

Innovation Strategies of MNCs: A Case Study from Turkey

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ABSTRACT

In this study, innovation and technology transfer strategies of foreign firms in Turkey and the impact of vertical and horizontal linkages, labour turnover and technology spillover on these activities are analyzed by adopting a grounded theory approach, which allows a theory to emerge from field work. It is found that the foreign firms are more innovative than their local partners, and generally transfer technology from their parent companies in home country not from local market. Additionally, findings of this study reiterate the importance of tacitness of knowledge, and confirm that technology cannot easily be transferred through passive mechanisms.

Key Words: *Foreign direct investment, Multinational Corporation, innovation, technology transfer, İstanbul, Turkey*

1. INTRODUCTION

The inflow of foreign direct investment (FDI) increased rapidly during the late 1980s and the 1990s as a result of the rapid internationalization of the world economy. Academics and governments have been increasingly concerned with the effects of multinational enterprises (MNEs) particularly on technological progress and on the role of foreign direct investment (FDI) in the process of economic development both in developing and developed economies. Contributions to our understanding of such effects have been many and varied –from econometric models assessing the impact of foreign direct investment (FDI) on economies and industries, to management-based studies looking at the activities and roles of the companies themselves [1]. On one hand, many would argue that, FDI is an important channel for the transfer of technology to developing countries and modern, advanced technologies introduced by multinational firms can diffuse to local firms through spillovers (imitation, demonstration effects, training local labour, vertical technology transfers, etc.). Actually, some empirical studies have found that FDI has a positive effect on local economy

[2 - 9]. On the other hand, others have reported that there is an inverse relationship between FDI and industrial productivity in host countries [5], [10 – 12], and potential drawbacks do exist, including a deterioration of the balance of payments, as profits are repatriated having negative impacts on competition in national markets. At present the consensus seems to be that there is a positive association between FDI inflows and economic growth, provided that receiving countries have reached a minimum level of educational, technological and/or infrastructure development [13].

Turkey which has always attracted very low inflows of FDI compare to other comparable countries has been a relatively closed market to foreign companies until 1980. It was only with a shift in Turkey from a protectionist trade regime to export-oriented economic liberalization in the mid-1980s that FDI increased significantly. The cumulative FDI until 1980 was only \$228 million. Annual FDI flows in Turkey grew rapidly from the mid-1980s, reaching \$1 billion in 1990 (Figure 1). During the 1990s when global FDI flows accelerated, FDI in Turkey remained static. The average amount of FDI remained below \$1 billion a year.

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Compared to its peers, Turkey receives the lowest FDI flows. On average, it has attracted net FDI flows of 0,32% of GDP in the 1975-2001 period (and only 0,44% in the 1990s when global FDI flows reached the peak) [14]. Total net FDI increased by 54% during 2002-2003, 59% during 2003-2004, 26% during 2004-2005, 99% during 2005-2006 and 10% during 2006-2007. Until this year, these extraordinary rates of increase, evidencing an FDI surge, significantly exceeded those in the corresponding total global FDI flows. By attracting \$22.03 billion FDI in 2007 - its highest ever total- Turkey ranked among the top five developing countries and the top 16 countries in the world. In 2007, close to 60% of the FDI flows, two-thirds of the total originating in the European Union, was recorded in the financial intermediation sector

through the full or partial foreign acquisition of Turkish financial firms such as Akbank, Oyak Bank and Finans Bank. The manufacturing sector accounted for about 22% of FDI inflows. In 2007, no FDI inflows were recorded as a result of privatization, unlike in 2004, 2005 and 2006. The negative trend in international direct investment flows persisted in the first quarter of 2009 as the signals of recovery from the global financial and economic crisis remained weak. As of end of first quarter of 2009, FDI inflows to Turkey totalled USD 2.2 billion, corresponding to 50 % fall compared to the same period of the previous year. The expectation for the year-end points out to a level below USD 10 billion in case this fall will be valid for the remaining of the year [14].

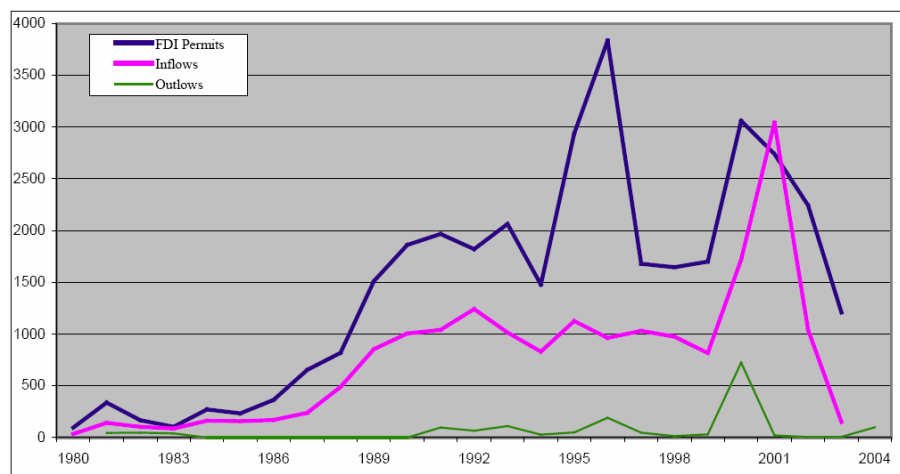


Figure 1. FDI Permits, Actual Inflows and Outflows of Direct Investments to and From Turkey by Years (Million \$)

Source: GDFI (Turkey's General Directorate of Foreign Investment), Turkish Treasury cited in [14].

