ATPS-Tanzania

The Role of Foreign Direct Investment (FDI) in Local Technological Capability Building: The Case of Tanzania

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List of abbreviations and acronyms

ATPS	Africa Technology Policy Studies
BP	British Petroleum
EAC	East African Community
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
M&A	Merger and Acquisition
MNE	Multi-National Enterprises
PANA	Pan African News Agency
R&D	Research and Development
SME	Small and Medium size Enterprise
SOE	State Owned Enterprises
SPCL	Simba Plastic Company Ltd
SSA	Sub Saharan Africa
TBL	Tanzania Breweries Limited
TCC	Tanzania Cigarette Company
TIPER	Tanzania-Italy Petroleum Refinery
TNC	Transnational Corporation
TSH	Tanzanian Shilling
URT	United Republic of Tanzania
UNCTAD	United Nations Conference on Trade and Development

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Executive Summary

Introduction

Foreign Direct Investments (FDIs) have been found to be important aspects of economic development of host countries, and crucial, in building technological capabilities of local companies in developing countries. It is a channel for international diffusion of technology, having the potential to transfer technological, organizational and managerial practices to developing countries, which may, in the long run, lead to higher technological capabilities, and innovation, resulting in economic growth in these countries.

For Tanzania specifically, FDI is a type of investment which is relatively infant as the government had opted for a socialist path of economic development from 1967 to around mid 1980s, following the Arusha Declaration. In mid 1980s, the government initiated and implemented deliberate economic liberalization policies. These resulted into the rise of FDI in Tanzania. For instance, FDI inflows increased from USD 2,418.7 million in 1999 to USD 3,776.6 million in 2001. Such investments were concentrated in the sectors of manufacturing (33.4%), mining and quarrying (28%) as well as agricultural (6.7%) (BoT, NBS and TIC, 2004: 23-24).

Statement of the problem

Despite the increased flow of FDIs in the country, very little is known about the role of their presence on local technological capabilities. This is a setback for the formulation of FDI policies that would improve technological capabilities of local firms and farms. This work sought to determine the role of FDI on local technological capability building, specifically identifying the determinants and constraints to linkages and knowledge exchange between local and foreign companies.

Conceptual framework

From the conceptual point of view, technological capability is defined as the ability to make effective use of technological knowledge in an effort to assimilate, use, adapt and change existing technologies (Kim, 1997: 4). Technological capability in other words allows firms to manage and generate technological changes (Bell, 1984). In this case, technological capability is understood as an ability to innovate. There are three levels of technological capabilities. These are basic, intermediate and advanced levels.

One of the sources which local firms acquire such capabilities is through Foreign Direct Investment (FDI). Rutherford (1998:178) provides a concise definition of FDI as being a business investment in a country other than the home country. FDIs are normally undertaken by Multinational Enterprises (MNEs) which must have at least 10% of equity shares. Entry into a country is through two major modes, namely Greenfield and Merger and Acquisition (M&A). By investing in new areas, FDIs are motivated by three major factors namely, markets, resources and efficient environment for business. Additionally by investing in a foreign country, FDIs are able to build local technological capabilities through different channels and these are: vertical linkages with suppliers and buyers, which include backward and forward linkages, horizontal linkages through demonstration and competition, and labor migration.

Research Methodology

The study consisted of three sectors and sample sizes for each of the sectors were: one hundred thirty-nine (139) firms for the manufacturing sector, 50 owners of mining firms, and 110 farmers. Both quantitative and qualitative approaches were employed to collect data. Whereas quantitative data collection techniques largely made use of questionnaires, qualitative data collection involved unstructured questionnaires and interview guides techniques.

Study Findings and Discussion

The findings of the study revealed that, most (70.4%) of FDIs in Tanzania are Greenfield investments and (29.6%) are M&A investments. About 68% of all FDIs are driven by

market seeking motives (mostly manufacturing sector), 32% by resource seeking (cheap labour and natural resources such as minerals). It was also found out that, no FDI entered for efficiency seeking motives. The fact that most of the FDIs are market seeking has double implication for Tanzania, especially because of the East African Community (EAC) Common Market. On the one hand, it is good news because the larger market is expected to attract more FDIs in the future. But on the other hand, this is only possible if the Tanzanian environment is more conducive for efficient production than other countries in the EAC; otherwise FDI will locate in any of the other African country with efficient production environment in order to freely access Tanzanian market from there. According to Pigato (2001) efficient and competitive production environment requires adaptable labour skills, sophisticated supplier networks, efficient business services, and flexible institutions. The fact that none of the FDI located in Tanzania for the purpose of efficiency seeking imply that Tanzania is poor in all these aspects.

With regards to levels of technological capabilities, most local firms in the manufacturing, mining and agricultural sectors have acquired technological capabilities only to a basic level; and the comparison between FDIs and local firms in terms of demonstration of technological capabilities, shows negligible difference; although FDIs perform slightly better than local firms on all levels, i.e. basic, intermediate and advanced levels.

One of the sources through which local firms acquire such capabilities is through FDIs. While there is extremely negligible contribution of FDI in the mining sector (on average only about 4% of the local mining firms acquired technological capabilities from FDI), there is sizeable contribution of FDI for the agricultural sector; where on average about 56% of farmers responded to have acquired knowledge and information for the innovative activities they carried out from FDIs. This is much higher for some of the activities. For instance the contribution of FDI in the agricultural sector is to the tune of 90.7% in relation to the introduction of new seeds. These findings suggest that FDIs have better spillover effect for technological capabilities in the agricultural sector. FDI set and demand higher quality products from farmers, which push farmers to strive for new and

better seeds to improve their produce. At times FDIs themselves have helped farmers in accessing such improved seeds. In this context therefore, an important policy implication, is for the government to facilitate FDIs in agro-processing. Another alarming finding for the agricultural sector is the fact that, only about 5% of the farmers responded to have accessed knowledge and information for the achieved innovations from R&D organizations. This is alarming because R&D organizations, through extension services, are expected to be the lead contributors to the agricultural innovations, especially on seeds and other inputs. R&D organizations' efforts, coupled with those of buyers (in this case FDIs) are the best approach through which farmers can improve the quality of their produce. For the manufacturing sector, FDI contribution of knowledge to local investors is about 14.6% of all the sample firms; indicating, to a large extent that FDI is not a source of knowledge for innovative activities for most firms.

The small contribution of FDIs on local technological capability building is evidenced by the extent of linkages between FDI and local firms which seem to be small in Tanzania. In the manufacturing sector, local firms have limited linkages with FDI. Only 14.3% of local firms appear to have forward linkages with FDIs and only 11.5% had backward linkages. Local firms are mostly linked to other local firms than they do to FDIs. Two major factors seem to be responsible for this: information gap between the suppliers and producers - especially the FDIs, and poor quality of local inputs for the FDIs. These facts are shown by the fact that 75% of FDIs in the sample firms import raw materials and other intermediate goods. This is a wake up call for Tanzanian firms to improve the quality and quantity of their products needed as input materials for FDI firms. It is also important for the government to address the information gap between suppliers and producers.

In the case of the mining sector, backward and forward linkages are non existent. The little contribution of technological capabilities achieved through FDI is through channels such as joint explorations and training activities. The lack of backward and forward linkages between FDIs and local firms can partly be attributed to the fact that the mining industry does not intensively use intermediate inputs, and most of the foreign mining

firms import their machinery and export their products. The only foreseeable avenue for linkages with the rest of the economy for this sector is through local processing of minerals, which will provide local miners with reliable market for their products and enhance linkages with FDIs, both in the mining and processing sectors. The processing activities would further enhance linkages with other local suppliers, and hence generating more employment opportunities.

