to local firms because MNCs from developed countries have superior technology as well as management techniques when compared to local firms. Blomström and Sjöholm (1999, p. 915-916) state that "when firms establish affiliates abroad and become multinational they bring with them some amount of proprietary technology that constitutes their firm-specific advantage and allows them to compete successfully with local firms who have the superior knowledge of local markets, consumer preferences and business practices".

Secondly, the results from the case study are consistent with the previous findings which suggest that local suppliers will improve their operation because they are forced to meet higher standards of quality, requirements, reliability and delivery of their products (Javorcik, 2008; Dries and Swinnen, 2004; Javorcik, 2004; Tan and Batra, 1999; Brash, 1966). Javorcik (2008) reveals that the most frequent requirements from MNCs were improvements to the quality-assurance process, acquisition of a quality certification (such as an ISO 9000), improvements to the timeliness of deliveries, use of a new technology or the purchase of new equipment. The study further suggests that as a result of imposing higher standards on their suppliers for product quality, technological content, or on-time delivery, multinationals may induce local producers in upstream sectors to make improvements (Javorcik, 2008). Tan and Batra (1999)

have found that buyers place greater emphasis on QC and JIT, equipment, technology, staff secondment and training to local suppliers. Brash (1966), in a study of the impact made by General Motors on its Australian local suppliers, emphasises the importance of the MNCs' stricter quality control, which also had an impact on the suppliers.

Thirdly, this finding complements the endogenous growth theory which emphasises the role of internationalisation in enhancing innovation which is generated from an international flow of ideas (Grossman and Helpman, 1991). This source of international spillovers which flow from buyers to sellers through their interactions enables local sellers to access the ideas and technology developed by their foreign counterparts. Grossman and Helpman (1991) stress that interaction between a domestic producer and its international agent contributes to the enhancement of the knowledge of domestic producers. It is interesting to note that, in order to fulfill the high quality requirements associated with goods targeted for the international markets, export-oriented MNCs in this study impose more stringent cost and quality requirements. As a result, they give knowledge and demonstrate the theory of how local suppliers can improve their product quality and promote their efficiency. Girma, Kneller and Pisu (2007) indicate that the acquisition of FDI is generally efficiency-promoting. Demonstration of quality improvement effects takes place where constant checking, strict and regular assessment, pre and post inspection by MNCs enable local suppliers to imitate the strategy in order to maintain their product quality. Saggi (2002) defines demonstration effects as occurring through the imitation and reverse engineering of a multinational enterprise's products and practices by local (host country) firms.

The MNCs in this study believe that by imposing a strict quality system they can help their partner, in this case local suppliers, to improve their product quality, and at the same time local suppliers can also benefit from their capability of supplying high quality products to other customers. MNCs are able to provide assistance to local suppliers because they expect local suppliers to provide products of a higher standard, which is essential to maintain MNCs' reputation. In this case, local suppliers have to meet the requirements of MNCs for higher standards of quality, reliability, and prompt delivery. Tan and Batra (1999) confirm in their earlier study that one of the most important types of assistance to suppliers focuses on improving quality and timely delivery of parts and components through quality control, JIT, technology improvement and worker training. This source of international spillovers which flows from buyers to sellers through their interactions enables local sellers to access the ideas and technology developed by their foreign counterparts.

Findings from this study suggest that MNCs can act as a catalyst to the quality improvement of local suppliers' products. Linkages established between MNCs and local suppliers have contributed to a positive influence on the development of local firms. Hence, it can conceivably be proposed that:

> *High quality and standard requirements imposed by MNCs can act as a channel of spillovers.*

5. CONCLUSIONS AND IMPLICATIONS

The case evidence was able to provide a detailed understanding as to the extent to which MNCs, through linkages with local firms, may facilitate the innovation activities of said local firms. Previous studies were unable to specifically identify how knowledge and technology were transferred through these linkages. Little attention has been paid to how these linkages may affect and improve the innovation activities of local suppliers. Therefore, the present study was designed to determine how and in what ways technology is transferred through these linkages. The findings based on the five cases contribute to the existing studies whereby this study sheds light on the various means that could be channels of spillover and how these linkage effects may improve the innovation activities of local suppliers. The study provides new insight and derives a number of testable propositions.

Hence, this study goes beyond the existing research in the area of FDI spillovers by opening the black box of MNCs' technology and knowledge spillovers in Malaysia. This study takes a different approach by focusing on MNCs as the generators of spillovers and local suppliers as receivers through vertical linkages and business relationships. In doing so, this study was able to make an important contribution to the FDI spillover literature by exploring the channels through which technology and knowledge could be transferred to the host country.

Thirdly, this study validates earlier theoretical and empirical research that vertical spillovers are more likely to be positive and it also explores the effects of the externalities created from FDI via vertical linkages (Rodriguez-Clare, 1996; Markusen and Venables, 1999; Javorcik, 2004). This study also supports the knowledge and technology-related theory (the Endogenous Growth Theory by Grossman and Helpman, 1991; Coe and Helpman, 1995); the theory emphasises the role of international trade in enhancing innovation generated from an international flow of ideas among countries

The findings show the importance of various advantages that local businesses could gain from business relationships with MNCs. For instance, activities like vendor management programmes to improve the product-quality of local suppliers may improve local suppliers' performance. In addition, MNCs' support for local suppliers to reach quality compliance is valuable as quality compliance certification is hugely important and crucial for today's business activities. The adaptation of total quality management (TQM) programmes by local suppliers from MNCs' requirements could also help local suppliers to have advanced quality planning and adequate quality control throughout the supply chain. Moreover, constant interactions between MNCs' engineers and local suppliers enable them to share new ideas. Consultations and discussions about product design, processes and technical specifications provide local suppliers with skills that could enhanced their innovative capability.

For policy-makers, the evidence obtained in this study related to foreign innovation activities as a significant factor for the improvement of national innovative capacity justifies government policies that aim to encourage more capital intensive foreign investments. Attracting more technology intensive foreign investments from leading economy countries may be an effective way of catching up with technological leaders in developed countries. Hence, providing

incentives to induce technology intensive foreign investments will benefit Malaysia's innovative capacity as a whole. As Malaysia is scheduled to develop into a knowledge economy, policy makers have to design appropriate policies to support innovation. Greater efforts must be made to attract foreign investments that prioritise R&D activities, in order to foster innovation as this is complementary to the efforts of the Malaysian government to create a knowledge-based economy. In addition, the policy makers may provide incentives like grants to MNCs that put vital time, effort and investment into R&D activities.

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