The studies on the FDI inflows in Turkey are generally focused on locational preferences of MNCs and FDI attracting performance of the country. For example, Erdilek (1982, 1986) have focused on problems and directions on FDI in the country [15, 16], Lenger and Taymaz (2006), on the other hand, have studied FDI in Turkish manufacturing industries and analyzed innovation and technology transfer activities of local and foreign firms. Lenger and Taymaz (2006) show that foreign firms in Turkey are more innovative than their local counterparts in medium- and high-tech industries, but not in low-tech industries [17]. However, in both industries, foreign firms tend to transfer technology from abroad (mostly from their parent companies) and emphasise the policy aimed at encouraging innovativeness should pay due attention to in-house technological activities.

From this point of view, the aim of this study is to analyze innovation and technology transfer strategies of foreign firms in Turkey and to understand the impact of vertical and horizontal linkages, labour turnover and technology spillover on these activities by adopting a grounded theory approach. For this aim, the structure of the paper is as follows. Section one presents a brief review of the existing literature. In section two the

methodology is presented and discussed. In section three main results of the case study are obtained and the final section concludes the paper discussing the derived results and the implied policy implications.

2. THEORETICAL BACKGROUND

The literature on MNCs is generally focused on five main areas of interest to host economies: the FDI-growth nexus; FDI-trade linkages; FDI and technology transfer; FDI, privatisation and corporate governance; and host-government policies for attracting FDI. FDI and technology transfer, which is the main concern of this study, is strongly emphasized in the current empirical literature since the international transfer of technology is accepted as an important source for economic growth especially for developing countries. Before given main channels for technology transfer from FDI, three approaches provide theoretical explanations should be mentioned here; industrial organisation theories, international trade theories and endogenous growth theories.

The *industrial organization theories* attempt to examine the indirect effect or externality of FDI on host countries [18]. These studies analyze the impact of FDI on market structure and competition in host countries and the role of FDI in technology transfer [18 - 22].

According to this approach FDI is not merely a source of capital, it is also a conduit for technology transfer and human skills augmentation in host countries.

Industrial Organization studies at the industry and firm level infer the presence of international knowledge spillovers from changes in the productivity of local firms associated with the “entry” of foreign subsidiaries. Without a direct measure of technology transfers, these effects include not only technology transfers, but also the effect of increased competition from the presence of affiliates [23].

International trade theories, focus to examine why FDI occurs and how firms choose between exporting, FDI and licensing as an entry mode [18], [24 – 26]. The feature of FDI is defined as knowledge-capital which has a joint-input or ‘public goods’ property [27]. This implies that spillovers or externality of FDI can occur in host countries. However, how FDI or multinationals affect the pace and pattern of technological progress has not been discussed explicitly. One exception is that Markusen and Venables (1999) have formally shown how it is possible for FDI to act as a catalyst, leading to the development of local industry through linkage effects [18],[28].

Recent empirical models in *International Trade* have started to focus on the effects of FDI on output growth rather than measuring international R&D spillovers via trade [12], [17], [29], [30]. FDI flows are used as weights when summing the stock of foreign R&D, based on the notion that FDI increases the proximity between the home and host country and hence leads to higher spillovers in these studies [23].

The endogenous growth theories, on the other hand, consider FDI as an important source of human capital augmentation, technology change and spillovers of ideas across countries [31] and therefore FDI is expected to have a positive effect on growth [18]. But this positive effect can be realised strategic interaction between foreign firms and local firms. Rodriguez-Clare (1996) emphasizes the necessity of backward and forward linkages between foreign and local firms not only for evaluating the magnitude of spillovers which depends on local firms respond positively to the technology gap and invest in ‘learning activities’ but also realizing for positive effect to the host country [32].

Table 1. Types of Linkages Foreign and Local Firms

Form	Relationship of foreign affiliate to local enterprise		
	Vertical		Horizontal (co-operation in production)
	Backward (sourcing)	Forward (distribution)	
“pure” market transaction	“off-the-shelf” purchases	“off-the-shelf” sales	
Short-term linkage	Once-for-all or intermittent purchases (on contract)	Once-for-all or intermittent sales (on contract)	
Longer-term linkage	Longer-term (contractual) arrangement for the procurement of inputs for further processing , Subcontracting of the production of final or intermediate products	Longer-term (contractual) relationship with local distributor or end-customer Outsourcing from domestic firms to foreign affiliates	Joint projects with competing domestic firms
Equity relationship	Joint venture with supplier Establishment of new supplier-affiliate (by existing foreign affiliate)	Joint venture with local distributor or end-customer Establishment of new distribution affiliate (by existing foreign affiliate)	Horizontal joint venture Establishment of new affiliate (by existing foreign affiliate) for the production of same goods and services as it produces
“spillover”	Demonstration effects in unrelated firms <ul style="list-style-type: none"> • Spillover on processes • Spillover on product design • Spillover on formal and on tacit skills (shop-floor and managerial) Effects due to mobility of trained human resources Enterprise spin-offs Competition effects		

Source: UNCTAD, 2001:131 cited in [1]

Actually, ample theoretical and empirical research provides evidence that knowledge originating in one country increasingly transcends national boundaries and contributes to productivity growth and technological progress in other countries [33]. However, the existing literature examines separately the impact of various channels for technology transfer, and does not comprehensively investigate the integrated learning effect of a variety of spillover channels which together may affect the innovation performance of indigenous/local firms [33]. Thus, there is a lack of research evaluating various channels for technology spillovers in a unified framework. In addition, the linkages between the innovations of local firms and international technology transfer sources have not been fully explored in developing countries. It is important to examine how international technology transfer channel sources are able to enhance local innovative capacity in developing countries. From this point of view the empirical study is realized for analyzing these technology transfer channels which are namely; vertical linkages, horizontal linkages, labour turnover and technology spillover (Table 1).