For the agricultural sector, the findings indicate that farmers have more forward linkages with FDIs (44.5%) than they are linked to local buyers (32%). The percentage of linkages with FDIs might have been raised by the case of sugar cane farming/industry where there is a market monopoly from one FDI processor, the Illovo Sugar Company. However, there are no backward linkages with FDI projects. This indicates that either, there is a low level of FDI investments in agro inputs such as fertilizer, or inputs FDIs are not in the vicinity of the farmers. The greatest backward linkages exist between the farmers and farmers' associations at 71.8% whereby farmers' associations supply to farmers substantial factor inputs.

There exist some determinants and constraining factors to linkages and knowledge exchange between FDIs and local firms. In terms of determinants, firms in the manufacturing sector pointed out the following: participation in market events such as fairs and exhibitions and business forums, Close location to FDIs, availability of and firms' access to Information Communication Technology (ICT). These facilitate firms to share information and build business linkages. However, local firms are constrained by lack of information about FDIs activities, inadequate financial resources and lack of support from business associations (industry associations and chamber of commerce) to organize or pay for firms' participation in market events. In addition, FDIs are concentrated in some few locations due to poor infrastructure. Moreover, local firms do not live up to the expectation of the FDIs in terms of quality of their products.

For the mining sector, and in the view of the respondents, determinants include local marketing of minerals, business workshops and forums in which firms undertaking FDIs

and local companies participate. These are among the avenues for local miners and FDIs to be connected and to share exploration, production and market information and opportunities. In the views of the authors however, local marketing of minerals is possible only when there is also local processing of minerals, which will not only assure market for the miners but will also create more jobs and linked to the national economy in general. According to Boucoum (2000, 1999), mineral processing is much stronger than mining in its capability to create backward and forward linkages with other industrial sectors, and thereby conducive in establishing a quasi-automatic process of industrialization. Therefore, the policy implication here is to put incentives for facilitating mineral processing investments in Tanzania and encourage joint actions among actors. If this was possible for Botswana, there is no reason why it should not be possible for Tanzania. Initiating mineral clusters around the major mining sites can be an excellent idea in this regard.

Another important barrier expressed by local investors in the mining sector is language: most local investors in the sector do not speak English which is a language mostly spoken by foreign investors. There is also a problem of lack of intermediaries in this sector: there is no institution which is responsible for facilitating linkages between local investors and FDIs. Furthermore, technologies in local mining companies are far below the level of technology employed by their foreign counterparts. This often prevents them from seeking collaboration with, or even borrowing best practices from FDIs. In addition, the existence of frequent disputes between local community and foreigners over natural resources such as land, has resulted into mistrust between FDIs and local companies. Such conflicts contribute in hindering any meaningful linkage that would have otherwise taken place.

For the agricultural sector, low financial capacity, low level of education, and lack of collaborative skills and courage, constrain local farmers to have linkages with FDIs. The growers associations and union leaders are weak in efficiently communicating with the foreigners, and fail in appropriately representing their groups in various forums in the plantations and factories owned by FDIs. Other constraints include bad relationships,

actual or perceived, between the small-scale farmers and the FDI plantation owners. There is late and, low payment, and lack of transparency in the weighting system for local farmers' produce. Harassment of villagers, accusations of theft when passing through FDI plantations, as well as deficiencies in the provision of protective gears, such as masks when applying pesticides for those working in the FDI plantations are some of the complaints given by farmers during interviews. Otherwise employment of local farmers in FDIs plantations have been reported to be one of the ways in which farming knowledge flows from FDIs to local farmers.

Conclusion and Recommendations

The intention in this study was to assess the extent to which FDIs in Tanzania contribute to local technological capability building. The study has found out that, this has happened to a very small extent, especially for sectors of mining and manufacturing. This has partly been explained by the quality of FDIs the country has so far been able to attract: Market seeking FDIs that dominate the low tech production, especially in the manufacturing sector, are not conducive for upgrading local technological capabilities. For such transfer to take place there has to be an appreciable difference between level of technological capabilities of FDIs and those of local companies. Although on the other hand, for a country to be able to attract, high tech FDIs that to a large extent are efficiency seeking, the level of local technological capabilities of local supplier firms has to be appreciable. This is a major policy challenge facing most of the least developed countries. The challenge can be addressed by attracting reasonably high tech FDIs through investments incentives exclusively targeting this particular cadre of FDIs. In addition, the government should also put in place reliable infrastructure and institutions that are friendly to efficient production. At the very least, in this regard, Tanzania should benchmark itself against other East African Community countries in regard to environmental factors for efficient production.

Another important problem preventing spillovers from FDIs to local firms stems from the weak linkages between foreign firms and local firms. Some of the reasons for this weakness include concentration of FDIs in some few locations, information gap between

producers and suppliers of inputs in the country, and frequent disputes between foreign investors and local entrepreneurs. To address these shortfalls it is recommended that the government should forge linkages between FDIs and local firms through the policy of minimum local content for FDIs, and address the information gap between the suppliers and producers generally. At the same time, it will be fruitful if the government can harmonize social and economic relationship between foreign investors and citizens. Currently existing conflicts and disputes should be put to a minimum.

1.0 BACKGROUND TO THE STUDY

The role of Foreign Direct Investments (FDIs) in economic development of nations has been acknowledged the world over, and their importance as a source of capital and technology has grown over time, given the scarcity of other sources of capital and technology. FDI has also become an important source of new technology as technical change accelerated. According to Lall and Narula (2004), FDI undertaken by Multinational Enterprises (MNEs) continue to dominate the creation of technologies. With rising costs and risks of innovation, their importance has also risen. Furthermore, FDI is presumed to be an important channel through which international diffusion of knowledge and technology takes place and is especially regarded as one of the driving forces integrating underdeveloped countries into the globalization process that has characterized the world economy over the past decades. For instance all the late entrants into globalised systems, from Malaysia to Mexico and Costa Rica, have gone the FDI route (Lall and Narula, 2004).

FDI is especially thought to be the easiest way to build local technological capabilities for underdeveloped countries. Several authors including Dunning (1993), Lall (1996), Narula (2001), Narula and Dunning (2000) have argued that MNEs have the potential to transfer technological, organizational and managerial practices to developing countries, which may, in the long run, lead to higher technological capabilities and innovation which in its turn may lead to economic growth in these countries. They further argued that, it is much easier for developing countries to attract segments of FDI activity and build up on this, rather than to develop local capabilities independently. With this realization, and with the growing role of MNEs in economic life in most countries, most developing countries' governments have liberalized their economies and removed restriction on FDI inflows; particularly in least developed economies, such as those in Sub Saharan Africa (SSA), the scope for FDIs have increased through government liberalization and privatization programmes (Lall, 2002; Pigato, 2001).

For Tanzania in particular, FDI is relatively infant as the government had opted for a

socialist path of economic development since 1967, following the Arusha Declaration. From 1967 to 1972, the majority of the MNEs and big local companies operating in Tanzania since independence were nationalized. During this period there were minimal FDI activities taking place in Tanzania. The FDIs during this period included the Tanzania–Italia Petroleum Refinery Company Ltd (TIPER), Aluminium Africa, Shell and British Petroleum (BP). The majority of investments were made by the State directly or indirectly. By 1980, there were about 400 State Owned Enterprises (SOE).

The revival of the foreign investment attraction came in mid 1980s as a result of deliberate economic liberalization policies that were initiated and implemented. Major and far-reaching reforms in financial institutions, public sector, civil service and other areas were made and are still underway to fine-tune the attraction of FDIs in the country. The reforms resulted into the rise of FDIs in the country. For instance, FDI inflows increased from USD 2,418.7 million in 1999 to USD 3,776.6 million in 2001 with sectoral distributions as follows: manufacturing (33.4%), mining and quarrying (28%) and agricultural (6.7%) (BoT, NBS and TIC, 2004: 23-24).