2.1. Vertical Linkages

Vertical linkages involve a direct relationship between subsidiary and local suppliers (backward or upstream linkages) or customers (forward or downstream linkages). Vertical linkages, while based around transaction(s), may also involve voluntary assistance, resource or technology transfer to the local firms that are potential suppliers of intermediate goods or buyers of their own products [34]. Vertical spillovers which also refer to productivity spillovers taking place due to two different types of linkages between foreign firms and their local suppliers/customers; *backward linkages* and *forward linkages*. *Backward linkages* exist when foreign affiliates acquire goods or services from local firms, and *forward linkages* when foreign affiliates sell goods or services to local firms [35].

Backward linkages are used for all transactions and relationships between foreign subsidiaries and local suppliers in the host economy [36, 37], [1]. With these types of linkages; MNCs can provide raw materials and intermediate goods, or assist local suppliers in purchasing these inputs, as well as helping prospective suppliers to set up production facilities. They can also provide training in management and organization, and help suppliers to diversify by finding additional customers [38]. According to the studies of Giroud and Scott-Kennel in 2006; spillovers via backward linkages may take place through direct knowledge transfer from foreign customers to local suppliers; higher requirements or rewards for product quality and on-time delivery that encourage local suppliers to upgrade their production management or technology [1].

Forward linkages, on the other hand, are used to describe downstream relationships between foreign subsidiaries and host economy firms where the latter take the role of customers for intermediate or final products, and agents for marketing, distribution etc. [1]. Local firms have the opportunity to benefit from spillovers and transfers of knowledge embodied in

products, processes and technologies of the MNCs [39] and may become more productive as a result of gaining access to new, improved, or less costly intermediate inputs produced by multinationals in upstream sectors [37].

Recent empirical studies emphasize three important factors that promote vertical linkages. It seems, first, that the larger the host market and the greater the technological capabilities of local suppliers, the more pronounced are the linkages. Second, according to the model developed by Rodríguez-Clare (1996), more linkages are created when the production process of the MNEs uses intermediate goods intensively; when the costs of communication between headquarters and the affiliate production plant are large; and when the home and host countries are not too different in terms of the variety of intermediate goods produced [32]. Third, government policies can also promote linkage creation, e.g. through policies requiring a minimum of local content, although the efficiency and usefulness of such policy requirements have been debated in the literature [38]. The one of the important points should be mentioned here is that, these types of linkages do not guarantee the technology transfer from MNC to local firms, but these linkages are accepted as crucial channels for these transfers.

2.2. Horizontal (Relational) Linkages

Horizontal linkages refer to collaborative activities between foreign and local firms, typically associated with alliances and other inter-firm network relationships [1]. Horizontal linkages involve a direct inter-firm relationship (eg. an alliance, technology sharing agreement, management contract, coproduction etc.), but do not involve competitive effects, which are better classed as spillovers (since there is no direct relationship formed between the firms, although joint projects with competitors could be included) [1]. The term "relational linkages" is also used for this type of linkages, for example Chen et al (2004) suggest that relational capital is evident in both supply-chain and alliance-based relationships [40]. Crucial point here is the term is adopted for direct interfirm linkages that are centred on collaboration rather than transactions or equity ownership. Thus, relational linkages are horizontal in nature but neither confined to the supply chain nor to a single industry.

2.3. Labour Turnover

There is an extensive literature that emphasizes the importance of tacit knowledge in technological activities [41]. Technology is, at least partly, tacit and embodied in people who develop and use it. Therefore, the transfer of workers, formerly employed by foreign firms, could constitute an important channel for spillovers. In other word, if a worker employed in a technologically superior firm, moves to another one, he/she can transfer, at least, a part of that technology. Thus, labour turnover could be an important mechanism for spillovers especially when the technology is tacit, so that it is difficult to be imitated and transferred through other means [17].

2.4. International Technology Transfer

The presence of technology and R&D functions has been widely used as an indicator of an establishment’s embeddedness and technology transfer in host regions, and the lack of such activity has been a long-standing concern amongst researchers and policy makers [42 - 45]. In recent years, the extent to which multinationals are utilizing the technological externalities of host countries, and hence upgrading their investments, has been debated [44] with especially UK studies reaffirming the routine nature of MNC R&D activity. Additionally, the general emphasis on the importance of learning and knowledge transfer to economic development has focused attention on processes of collaboration between leading inward investors and regional universities and research institutes [45]. In this context regional agencies have often sought to broker relationships between industry and the higher education sector [46].

3. METHODOLOGY

In this study grounded theory approach [47 - 48] which is one of the best known theories in qualitative analyzing is adopted. Grounded theory encourages researchers to adopt an ‘open’ approach in their field study, thus allowing the development of theory (or plausible relations among concepts) that is grounded in data systematically collected and analysed [47 - 49]. This methodology also accommodates and encourages continuous research because it considers the plausibility of a theory as temporary and spatial (for more information see [47, 48], [50]).

As mentioned before, the aim of this study is to analyze innovation and technology transfer strategies of foreign firms in Turkey and to understand the impact of vertical, horizontal linkages, labour turnover and international technology transfer on these activities by

Table 2. Distribution of clusters and the ratio of selected MNCs

	Cluster 1		Cluster 2		Cluster 3		Cluster 4		Cluster 5	
	#	%	#	%	#	%	#	%	#	%
İstanbul	252	20	357	29	163	13	167	14	298	24
Selected MNCs	4	20	5	27	2	13	2	13	5	27

Within the framework of grounded theory, board directors in 18 foreign companies were accessed for interviews. In general, access to such prominent individuals is the main barrier to examining two-tier boards. However, the author had successfully approached these people in a sample of the listed MNCs in Turkey. These interviews are realized in March - July 2008 and each interview took to one and a half or two hours length. All most all of the questions are open-ended except questions that are related general structure of the MNCs and contain numerical variables. The important point has to be mentioned here is that, the aim of these study is not to reach a general conclusion, instead “to understand the process more deeply in limited cases”.

adopting a grounded theory approach. For this aim, MNCs and their innovation and technology transfer strategies are reviewed in literature at the beginning in order to identify keywords, which are used in-depth interviews. Then, İstanbul is selected as a case study area, because İstanbul is not only the most favoured city by foreign investors in Turkey (approximately, 75,4% in terms of invested capital goes that city) but also İstanbul have been a commercial and cultural centre since the Byzantine period. İstanbul provides easy access to Europe, and historically, it has a traditional link with the pepper route to eastern world. The significant historical role of İstanbul has also been affecting FDI, as the headquarters of big MNCs prefer to select location in the cities that have a cultural and historical prestige in the world. Moreover, the existence of a large potential market, “financial activities” (e.g. the existence of foreign banks and so on), “manufacturing capabilities” (i.e. cheap and qualified labour force) and “cultural activities”, are some of the other significant factors for attracting MNCs.

The number of MNCs located in İstanbul is very high, so it is very difficult to decide MNCs for in-depth interview. For this reason, a hierarchical cluster analysis is held in the case selection process. The criterion used in the cluster analysis are; establishment year, home country, sector, invested capital, ownership ratio of MNCs. The quantitative data used in this analysis was obtained from The Undersecretariat of Treasury of Turkey. With using these data, five steps cluster analysis was derived in SPSS program. With reference to the analysis, number of cases from each cluster was decided. In the firm selection process, an e-mail was sent to all MNCs. According to the replies from MNCs, firms were selected for deep-interviews. The important point here is the preservation of the rough proportionality between firm numbers in the cluster and in the case study (Table 2).

4. INNOVATION STRATEGIES OF MNCS IN İSTANBUL

The results of the case study is given under the topics of vertical linkages, horizontal linkages, labour turnover and international technology transfer, which are the main technology transfer channels from MNCs. But before that, general characteristics of interviewed MNCs without their names are summarized below.

4.1. General Characteristics of Selected MNCs

As can be seen from the Table 3 all most all of the selected firms have been established after 1980, when radical adjustments have been realized in Turkish economic structure as a result of liberal policies have been taken in by government. Thus, after this year there

has been an huge increase in the number MNCs in the country, and in İstanbul.

Home countries of these investments are mostly OECD countries and 12/18 are from EU countries in the case study. When the share of İstanbul in these investments is analysed, it is found that Eastern European countries and other countries mostly prefer to invest to İstanbul and they have not made major investments in the other parts of the country. On the other hand, the share of İstanbul among Islamic countries' investments is very low in contrast to the others. As known the percentage of Islamic countries' investment is very limited (1,8% as invested capital) and they prefer to invest south east and eastern Anatolia, which can be explained not only by spatial proximity but also by ethnical and cultural ties [51].

MNCs in İstanbul are mostly engaged in service sector. Actually 72,2% of established MNCs and 63,9% of

invested capital to Turkey are realized in service sector in İstanbul [51]. On the other hand, the percentage of total invested capital in industry sector in Turkey is 41,5% and the share of MNCs in İstanbul in that is only 33,3%. The share of İstanbul in agriculture and mining sectors is very limited and it is around 1,5%. All these numbers show the specialization of İstanbul in service sector, rather than other sectors, i.e. industry, agriculture and mining. Thus, parallel to these investment patterns, selected cases show similar characteristics in terms of invested sectors; 9/18 are in service sector, 7/18 are in manufacturing sector and the rest of them are in agriculture and mining sectors. As can be seen from the Table 3 ownership ratio changes between 25% and 99% and is and 11 of the 18 MNCs have above 75% ownership ratio. MNCs with high ownership ratios have also foreign labour (especially in manager position) in their firms.

Table 3. General characteristics of selected firms

	Firm (#)
Establishment year	
Before 1980	3
1980-1989	8
After 1990	7
Home country	
OECD (AB member)	12
Other OECD	5
Muslim countries	1
Sector	
Manufacturing	7
Agriculture	1
Mining	1
Service	9
Ownership ratio (%)	
0-24	-
25-49	5
50-74	2
75-100	11
Number of Foreign labour	
Not available	8
Available (average 40 person)	10

4.2. Vertical Linkages

As mentioned above vertical linkages based on transaction(s), voluntary assistance, resource or technology transfer to the local firms that are potential

suppliers of intermediate goods or buyers of their own products [34] and analyzed under two topics; *backward linkages* and *forward linkages*.

Backward linkages between foreign affiliates and local firms are very strong according to the interviewees. In spite of the changing process in production circles in recent years, 91% of MNCs emphasize that they acquire goods or services from local firms. This ratio is very high compare to the European countries (for UK case, see [52]). The crucial point here is that, these percentages change with reference to the sector. For example, in production and agriculture sectors, foreign affiliates mostly using local/national channels in backward linkages, these firms are determined as resource-seeking firms by Dunning (1981) [53]. With reference to the interviewees, foreign affiliates generally use local channels in supplying intermediate goods rather than raw material especially in recent years. This situation can be explained the empowerment of local manufacturing sector. The accrument of is type of strong relationship can be a potential for technology transfer and should be encouraged by transferring high tech and knowledge to local producers in order to increase product quality and differentiate production methods in this process. Service sector, which requires more knowledge capacity, are mostly acquired their needs from MNCs' home countries. Limitation in these types of relationships between local firms and foreign affiliates in service sector show still low innovative capacity of local markets and thus limited technology transfer from MNCs to local market in this sector.

When *forward linkages* are taken into account, interviewees report that they prefer Turkey not only her geopolitical position but also being close to unsupplied markets. So, they mostly use local firms and/or agents in marketing and distribution of their products to these unsupplied markets (15/18). The existence of these type of relations of course do not guarantee transfer of technology, but these are accepted potential channels for this transfer [38].