1.1 The Research Problem

Despite the fact that FDIs have been found to be very instrumental in building local technological capabilities elsewhere, very little can be said on the impact of the increased inflow of FDI on local technological capability building in Tanzania. This is from the fact that, the impacts of FDIs are not automatic. At the very least, different conditions are necessary for different contexts. According to Narula and Dunning (2000), the motives for FDI are crucial in determining the extent to which they will be useful in strengthening local technological capabilities in developing countries. Importantly, FDI may also result in negative spillovers if indigenous firms have to close down, as they cannot compete in upgrading their technologies. Furthermore, no spillovers may occur if obstacles in the institutional infrastructure or gaps in the absorptive capacity hinder this. Strengthening the positive impact of FDIs on local technological capability therefore requires an in-

depth knowledge of the local conditions concerning the above-mentioned factors, and putting in place appropriate policies to enhance the positive impacts.

Unfortunately, very few studies on the impact of FDIs on local technological capabilities exist in Tanzania. The few available studies indicate intra-firm technology transfer through acquisition of parastatal companies[4] by MNEs. This form of technology transfer includes upgrading of production and marketing processes at the acquired firms that occur as a result of the greater technological strengths that foreign investors potentially bring in as a result of the firm-specific assets of parent companies. Good examples in Tanzania are Tanzania Breweries Limited (TBL) and Tanzania Cigarette Company Limited (TCC), where productivity of these companies increased tremendously just after two years of privatization and acquisitions by foreign firms (Portelli and Narula, 2004). However the real value of FDI happens as a result of general knowledge spill over to the local companies. This may occur when the MNEs create linkages with local firms and become integrated in the host economy, and thereby pulling up local technological capabilities. In Tanzania very little is known on the extent to which FDIs are integrated into the local economy, and consequently their impact on local technological capabilities. This study is a modest attempt to shed some light on this glaring knowledge gap.

1.2 Study Objectives

Below are the specific objectives of the study that informs this report

- To identify location motives of FDI in Tanzania
- To identify the extent of linkages between FDIs and local companies
- To determine the level of technological capabilities of Tanzanian companies
- To investigate the extent to which FDI contributes to local technological capability building
- To identify the determinants and constraints of linkages and knowledge exchange between FDIs and local companies

[4] The concepts Companies, Enterprises, and Firms are used interchangeably.

1.3 Research questions

The following research questions guided the study

- What are the major FDIs location motives for Tanzania?
- What is the extent of linkages between FDIs and local companies?
- What is the level of technological capabilities of the Tanzanian companies?
- To what extent does the presence of FDI in the country contribute to local technological capability building?
- What are the determinants and constraints to linkages and knowledge exchange between FDI and local companies?

1.4 Structure and Outline of the Report

The section that follows this introductory section (section two) is devoted to theoretical and conceptual framework used in the work. It introduces and discusses the concept of technological capabilities and how it can be brought about by foreign direct investment in host economies. In so doing, the section also introduces and briefly discusses the concept of foreign direct investment. Section three is devoted to methodological issues. Sections four, five and six are devoted to study results for the three sectors involved in this study, namely manufacturing, mining and agriculture. The study findings have been put in three different sections rather than one section for two major reasons: First, it is because of the differences in the nature and structures of production in the three sectors and therefore interaction between FDI and local companies also are slightly different and therefore requiring slightly different methodological, analysis and reporting approach. Second, given the differences in the three sectors, they are likely to attract different audience, and therefore it was necessary to treat each sector as if it is independently looked at, and hence, drawing conclusions that are relevant for that specific sector. Having said this, it was also necessary to put all sectors under one report for possible comparison of spill over effects and local technological capability building between the different sectors.
Section seven is devoted to overall summary, conclusions and recommendations.

2.0 THEORETICAL AND CONCEPTUAL FRAMEWORK

This section provides the theoretical setting and conceptual framework that guided the study. It first elaborates the concept of technological capability and how this is related to innovation. In the second part, the concept of FDI is defined, and different channels through which technological knowledge is communicated between FDI and local companies are identified. Furthermore, the necessary conditions for this to happen are described.

2.1 The Concept of Technological Capabilities

Technological capabilities can be defined as "the ability to make effective use of technological knowledge in efforts to assimilate, use, adapt and change existing technologies" (Kim, 1997: 4). Others have defined technological capability as the ability of firms to manage and generate technological changes (Bell, 1984). In this case technological capability is defined as the ability to innovate. On the other hand innovation is defined in its broadest term to include mere adoption and mastering of technology and can be can be categorized in three major degrees of novelty as follows:

i) Introduction of completely new technology, which is of firms own design and first to the market or the world (high innovation capability);
ii) Modification of existing technology (midlevel innovation capability) and;
iii) Successful adoption of existing technology that is new to the firm (lowest level of innovation capability.

The impact on the firm's performance and easiness to acquire the above capabilities differs from firm to firm. It is relatively easy to acquire capabilities at the lowest level, gradually moving up to high level capabilities. In most cases capabilities have been built systematically moving from low (mere adoption of technologies already used by other firms) to high (in-house design and implementation of innovation that is first to the market). The impact on the firm's performance runs from the opposite direction, with high innovation capability denoting high impact (Bell and Pavitt, 1993).

Other studies (Bell, 1993; Figueiredo, 2001; Hobday, 2000) have emphasized that it is crucial to distinguish between production and innovation capabilities as these reflect completely different sets of accumulated skills. Developing production capabilities involves accumulating skills and abilities to operate new technologies (ability to successfully imitate). Building innovative capabilities on the other hand is a far more cumbersome task. In order to build innovative capabilities countries need to deepen their knowledge and understanding about the new technologies to the extent that they will be able to change and modify existing technologies and eventually introduce new technologies. Building production capabilities on the other hand is relatively easy - it involves things like laying out the machines on the factory floor in a better order, changing the design of the product packaging or copying ideas from a producer in a distant market in order to create a local advantage (Arnold and Thuriaux, 1997). According to this definition, production capabilities can be equated to a lower level of innovation capabilities such as mere successful adoption of existing technologies; meaning that technological capabilities are actually innovation capabilities – innovation defined in its broadest form.

Just like innovation capability, technological capability is categorized in three major levels depending on the easiness to achieve. The levels are basic, intermediate and advanced (Lall, 1992; Bell and Pavit, 1995; and Ariffin and Figueiredo, 2003). Specific innovative activities belonging to the different levels of technological capabilities are elaborated below.

Basic technological capabilities

The basic level of technological capabilities in the product technologies includes the following activities:

- Introduce minor adaptations to product technology
- Conduct regular quality control to maintain standards and specifications
- Modify designs

For the process technologies, the following activities belong to the basic level of technological capabilities;

- Introduce minor changes to process technology to adopt it to local conditions
- Maintenance of machinery and equipment
- Introduce planning and control of production, and
- Improve efficiency in existing work tasks

Intermediate Technological Capabilities

The intermediate level of technological capabilities in the product technologies includes the following activities

- Introduce new design for manufacturing
- Improve product quality

For the process technologies, the following activities belong to the intermediate level of technological capabilities

- Manufacture of components
- Introduction of automation of processes, and
- Selection of technology

Advanced Technological Capabilities

The advanced level of technological capabilities in the product technologies includes the following activities

- Conduct R&D into new product generations
- Develop entirely new products or components

For the process technologies, the following activities belong to the intermediate level of technological capabilities

- Performance of own-design manufacturing
- Introduction of major improvements to machinery
- Development of new equipment
- Development of new production processes
- Introduction of radical innovations in the organization

The major distinguishing factor of technological capability between least developed countries and developed countries lies in the type of capabilities. The literature on technological capabilities in developed countries discusses technological capabilities mostly in the context of high innovation capabilities. These include introducing to the market a radically new product and/or application of radically new processes. This has in most cases been associated with Research and Development (R&D) activities.