All of the selected MNCs have been more than 19 years in Turkey and this is very crucial duration for linkage creation. According to Rasiah (1994), these types of linkage creations can be negligible at first, but had grown substantially five years later [54]. All in all, backward and forward vertical linkages between MNCs and local firms are being strong level in most of the cases and will be extended over time, which can be a concluded of technology transfer to local firms.

4.3. Horizontal (Relational) Linkages

Horizontal linkages directly focus on organizational and managerial relations among firms (eg. an alliance, technology sharing agreement, management contract, co-production etc.), but not production processes. Local firms try to adapt, imitate and/or absorb new technologies developed by foreign affiliates. Thus, horizontal linkages are very crucial for MNCs in order to take part in organizational competition. In this study, horizontal linkages are examined by their collaborative project development and new partnerships for production attempts.

According to the interviewees, there is a full-competitive market in their engaged sectors in Turkey. Their competitors change with reference to sector, for

example in retail trading sector all most all of the competitors of MNCs are local firms, in manufacturing sector on the other hand, competitors are both local and international. There is a linear relationship between ownership ratio and competitor's origin. The more ownership ratio local partner has, the number local competitors it has. MNC 2 is an extreme example in here. Although the ownership ratio of foreign affiliate is 99%, their competitors are from both local and international market equally. This situation can be explained by high number local projects of MNC 2. These local projects have pro-competition effects on local market and thus create competitive environment which increases innovativeness of firms. Wang and Blomström (1992) also stress that the more competition the MNC affiliate faces from local firms, the more technology it has to bring into retain its competitive advantage, and hence the larger will be the potential for spillovers [55].

In some empirical studies, collaborative projects between foreign affiliates and local firms increase knowledge flows from foreign affiliates to local firms [34]. According to the interviewees, some of the firms (3/18) have these types of projects with local firms, but foreign affiliates generally limit/control (2/18) or restrict (5/18) knowledge flows to their local partners. The rest of the MNCs (8/18) have no collaborative studies with local firms, but they have no restriction or limitation policies either. This can be evaluated a potential for technology transfer to local firms and thus rise in innovative capacity of local firms.

4.4. Labour Turnover

Labour turnover take place when technology is transferred from one firm to another through the employment relationship. Therefore, the higher the number of the labour transfers, the higher the probability of technology transfer.

There is some evidence to suggest that recent inward investments (in manufacturing and in service sectors) are generating a demand for new and higher skilled workforce in peripheral countries [56, 57] like Turkey. Actually, MNCs generally do not volunteer to pay for developing labour skills in host country. For this reason, MNCs which volunteer to pay for these expenditures have a tendency do not loose their labour.

Responses to a survey question on firms' investment in developing workforce skills indicated that an average of 1,5% of sales revenue is spent on training per annum. These figures are less than MNCs in Europe¹. On the other hand, almost all of the MNCs stated that although they have been giving educational/professional seminars to local firms and their local employees, their investments on training had been stable over the last seven years. The only reason of this situation is economic crises in Turkey. According to MNC 3;

¹ For example, according to the study of Phelps et al. (2003), in UK these figures have risen to 2,45% in Wales, and 2,26% in north east of England.

“..... to survive to the economic crises realized in Turkey, we had to limit our expenditures. One of the most important and simple solutions for that was to decrease the training expenditures especially on local firms. We did not prefer this type of limitation, but we did not increase our training expenditures either”.

In the light of similar statements from respondents, it can be said that, MNC plants offer a limited contribution to the development of work force skills in regional economies. This information has lot of purchase on the question of technology transfer and of course labour turnover.

According to interviewees, MNCs only use wage policy to stop labour turnover. Compare to the European studies, Turkish labour turnover is very limited, but they are more willing to switch a new job. Approximately 25% of labours, who quit their job in MNCs, open their own firm, other 75%, prefer to transfer another local or international firm for higher wages and/or better working conditions.

As supported in Lenger and Taymaz (2006) study, the possibility that a firm will employ a former employee of a foreign firm is much higher in high-tech industries than in low-tech industries because of the larger share of labour turnover in high-tech foreign firms [17]. Lenger and Taymaz (2006) also show that labour spillovers from foreign firms contribute significantly to the innovativeness of Turkish manufacturing firms. However, as may be expected, labour spillovers do not have any impact on the probability of technology transfer from abroad. This finding indicates that tacit knowledge, embodied in people, plays an important role for innovativeness [17]. Moreover, in supporting this

argument, the skilled employee is also one of the main determinants of innovativeness.

4.5. International Technology Transfer

The presence of technology and R&D functions has been widely used as an indicator of an establishment's technology transfer in host regions, and the lack of such activities have been a long-standing concern amongst researchers and policy makers [42 - 45]. This study indicated that although only three MNCs have separate R&D department, a high proportion of establishments had some involvement with research, development or design activities. Of course, sectors of the companies are the most important determining factor in having R&D activities and R&D expenditure. According to the interviewees, there is no strong distinction from the any other country in the world in terms of R&D expenditure. The average expenditure for R&D activities is around 0,2-0,4 % of the total sales revenue. Exceptionally, MNC 4, which is concentrated on information technologies, spends about 1% for R&D activities annually. Actually, these type of knowledge-intensify sectors, like information technology, R&D is the major activity for their firm.

The data on the Table 4 refers to different categories and sources of R&D activities of the selected MNCs in İstanbul. The survey drew an important distinction between internal and external sources, allowing us to comment on the extent of collaboration between MNC affiliates and the private and public sector research institutions – something which has been strongly emphasized in the recent literature on knowledge and learning [58, 59].

Table 4. Categories and Sources of R&D Activities

Location of R&D	On-site	Parent company	Bought from home country	Bought locally	Bought internationally
Research, new products	**	*	***	*	
Research, new processes	****	*	**		
Design and redesign of products	***	**	*		
Adaptation of products	***	**			*
Adaptation of processes	*****	**	**		*
Product testing	***	**	*		
Process testing	**	*			
Total	22	12	9	1	2

As can be seen from the table, internal sourcing (on-site and parent company sourcing) is more important than external sourcing in R&D activities in general. But there is an interesting point which should be mentioned here that although one of the most important higher order R&D activities, namely research for new products, are mostly provided by the home country, and then on-site and parent company respectively. The other one, research for new process, is mostly provided by

on-site and then home country and parent company. This indicates that there is no strong distinction among internal and external sourcing in the advanced form of R&D activities that means local capacity is as much quality as home country. Beyond this, two observations regarding to the sourcing of R&D activities can be made; first, Table 4 shows that on-site provision is more significant in almost all forms of R&D activities as mentioned above. By contrast, levels of parent company

provision tend to be in the second order in these activities and it is highly related absorptive capacity in the host country which is crucial for obtaining significant benefits from FDI. Second, Table 4 demonstrates that external sources of R&D activities are insignificant compared to intra-corporate and on-site sources (except research on new products). The recent emphasis on local sourcing of R&D by collaborative studies between MNCs and organizations such as universities, research institutes, innovative SMEs show positive effects of these types of collaborations on technology transfer to the local economy [45, 46]. More than a half of the selected MNCs (13/18) have these types of studies with local universities, governments,

institutes and etc., which can be accepted as a potential channel for technology transfers.

5. CONCLUSION

International technology transfer is central for developing countries, which traditionally lack indigenous capabilities to generate new technologies [60]. For this reason, the aim of this paper was to analyze innovation and technology transfer strategies of foreign firms in Turkey and clarify the impacts of vertical and horizontal linkages, labour turnover and technology transfer on these activities. Table 5 summarizes propositions generated by the literature and supported by the cases in this study.

Table 5. Propositions Generated by the Literature Case and Supported by the Cases

Propositions Generated by the Literature	Explicitly Supported	Implicitly Supported	Not Referred To
Vertical linkages			
These types of linkages are supported by service and/or production relations			
New externalities can be emerged by knowledge transfer from foreign suppliers to local producers.			
With these externalities, high knowledge and technology transfer to local producers can be realised and this affects product quality and supports local producers.			
Relations between foreign subsidiaries and local suppliers do not guarantee technology transfer.			
The larger the host market and the greater the technological capabilities of local suppliers, the more pronounced are the linkages			
More linkages are created when the production process of the MNCs uses intermediate goods intensively; when the costs of communication between headquarters and the affiliate production plant are large; and when the home and host countries are not too different in terms of the variety of intermediate goods produced			
Government policies can also promote linkage creation.			
The greater the age of the MNC in a location, the more MNC will transfer more technology .			
Horizontal linkages			
When MNCs bring a new technology to the local market, local firms try to adapt that technology.			
The more competition the MNC affiliate faces from local firms, the more technology it has to bring into retain its competitive advantage, and hence the larger will be the potential for spillovers			
The more technology sharing agreement firms have, the more possibility to transfer of technology to local firms			
The existence of MNCs in a host country, not only raise the number of new technologies which accessible by local firms but also increase competitiveness in the market.			
Rise in the competitiveness of the market cause to develop and adopt new technologies			
The more joint projects TNCs and local firms realised, the more possibility to transfer of technology to local firms			

Labour turnover			
Labour in MNCs are generally high qualified and MNCs mostly use high technology.			
The transfer of workers, formerly employed by foreign firms, could constitute an important channel for technology spillovers			

Table 5. Propositions Generated by the Literature Case and Supported by the Cases

In order to resist these spillovers MNCs use "efficiency wage" policy generally.			
The transfer of technology is possible with labour turnover.			
Technology transfer			
With the effects of MNCs' R&D activities, product quality may be increased in the host country.			
With the effects of MNCs' R&D activities, new intermediate products diversity- may be increased in the host country			
With the effects of MNCs' R&D activities, new knowledge transfer to the social capital and rise in product quality may be seen in the host country			
Required infrastructure for R&D and relationship among university-government and industry cannot be realised in developing countries.			

As can be seen from Table 5 some of the propositions which were not referred to by the cases, are mostly about horizontal linkages and technology transfer subjects. On the other hand, propositions about vertical linkages and labour turnover are explicitly supported by the selected MNCs. There is no doubt that results cannot be generalized for all MNCs in the country, but these are giving important clues for analyzing technology transfer processes in Turkey. Thus some of the concluding remarks are given below;

- MNCs in Turkey are commonly resource-seeking firms [53] and they mostly have vertical linkages (both backward and forward) with local firms. As mentioned above, these types of linkages may take place through direct knowledge transfer from foreign customers to local suppliers; higher requirements or rewards for product quality and on-time delivery that encourage local suppliers to upgrade their production management or technology. Additionally, local firms have the opportunity to benefit from spillovers and transfers of knowledge embodied in products, processes and technologies of the MNCs [39] and may become more productive as a result of gaining access to new, improved, or less costly intermediate inputs produced by multinationals in upstream sectors [37]. Turkey should benefit from these linkages with this respect.