However, according to existing literature, acquisition of technological capabilities is a process that starts with lowest level of innovation capabilities such as mere adoption of existing technologies and minor improvements of the adopted technologies. Among other factors, acquisition of capabilities depends on the level of absorptive capacity a firm has achieved at that point in time.

Absorptive capacity is generally defined as the ability of the firms to utilize available information and knowledge that comes through the interaction with other organizations, such as other firms, users or knowledge providers such as research institutions (Cohen and Levinthal, 1990; Giuliani and Bell, 2005). It involves the ability to recognize the value of the information and knowledge deemed necessary for the firm's innovation process, to be able to acquire, assimilate, transform and exploit it (Todorova and Durisin, 2007). Thus, absorptive capacity increases a firm's access, as well as usage (processing and commercializing) of knowledge and information through collaboration with other actors. The absorptive capacity is a function of the firm's skill base, its internal technological effort and its linkages with external sources of knowledge (Lall, 1992).

Available literature indicates that the availability of a minimum level of absorptive capacity at the firm level is a pre-requisite for the absorption, internalization and diffusion of externally available knowledge. It has been argued that the discussed potential knowledge and technology flows embodied in FDIs, have limited or no effect at all on development and economic growth without absorptive capacity. Hence, in order to learn from the MNEs and to be able to absorb and diffuse the available knowledge and technology, the absorptive capacity of the indigenous firms in the host country is of great

importance (Durham, 2004; Cohen and Levinthal, 1990). The key assumption is that "exploitation of competitors` technology is realized through the interaction of the firm's absorptive capacity with competitors` spillovers" (Cohen and Levinthal, 1990: 141).

The problem with the literature on spillovers and absorptive capacity - as far as least developed countries are concerned, is that there is an over emphasis on R&D activities by local firms as an important indicator of absorptive capacity. It is believed that R&D activities of local firms strengthen their absorptive capacity. This could be because in most developed countries innovation is taken to be only those novel products and processes that to a large extent are products of R&D activities. However, as it has earlier been alluded to, innovation in its broadest form include the mere successful adoption of old technologies; or acquisition of basic technological capabilities such as mastering production in terms of products and processes. In the absence of indicators for absorptive capacity for such kind of capabilities therefore, the study only sought to find out the extent to which Tanzanian firms have acquired technological capabilities from foreign firms and identified barriers and enablers of knowledge exchange between foreign and local firms, without directly indulging into the issues of absorptive capacity of local firms. Although, and of course it is expected that, in the process, it will be evident whether or not absorptive capacity is one of the barriers preventing local firms to learn from FDIs.

2.2 Foreign Direct Investment (FDI): Definition and Characteristics

2.2.1 Defining FDI

Several FDI definitions have been given in the literature and these are more or less similar. A more representative definition of FDI is that by Rutherford (1992: 178; 1995: 178-179) who defines FDI as business investment in another country, which often takes the form of setting up local production facilities (through Greenfield) or purchase of an existing business (through merger and acquisitions (M&As). FDIs are normally undertaken by Multinational Enterprises (MNEs) also known as Transnational Corporations (TNCs), which must have at least 10% of the equity shares.

Several types of FDIs can be identified depending on the classification criteria. Among the FDI types include inward-FDIs and outward-FDIs. These types depend on the direction of flow of the FDIs from a given country's standpoint. In-ward FDIs are the ones flowing into a country from abroad while outward-FDIs are those flowing from a given country to the rest of the world. This work is only concerned with the in-ward FDIs.

In-ward FDIs have different motives to locate production in a foreign country. In literature, three major motives can be identified. These are resource seeking, market seeking and efficiency seeking (Dunning, 1993).

i) In the category of resource seeking, the MNEs aim at acquiring particular types of resources that are not available at home (like natural resources or raw materials) or that are available at a lower cost (such as unskilled labor that is offered at a cheaper price with respect to the home country).

ii) For the case of market seeking, MNEs invest in a foreign country to exploit the possibilities granted by markets of greater dimensions. Other reasons that push MNEs to the choice of market seeking (besides that of searching and exploiting new markets) include following suppliers or customers that have built foreign production facilities, to adapt goods to local needs or tastes and saving the cost of serving a market from distance. In recent times, it is becoming important also to have a physical presence on the market to discourage potential competitors from occupying that market.

The above two types of motivations are the most cited and debated in the relevant literature; in particular with regard to international trade models that try to formalize the OLI (eclectic) paradigm. They are defined respectively as horizontal and vertical. Horizontal FDI as seen in Markusen (1984), Horstmann and Markusen (1992); Brainard (1993); Markusen and Venables (1996a, b., 1998) is the type of FDI undertaken to place

production closer to foreign markets. In this case, production of goods and services in the host economy takes the place of exports from home country and FDI can substitute trade (export particularly) between home and host economies. Vertical FDIs on the other hand, as seen in Helpman (1984); Helpman and Krugman (1985), is undertaken to exploit lower production costs in order to serve both foreign and home market. In this case FDI can be a complementary to trade when a part of the production in the host economy is exported back to the home country.

iii) Efficiency seeking: Here the intention of an MNE is to take advantage of different factor endowments, cultures, institutional arrangements, economic systems and policies, and market structures that are amenable to efficient production.

However, it is worth noting that, many of the larger MNEs are pursuing pluralistic objectives and most engage in FDI that combines the characteristics of each of the above categories. The motives for foreign production may also change as, for example, when a firm becomes an established and experienced foreign investor (Dunning, 1993, 56).

According to Narula and Dunning (2002), in general, developing countries are unlikely to attract the third category of FDI; they primarily attract the first and second categories. Since developing countries are in wide range in the level of development, these can also be subdivided for least developed countries and other developing countries. Least developed countries would tend to have mainly resource seeking FDI, and countries at the catching up stage mostly market seeking FDI. Efficiency seeking investments with most stringent capability needs will tend to focus on the more industrialised developing countries (Narula and Dunning, 2002).

2.2.2 Channels for Knowledge Exchange between FDI and Local Companies

The existing literature suggests some channels by which technology transfer and associated innovation/technological capability building through FDI occurs. This is either directly through linkage or indirectly through spillovers (Lall and Narula, Gachino, 2006). Specifically the channels include vertical linkage, horizontal linkage, labour

migration and internationalization. These are elaborated in what follows.

Vertical linkage with buyers and suppliers

MNEs may transfer technology to firms that supply them with intermediate goods, or to buyers of their own products. For some time now, it has been recognized that MNEs may benefit the host country via the backward and forward linkages they generate. Backward linkages are relations with suppliers in the factor inputs market. Forward linkages refer to relations with buyers – either consumers or other firms using the MNEs intermediate products as part of their own production process in the factor output market.