- Horizontal linkages, on the other hand, seem insignificant in this study, parallel to the study of Lenger and Taymaz (2006). Limited collaborative projects between MNCs and local firms can be evaluated MNCs are not willing to share new technologies with local firms because of the belief on low innovative capacity of local firms.
- Labour turnover is found another important channel for spillovers and thus technology transfer from MNCs to local firms in Turkey. Different from labours in developed countries, labours in Turkey are more willing to switch a new job, but very limited number of them can realize that. Economic conditions (high unemployment rates, effects of global economic crises, and etc.) in the country are effective in this decision-making process.
- MNCs mostly use internal sources for R&D activities and levels of parent company provision these sources tend to be in the second order. External sources of R&D activities, on the other side, are insignificant compared to intra-corporate and on-site source. This situation can be related absorptive capacity in Turkey which is crucial for obtaining significant benefits from FDI.

All in all, the possible channels for technology transfer to Turkey are vertical linkages and labour turnover, so it is very important to use these channels efficiently and develop new strategies for building up new horizontal

linkages and technology transfers. For future implementations, liberalization of trade and FDI policies may need to be complemented by appropriate policy changes with respect to education, R&D, and human capital accumulation, to take full advantage of increased trade and FDI.

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6. REFERENCES

- [1] Giroud, A. and Scott-Kennel, J., "Foreign-local linkages in international business: A review and extension of the literature", in Proceedings of the 48th Annual Meeting of the Academy of International Business, *Guanghua School of Management*, Peking University, (2006).
- [2] Caves, R., "Multinational Firms, Competition, And Productivity In Host-Country Markets", *Economica*, 41: 176–193. (1974).
- [3] Kokko, A., "Technology Market Characteristics and Spillovers", *Journal of Development Economics*, 43: 279–293, (1994).
- [4] Oulton, N., Investment, Capital and Foreign Ownership in UK Manufacturing, Discussion Paper, No. 141, *National Institute of Economic and Social Research* (NIESR), (1998).
- [5] Blömström, M., Sjöholm, F., "Technology Transfer and Spillovers: Does Local Participation with Multinationals Matter?" *European Economic Review*, 43: 915–923, (1999).
- [6] Xu, B., "Multinational Enterprises, Technology Diffusion, and Host Country Productivity Growth", *Journal of Development Economics*, 62: 477–493, (2000).
- [7] Baldwin, R., Braconier, H., Forslid, R., "Multinationals, Endogeneous Growth and Technological Spillovers: Theory and Evidence", *CEPR Discussion Paper*, No. 2155, London, (1999).
- [8] Girma, S., and Wakelin, K., "Regional Underdevelopment: Is FDI the Solution? A Semi-Parametric Analysis", GEP Research Paper No. 2001/11, *University Of Nottingham*, UK, (2001).
- [9] Branstetter, L., "Is Foreign Direct Investment a Channel of Knowledge Spillovers? Evidence From Japan's FDI in The United States", *NBER Working Paper* No. 8015, (2001).
- [10] Haddad, M., "Are There Positive Spillovers from Direct Foreign Investment? Evidence From Panel Data For Morocco", *Journal of Development Economics*, 42: 51–74, (1993).
- [11] Aitken, B. and Harrison, A. "Do Domestic Firms Benefit From Foreign Direct Investment? Evidence From Venezuela", *American Economic Review*, 89: 605–618, (1999).
- [12] Lichtenberg, F. and Van Pottelsberghe De La Potterie, B., International R&D Spillovers: A Re-Examination, *NBER Working Paper* No. 5688, (1996).
- [13] Hansen, H. and Rand, J., "On the Causal Links Between FDI and Growth in Developing Countries", *The World Economy*, 29(1): 21-41, (2006).
- [14] Yilmaz, B. and Barbaros, A., "Development and Determinants of Foreign Direct Investment in Turkey: A Comparison with Ireland and Spain", Elites and EU Enlargement, *Second International Conference, Bremen/Germany*, (2005).
- [15] Erdilek, A., Direct Foreign Investment in Turkish Manufacturing, J.C.B. Mohr, *Tübingen*, (1982).
- [16] Erdilek, A., "Turkey's New Open-Door Policy of Direct Foreign Investment: A Critical Analysis of Problems and Prospects", *METU Studies in Development*, 13: 171–191, (1986).
- [17] Lenger, A., and Taymaz, E., "To Innovate or to Transfer? A Study on Spillovers and Foreign Firms in Turkey", *Journal of Evolutionary Economics*, 16: 137–153 (2006).
- [18] Liu, X. and Wang, C., "Does Foreign Direct Investment Facilitate Technological Progress? Evidence from Chinese Industries", *Research Policy*, 32: 945–953, (2003).
- [19] Hymer, S.H., The International Operations of National Firms: A Study of Direct Foreign Investment, *MIT Press, Cambridge, MA*, (1976).
- [20] Buckley, P. J. and Casson, M. C., The Future of the Multinational Enterprise, *Macmillan Publications*, London, (1976).
- [21] Dunning, J. H., Multinational Enterprises and the Global Economy, Addison-Wesley *Publication, Wokingham*, (1994).
- [22] Caves, R. E., Multinational Enterprises and Economic Analysis, *Cambridge University Press, Cambridge Second Edition*, (1996).
- [23] Veugelers, R. and Cassiman, B., "Foreign Subsidiaries as a Channel of International Technology Diffusion: Some Direct Firm Level Evidence From Belgium", *European Economic Review*, 48: 455 – 476, (2004).
- [24] Ethier, W.J., "The Multinational Firms", *Quarterly Journal of Economics*, 102: 805–833, (1986).
- [25] Horstmann, I.J., and Markusen, J.R., "Endogenous Market Structures in International

- Trade”, *Journal of International Economics*, 32: 109–129, (1992).
- [26] Brainard, L.S., “A Simple Theory of Multinational Corporations and Trade With a Trade-Off Between Proximity and Concentration”, *NBER Working* 4269, (1993).
- [27] Markusen, J.R., Foreign Direct Investment and Trade Centre for International Economics Studies, Policy Discussion, 0019, *University of Adelaide*, Australia, (2000).
- [28] Markusen, J.R. and Venables, A.J., “Foreign Direct Investment as a Catalyst for Industrial Development”, *European Economic Review*, 43: 335–356, (1999).
- [29] Barrell, R., Pain, N., “Domestic Institutions, Agglomerations And Foreign Direct Investment in Europe”, *European Economic Review*, 4–6: 925–934, (1999).
- [30] Braconier, H., Ekholm, K., Midelfart Knarvik, K-H., “Does FDI Work As A Channel For R& D Spillovers? Evidence Based On Swedish Data”, The CEPR/IMOP *Workshop, Greece*, (1999).
- [31] Grossman, G., and Helpman, E., Innovation and Growth in the Global Economy, *MIT Press*, Cambridge, MA., (1995).
- [32] Rodriguez-Clare, A., “Multinationals, Linkages, and Economic Development”, *American Economic Review*, 86(4): 852-873, (1996).
- [33] Liu, X. and Buck, T., “Innovation Performance and Channels for International Technology Spillovers: Evidence from Chinese High-Tech Industries” *Research Policy*, 36: 355-366, (2007).
- [34] Saggi, K., Trade, Foreign Direct Investment, and International Technology Transfer: A Survey, *World Bank Research Observer*, 17: 191-235, (2002).
- [35] UNCTAD, “World Investment Report”, United Nation, New York, (2001).
- [36] Moran, T. H., Parental Supervision: The New Paradigm For Foreign Direct Investment And Development, Washington DC, *Institute For International Economics*, (2001).
- [37] Javorcik, B. S., Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages, *World Bank Research Paper, Washington*, (2003).
- [38] JBICI-Japan Bank For International Cooperation Institute, Foreign Direct Investment And Development: Where Do We Stand?, *JBICI Research Paper*, No:15, (2002).
- [39] Driffield, N., Munday, M. and Roberts, A., “Foreign Direct Investment, Transactional Linkages, and the Performance of the Domestic Sector”, *International Journal of the Economics of Business*, 9(3) : 335-351, (2002).
- [40] Chen, T.-J., Chen, H. and Ku, Y.-H., “Foreign Direct Investment and Local Linkages”, *Journal of International Business Studies*, 35(4): 320-333, (2004).
- [41] Cowan, R., David, P.A. and Foray, D., “The Explicit Economics of Knowledge Codification and Tacitness”, *Industrial and Corporate Change*, 9(2): 211–253, (2000).
- [42] Hood, N., and Young, S., “US Investment in Scotland - Aspects of the Branch Factory Syndrome”, *Scottish Journal of Political Economy*, 23(3): 279-94, (1976).
- [43] Thwaites, A. T., “Technological Change, Mobile Plants and Regional Development”, *Regional Studies*, 12: 445–461, (1978).
- [44] Cantwell, J., “The Globalisation of Technology: What Remains of the Product Cycle Model”, *Cambridge Journal of Economics*, 19:155–174,(1995).
- [45] Howells, J., “Tacit Knowledge, Innovation and Technology Transfer”, *Technology Analysis and Strategic Management*, 8: 91–106, (1996).
- [46] Phelps, N., Mackinnon, D., Stone, I. and Braidford, P. Embedding the Multinationals? Institutions and the development of overseas manufacturing affiliates *in Wales and North East England, Regional Studies*, 37: 27-40, (2003).
- [47] Glaser, B. G., Strauss, A., The Discovery Of Grounded Theory: Strategies For Qualitative *Research, Aldine Press*, New York, (1967).
- [48] Strauss, A. and Corbin, J., Basics of Qualitative Research: Grounded Theory Procedures and Techniques (2nd Edition), *Sage Publications, Thousand Oaks*, Ca., (1998).
- [49] Partington, D., “Building Grounded Theories of Management Action”, *British Journal of Management*, 11(2): 91–102, (2000).
- [50] Xiao, J. Z., Dahya, J. and Lin, Z., “A Grounded Theory Exposition of the Role of the Supervisory Board in China”, *British Journal Of Management*, 15: 39–55, (2004).
- [51] Sat, N. A., Local Embeddedness of Transnational Corporations: Turkish Case, *Unpublished Phd Thesis*, METU, Ankara, (2005).
- [52] Phelps, N. A. and Fuller, C., “Multinationals, Intracorporate Competition, and Regional Development”, *Economic Geography*, 76(3): 224-243, (2000).
- [53] Dunning, J.H., International Production and the Multinational Enterprise, *Allen and Unwin Pub.*, London, (1981).

- [54] Rasiah, R., "Flexible Production Systems and Local Machine Tool Subcontracting: Electronics Component Multinationals in Malaysia", *Cambridge Journal of Economics*, 18: 279-98, (1994).
- [55] Wang, J.Y. and Blömström, M., "Foreign Direct Investment And Technology Transfer", *European Economic Review*, 36: 137-155, (1992).
- [56] Peck, F. and Stone, I., New Inward Investment and The Northern Region Labour Market Employment, Department Research Series No. 6, *Department of Employment, Sheffield*, (1992).
- [57] Rees, G. and Thomas, M., "Inward Investment, Labour Market Adjustment and Skills Development: Recent Experience in South Wales", *Local Economy*, 9: 48 – 61, (1994).
- [58] Lundvall, B.-Å. and Johnson, B. "The Learning Economy", *Journal of Industry Studies*, 1(2): 23-42, (1994).
- [59] Cooke, P. and Morgan, K. The Associational Economy, *Oxford, Oxford University Press*, (1998).
- [60] Padilla-Pe'Rez, R., "A Regional Approach to Study Technology Transfer Through Foreign Direct Investment: The Electronics Industry in Two Mexican Regions", *Research Policy*, 37: 849-860 (2008).