As regards backward linkages, MNEs source parts, components, materials and service from suppliers in the host country. The effect of such linkages on local companies depends on the quantity and quality of the supplied inputs, the terms of procurement and the willingness of the MNEs to transfer knowledge and build a long-term relationship with local companies (UNCTAD, 2005). MNEs can contribute to raising the productivity of their supplier firms in various ways. They can provide technical assistance or information to raise the quality of the suppliers' products or to facilitate innovations. McIntyre et al. (1996) notes that quality seems to be the driving force for technology transfers through backward linkages. When a foreign affiliate wants to export the products they produce, they will have to meet the quality standards of world markets. In this case, the suppliers' intermediate products will have to be of high quality as well. Consequently, McIntyre et al. (1996) found that MNEs usually do not hesitate to train local suppliers. However, negative effects may occur. For example, if suppliers are forced to meet higher standards of quality, reliability and frequency and speed of delivery required by the MNE without any training or assistance being provided by MNEs affiliates. In the short term, this could lead to suppliers failing to meet the necessary requirements, leading to firm failures and job losses.

MNEs can provide or assist suppliers in purchasing raw materials and intermediary goods. MNEs can also help prospective suppliers to set up production facilities. They can help in providing training in management and organization. They can also assist suppliers

to diversify by finding additional customers (Lall, 1980). Empirical evidence of these linkages are found in many studies, including *inter alia* Lall's (1980) study on Indian truck manufacturers, Wanatabe (1983), UNCTC (1981), and Behrman and Wallender (1976).

Forward linkages occur with firms' buyers. This can be distributors, which can benefit from the marketing and other knowledge of the MNE, or – in case of intermediate products – downstream firms who can use higher quality and/or lower priced intermediate goods in their own production processes. Downstream firms can benefit from lower prices arising from increased competition in their supply market (Pack and Saggi, 1999) and consumers thus benefit from lower-priced final products. Aitken and Harrison (1991) find that spillovers from forward linkages are important in most industries – and in fact, they argue that the downstream effects of FDI are generally more beneficial than the upstream effects.

Generally, in regard to backward and forward linkage formation, the literature suggests that linkages are not automatic, but there are factors that govern them. Firstly, it seems that linkages are more pronounced the larger the size of the host market; and so are the technological capabilities of the local suppliers. Secondly, according to a model of Rodríguez-Clare (1996), more linkages are created when the production process of the MNEs uses intermediate goods intensively; when there are large costs of communication between headquarters and the affiliate production plant; 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 through policies requiring a minimum of local content.

For the Tanzanian case, backward and forward linkages are potential vehicles for contribution of FDIs in the local technological capability building. This study attempted to document evidence for this. The study also attempted to identify factors that facilitate or prevent such linkages, and the extent of knowledge transfer through these linkages.

Horizontal linkages through demonstration and competition

Related to the issue of vertical linkages, is the diffusion of technology through horizontal 'linkages' with the competitors of the MNEs affiliates. This diffusion of technology takes place through either demonstration effects or competition effects. The demonstration effect happen when local companies are, exposed to the superior technology of the MNE, which may lead local firms to update their own production methods (Saggi, 2000). When an MNE starts using a specific technology that has not yet been used in the host economy, its competitors may start imitating the technology. Often, the introduction of a new technology by an MNE reduces the (subjective) risk for local firms to use the same technology. Local firms may lack the capacity, financial resources or information required to acquire the necessary knowledge or to adopt the technology to local circumstances. However, when a certain technology used by an MNE succeeds in the local environment this may trigger a wider adoption by local firms in the host country. A vital part of this demonstration argument is geographical proximity. The vast majority of developing countries, however, are not well integrated in the world economy, making technology transfer through demonstration effects extremely difficult without existences of FDIs in their own countries. However, while FDIs may expand the set of technologies available to local firms, it also usually increases competition. Moreover, demonstration and competition effects reinforce each other.

The entry of an MNE increases competition, which is in itself an incentive to upgrade local technologies. This in turn further increases competition that stimulates an even faster rate of adaptation of the new technology (Sjöholm, 1997). Wang and Lömstrom (1992) also stress that the more competition the MNE affiliate faces from domestic firms, the more technology they have to bring in, in order to retain their competitive advantage, and hence the opportunity for a larger potential spillovers. This notwithstanding however, according to the WTO (1998) FDI is likely to crowd out local firms in developing countries than in developed countries, because of their greater technological advantages. This is a very important negative aspect to consider in the Tanzanian environment.

Labour migration

Another way, apart from linkages, through which technology may be transferred and disseminated in a host country, is through labour migration. Workers employed by MNEs affiliates acquire knowledge of its superior technology and management practices, either through training or hands-on experience. By switching employers to local firms or setting up their own businesses, the technology is spread (Glass and Saggi, 1999, Gachino, 2006).

2.2.3 Characteristics of FDI and Conditions under which their Benefits Accrue to the Host Countries

There are various FDI characteristics and conditions that influence a host country benefits from such investments. These characteristics and conditions are outlined in what follows.

Location Motives

FDIs investment motives and their overall strategy are important factors to consider when referring to local spillovers. For example, market seeking FDIs generally purchase more locally, than export oriented FDIs because of lower quality requirements and technical specifications (Reuber et al 1973; Altenburg 2000). As a result, FDIs are more likely to be integrated backward in the host country when they source relatively simple inputs (Ganiatsos, 2000; Carillo, 2001). For example, in the case of FDI in agro-based industries, there is a greater likelihood for affiliates to be integrated backward, especially given the early stage of development of the host country. It is therefore important to understand location motives of FDI in order to have an idea on the extent to which they will be embedded in the local economy.

Type of FDIs

Potential benefits for the host country between Greenfield investment and M&As are also different. M&As raise particular concerns for developing countries, such as the extent to which they bring new resources to the economy, the denationalization of domestic firms, employment reduction, loss of technological assets and increased market concentration with implications for the restriction of competition. According to UNCTAD, as for the

host country, the benefits of M&As are lower and the risks of negative effects are greater when compared to Greenfield investments, especially at the time of entry over a short term. This notwithstanding however, existing studies also indicate that affiliates established by mergers and acquisitions are likely to have stronger links with domestic suppliers than those established by Greenfield investments. However it is argued that, unless these linkages go beyond the linkage established by the local firms that FDIs are replacing, the impact of this type of FDI will be minimal (UNCTAD, 2000; Kennel and Enderwick, 2001). The relative benefits between Greenfield investment and M&A to the host economy are therefore not clear from the existing literature; although of course they seem to tilt more towards Greenfields, especially in regard to employment generation.

Country Investment Objectives and Policies for FDI

The positive effects of FDI on technological progress are dependent on the objectives pursued by the host countries. In most cases, FDI is promoted only along the lines of capital formation and employment generation, with disregard to other national capability building measures (Dhungana, nd). There is a need therefore to determine the relationship between government policies for attracting FDIs and impact of the FDIs.

3.0 RESEARCH METHODOLOGY

3.1 General Research Approach

The study consisted of three sectors of manufacturing, agriculture and mining. Given some appreciable differences in the three sectors; slightly different research approaches were employed for each sector. For the manufacturing sector, survey was used for both FDI and local companies. The survey was complemented by semi-structured interview of four (4) firms (2 FDIs and 2 non-FDIs) in order to follow up interesting issues that emerged from the survey. Since a database on manufacturing FDI in the country was not available, the same questionnaire, with filtering questions, was used to identify and survey FDI and non-FDI firms. The approach also helped in estimating the proportion of FDIs in the manufacturing sector.

For mining and agricultural sectors, where FDIs are few in number and known before hand, a survey was used only for the local mining companies and farmers living near FDI projects. In-depth case studies were used for FDIs. Interview guides were prepared basing on interesting issues that emerged from the survey of local firms and farmers.

3.2 Sample Sizes

For the manufacturing sector a sample size of 200 firms was randomly selected from most industrialized regions of Dar es Salaam, Arusha, Morogoro, Kilimanjaro and Tanga. The sampling frame was obtained from the database of all manufacturing firms kept by the National Bureau of Statistics (NBS). For the agricultural sector, 150 farmers surrounding major FDI investments in Sugar and Coffee plantations were randomly selected; and for the mining sector, a sample of fifty local firms/cooperatives from Geita and Shinyanga surrounding mining FDIs was purposively selected.

3.3 Data collection methods

Various tools were used to collect primary data. These tools included questionnaire and interview guides. Secondary data was collected through in-depth documentary reviews.

3.4 Data analysis

For data analysis, both qualitative and quantitative analytical tools were used. Qualitative data was analyzed using content analysis techniques, while quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS) tool.

4. STUDY FINDINGS: MANUFACTURING SECTOR

4.1 Introduction

Manufacturing sector is the largest recipient of FDI in Tanzania with about 33.5 percent of total FDI stock by 2001 (Kabelwa, 2006). This is despite the fact that the sector contribution to GDP and growth rate is still very small. For instance between 1995 and 2005, the manufacturing share of value added to GDP remained quite unchanged around 7-8% (UNIDO, 2011)[5]. Much of the FDI in the manufacturing sector went to food and beverages sub-sectors, followed by chemicals and petroleum, agro-industry, machinery, motors and equipment.

Methodologically, out of the 200 manufacturing firms that were included in the survey, 139 (69.5%) firms successfully completed and returned the questionnaires. Analysis of findings was therefore based on this sample. The study findings section is divided in two parts. First part briefly provides basic information about the surveyed firms. The information includes ownership type, age of the firms, size and their major products. The second part deals with the main findings. It presents, analyzes, and discusses the major study findings along the study objectives and questions.

4.2 Basic information about the sample firms

Ownership Type

The study findings revealed that out of 139 surveyed firms, 100 (71.9%) were private under local investment, and 26 (18.7%) private firms were under foreign direct investments (FDIs). In addition, 5 (3.6%) were joint venture between government and local private firms, 4 (2.9%) were state run enterprises and 4 (2.9%) a joint venture between government and foreign enterprises. Table 4.1 gives the summary and Figure 4.1 depicts the types of firms in the manufacturing sector.

[5]UNIDO, Industrial development constraints and challenges, http://www.unido.org/index.php?id=6453. Retrieved on 18 May 2011.

Table 4.1: Ownership type

Types of firms	Frequency	Percent N=139
State run enterprise	4	2.9
Private under foreign direct investment	26	18.7
Private under local investment	100	71.9
Joint venture: government and local private	5	3.6
Joint venture: government and foreign investment	4	2.9
Total	139	100.0

Source: Field data, 2010.

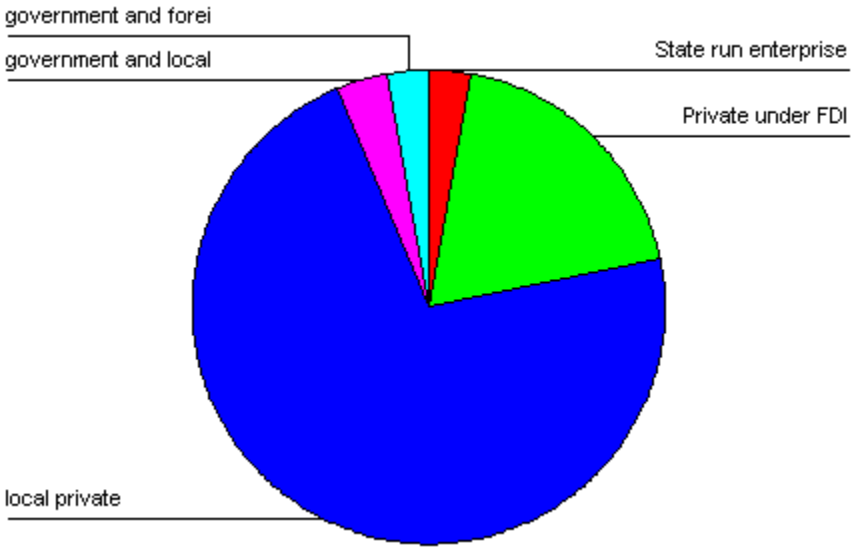

Figure 4.1: Ownership of sample firms.
Source: Field data, 2010

Age of Sample Firms

Most of the surveyed firms were established between 1990s and 2007, with ages between 20 and 3 years. The duration can partly be described by the fact that Tanzania embraced market and private sector-led economic philosophy from around mid 1980s and mid 1990. This is the time when there were many and major far-reaching reforms in the

management of the Tanzanian economy. These reforms, inter alia made it relatively easier to establish businesses including setting up firms such as those included in the study sample. The time of establishment of the surveyed firms is shown in Figure 4.2 below.

Figure 4.2: Year of establishment of sample firms.
Source: Field data, 2010.

Main Product line of Sample Firms

The majority (36.6%) of the surveyed firms were those which in the subsectors of food products, beverages and tobacco products. The other prominent subsectors (15.8% of the total) were manufacture of other non-metallic mineral products. The least included sector (by 0.7% of firms) were manufactures of radio, Television and communication equipment and apparatus and of medical, precision and optical instruments, watches and clocks. The following table presents information on the product sub-sectors of the sample firms.

Table 4.2: Main sub-sectors of the sample firms.

	Frequency	**Percent N=139**	**Valid percent N=138**
Manufacture of food products, beverages and tobacco products	45	32.4	32.6
Manufacture of textiles, clothing and leather goods	20	14.4	14.5
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straws and plaiting materials; manufacture of paper and paper products; publishing, printing and production of recorded media	12	8.6	8.7
Manufacture of coke, refined petroleum products and nuclear fuel, manufacture of rubber and plastic products	15	10.8	10.9
Manufacture of other non-metallic mineral products	4	2.9	2.9
Manufacture of basic metals, fabricated metal products, machinery and equipment; manufacture of office, accounting and computing machinery	22	15.8	15.9
Manufacture of radio, television and communication equipment and apparatus, and manufacture of medical, precision and optical instruments, watches and clocks	1	0.7	0.7
Manufacture of transport equipment	2	1.4	1.4
Manufacture of furniture, manufacturing recycling	16	11.5	11.5
Electricity, gas, steam and hot water supply	1	0.7	0.7
Total	138	99.3	100
No response	1	0.7	
Total	139	100	

Source: Field data, 2010.

Size of Sample Firms in Terms of Employment

The survey also sought to capture the size of the sample firms. Indicators normally used

to measure firm size include capital investment, sales turnover, profitability and number of employees. For the sake of convenience, this study used only the number of employees. This is due to the sensitivity and confidentiality of such indicators as capital investment, sales turnover and profitability on the part of respondents.

Table 4.3: Size of firms in terms of employment

Number of employees	Frequency	Percent N=139
between 1 and 4 (micro enterprises)	12	8.6
between 5 and 49 (small enterprises)	76	54.7
between 50 and 99 (medium enterprises)	27	19.4
employees 100 and above (large enterprises)	24	17.3
Total	139	100.0

Source: Field data, 2010.

From Table 4.3 above, it can be deduced that majority of the surveyed manufacturing firms (76 out of 139, or 54.7%) were small enterprises, followed by medium enterprises (27 or 19.4%), and large enterprises were 24 (17.3%). Cumulatively, the majority of companies (82.7%) had less than 100 employees. This suggests that most of the Tanzanian firms belonged to the Small and Medium Size Enterprises, which is in consisted with well-known fact that most of the manufacturing firms in Sub-Saharan Africa, Tanzania inclusive are SMEs. However, since no figures on indicators like size of capital investments and sales revenues, it cannot be confidently and authoritatively concluded that these firms are SMEs.

4.3 Main Findings

This main section on study findings addresses the study questions and objectives. Issues presented and discussed include FDI entry modes, their location motives in Tanzania, extent of their linkages with local firms as well as levels of technological capabilities.

Other issues include extent of acquisition of technological capabilities by Tanzanian manufacturing firms - comparing local companies and FDI, extent of FDI contribution to local technological capabilities as well as identification of the determinants and constraints to linkages and knowledge exchange between FDI and local companies.

4.3.1 FDI Entry Modes

As earlier alluded to, there are two major FDI entry modes. One is Greenfield investments in which MNEs enter a country by establishing new enterprises. The other alternative is through mergers and acquisitions (M&A), where MNEs enter the country by merging with and/or acquiring existing local firms. There is a third entry mode, which is not so popular - a combination of the two in the form of Brown field investments (Ngowi, 2002). In this form, an MNE enters into a country through M&As and then turns the merged or acquired firm into almost a totally new (Greenfield) investment by investing in its upgrading.

Most of the surveyed companies (19 out of 27 or 70.4% of the total) were Greenfield in nature, and only eight (8) which were 29.6% of the total entered through M&A. Although there was no mention of Brownfield investment in the sample, some form of Brownfield investment in Tanzania does exist. An example is the Tanzania Breweries Limited (TBL), which is normally cited as being among the best examples of Brownfield investments in Tanzania. Table 4.4 and Figure 4.3 below present the entry modes of the surveyed companies.

Table 4.4: FDI Entry Modes

FDI entry modes		Frequency	Percent N=27
Valid	Greenfield	19	70.4
	Merger & Acquisition	8	29.6
	Total	27	100.0

Source: Field data, 2010.

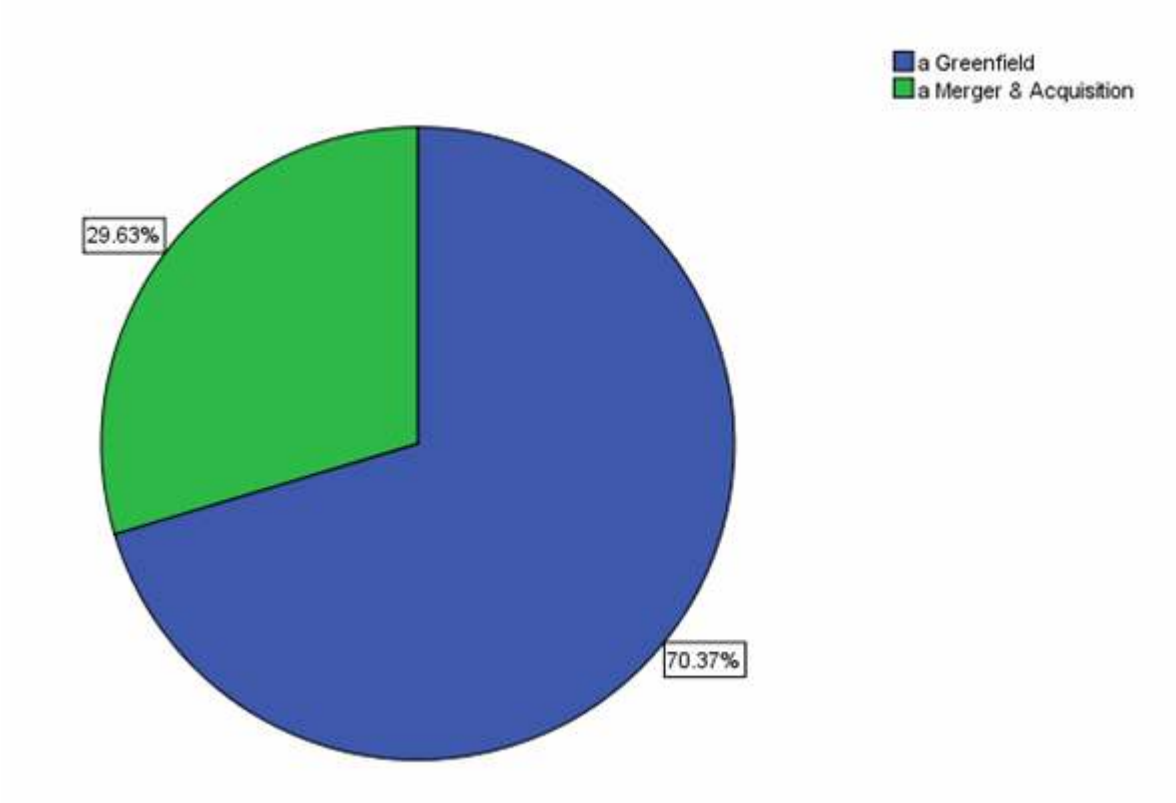

Figure 4.3: FDI entry modes.

Source: Field data, 2010.

From the, above it can be deduced that the dominant entry modes for FDIs in the Tanzanian manufacturing sector is through Greenfield, which according to literature is the most preferred mode in terms of benefit to local economy. According to Nanda (2009) Greenfield Foreign Direct Investment can bring benefits to the developing countries, while Merger and Acquisition FDI can be harmful or have little help for the same country. A study based on 84 countries from 1987 to 2001 by Miao and Wong (2009) showed growth effect from the Greenfield investments while the M&A had negative effect. Furthermore, M&A investments required a minimum level of human capital to have positive impact on the developing country's economy, but the Greenfield investment does not need that level of human capital to be effective (Miao and Wong, 2009).

4.3.2 FDI Location Motives in Tanzania

As discussed in section two, FDIs have various motives to enter into a country. These include resource seeking including natural and human resources, market seeking including local and regional ones, and efficiency seeking, where FDI choose to locate in a certain country because of efficiency enhancing production environment. Their distribution in Tanzania manufacturing companies is presented in Table 4.5 below

Table 4.5: FDI Motives in Tanzania

		Frequency N=27	Percent	Valid Percent N=25
	Markets seeking	17	66.6	68
	Resource seeking	8	29.6	32
	Efficiency seeking	0	0	0
	No response	2	7.4	
Total		27	100.0	100.0

Source: Field data, 2010.

Table 4.5 above indicates that out of the twenty-five (25) firms that responded to the question on motives, 17 or 68% of the total were driven by markets seeking motive, and 8 (32%) were found to be those driven by resource seeking (cheap labour) motive. Market seeking motive is a motive by which FDI become close to product markets. MNEs may also engage in market-seeking investment when their main suppliers or customers have set up foreign producing facilities in the host countries. In order to maintain their business, they must follow them overseas (Dunning, 1993, 58).

The above implies that most FDIs in the manufacturing sector are market seeking. This is logical given the fact that the alternatives to reach the same market would be through arms-length strategies such as exporting or various forms of licensing including franchising. These are more expensive market access strategies compared to access through FDIs: Traditionally FDI determinants such as market size are normally prevalent in markets that are sheltered from international competition by high tariffs or quotas that triggered "tariff-jumping" FDI (Kudina and Jakubiak, 2008).

Generally, market seeking FDIs favor larger markets, and for this reason, in the long term, one expects to see more market-seeking FDIs due to among other things the East African Community (EAC) Common Market that officially started in 2010, which is expected to broaden the market for FDIs located in Tanzania. This is due to removal of tariffs within the region and imposition of common external tariffs for goods and services from outside the block. This notwithstanding, it is worth noting that the extent to which FDIs are seeking to serve the East African market, they can locate anywhere in the five member states of Tanzania, Uganda, Kenya, Rwanda and Burundi in order to seek more markets. The key issue will be the nature of investment climate in each of these countries, especially those aspects that improve efficiency and competitiveness of production. This implies that these FDIs may not necessarily locate in Tanzania, unless its production environment is more efficient and competitive compared to the rest of countries in the community. According to Pigato (2001), competitive production environment requires adaptable labour skills, sophisticated supplier networks, efficient business services, and flexible institutions, which is basically favorable environment for efficiency seeking FDI, which according to our study, does not exist in Tanzania. Most important policy implication for Tanzania would be to improve these aspects of the economy that improve the competitiveness of its production environment, otherwise in the long run, market seeking FDI will locate in other countries of the East African Community that have favorable environment for competitive production and access Tanzanian market from there.

4.3.3 Extent of Linkages between FDI and Local Firms

In section two it is argued that one way of transferring technology from FDI to local firms is through backward and forward linkages. This study sought to assess the extent of backward and forward linkages between local firms and FDIs. Questions were posed for backward and forward linkage - both from the perspectives of the FDIs and of the local firms. Backward linkage from the perspectives of the local companies is forward linkage from the perspectives of FDIs. The following sub-sections present the findings for these linkages.

Backward linkage from the Perspectives of Local Firms and Forward Linkages from the Perspectives of FDI

Backward linkage from the perspectives of local firms entails relations with FDIs as suppliers of inputs. Identification of the extent of backward linkage between local firms and FDIs results from analyzing the proportion of local firms who bought material inputs from FDI. The results are presented in Table 4.6 below. Note however that, the percentages are not supposed to add to 100, as the question involved multiple responses.

Table 4.6: Backward linkages: Local firms

	Frequency	**Percent** N=139
buying inputs from non-FDI	103	74.1
buying of inputs from FDI	20	14.3
importing inputs	52	37.4

Source: Field data, 2010.

From Table 4.6 above it can be noted that, most (74.1%) of local firms in Tanzania source their material inputs from other local firms, while only 14.3% source theirs from firms under FDI. 37.4% firms import their material inputs. The study findings show that Tanzanian manufacturing firms do not only have more backward linkages with other local firms compared to FDIs, but actually backward linkage with FDI is very limited. However, if this is assessed from the perspectives of FDI as their forward linkage with local firms, then the picture is slightly improved (See Table 4.7). The table indicates that 50% of FDI actually sold their products to local firms as against 12.5% to other FDIs in the country.

Table 4.7: Forward linkages: FDI

FDI linkages to local companies	**Frequency**	**Percent N=24**
FDI selling products to local firms	12	50
FDI selling products to FDI	3	12.5
FDI selling products to end-users	17	70.8
FDI exporting	10	41.6
No responses	3	11.1

Source: Field data, 2010.

Forward linkage from the Perspectives of Local Firms and Backward Linkages from the Perspectives of FDI

Forward linkages with FDI on the perspectives of local firms occur when local firms sell inputs to FDI. To determine the extent to which local companies supplied inputs to FDIs, proportion of local firms that sold their products to FDI was sought. Table 4.8 below indicates the trend observed.

Table 4.8: Forward linkages: Local firms

	Frequency	**Percent N=139**
Firms selling products to other local firms	54	38.8
Firms selling products to FDI	16	11.5
Firms selling products to end-users	116	83.5
Firms exporting	29	20.9

Source: Field data, 2010.

Table 4.8 above shows that the majority of local firms (83.5%) sell their products to local end-users - wholesalers or retailers in the local market, indicating that largely manufacturing sector in Tanzania is consumer goods oriented. In terms of sale to other local firms as inputs, majority (38.8%) sell to other local firms as against the small number (11.5%) who sell to FDIs, indicating that FDI in the Tanzanian manufacturing sector has very limited backward linkage with local firms. It is however interesting to compare this figure with the proportion of FDI who source their inputs from local firms, which is 54.2% (refer to Table 4.9 below), indicating that FDIs were much more linked to local firms than they do to other FDIs, although of course, 75% of FDI imported raw materials and other intermediate inputs. This can partly indicate some degree of dissatisfaction with local input materials even though more than half of the FDIs source their raw materials from local firms. The import proportion indicates that FDI relied much on foreign than local input materials. Some FDIs which did not buy input materials from local companies claimed that local inputs are of low quality. Nevertheless, this can also mean that the kind of supplies required by the existing FDI investments were not available locally. Policy implication for this is to fill these gaps by attracting local investment in these areas. The first thing is to identify FDIs inputs materials and

intermediate inputs needs.

However, the fact that more than half of FDI bought their material inputs from local sources, imply that there are prospects for FDI to source a good part of their inputs from local sources, especially if the quality of inputs is raised. Quality and quantity of local materials are therefore a determinant of linkages between FDIs and local companies - McIntyre et al. (1996) notes that quality seems to be the driving force for technology transfers through backward linkages. On the other hand, FDIs can contribute towards upgrading of technological capabilities of local firms by providing technical assistance or information to raise the quality of the suppliers' products. When foreign affiliates want to export the products they produce, they will have to meet the quality standards of world markets. In this case, the suppliers' intermediate products will have to be of high quality as well. Consequently, McIntyre et al. (1996) found that MNEs usually do not hesitate to train local suppliers. However, this can only happen when there are incentives or a regulatory framework that prevents/discourages FDIs from importing the inputs.

It is also interesting to note from Table 4.8 that, a reasonable proportion of local firms do export (about 20.9%) and this is good for technological learning and deepening of innovation capabilities. Export of manufactured goods, especially to a country that is relatively more developed enables a country to have access to sophisticated buyers, and expand its market size, both of which are conducive to innovation (Zhu and Jeon, 2007).

Table 4.9: Backward linkages from the perspective of FDI

	Frequency	**Percent N=24**
FDI buying inputs from local companies	13	54.2
FDI buying inputs from FDI	6	25
FDI importing inputs	18	75
No responses	3	11.1

Source: Field data, 2010.

The fact that more than half of FDI sell intermediate goods to local firms, while most of them (70.8%) sell products to end-users further confirms that manufacturing FDIs in Tanzania are markets seeking.

Most importantly to note in from the above is that, backward and forward linkage formation is governed by multiple factors. In a model by Rodríguez-Clare (1996), more linkages are created when the production process of the MNEs uses intermediate goods intensively. In this case, formation of backward and forward linkages between foreign and local firms really depends on the type FDIs Tanzania was able to attract. The Government can also promote linkage creation through different policies, including some minimum local content. To the best of the authors' knowledge, such a policy does not exist in Tanzania; or if it does, this has not been enforced. Therefore, this indicates potential increase in linkages if appropriate policies are put in place and enforced.

4.3.4 Determinants and Constraints to Linkages and Knowledge Exchange between FDI and Local Firms

In the previous section we dealt with the extent of linkage between FDI and local firms. This section sums up respondents' opinions over the determinants and constraints of linkages and knowledge exchange between FDI and local firms.

According to respondents, one way of knowing and linking to each other is participation in market events as well as business forums. Market events such as fairs and exhibitions are extremely important in business linkages: They bring actors from the supply and demand sides of an industry together at a single location though this is for a limited period. The events give participants comprehensive market information and serve as a platform for business contacts. Surveyed firms claimed, however, that their constraints to take part in the events of such kinds were due to several reasons. One of the most important - especially for smaller firms - is inadequate financial resources to attend fairs and exhibitions. Similarly, business associations such as chambers of commerce and industry associations were unable to support firms' participation by either organizing or paying for national and international market events.

Second determinant is the even distribution of FDIs along major industrial areas in the country. In this case, there is a need to facilitate FDIs to open up plants in different areas in the country, including rural areas and other regions that are hitherto unattractive to FDIs. One approach to do this is to improve the infrastructure in potential areas as poor infrastructure was stated as a hindering factor for firms to be able to operate in some areas in the country. Physical and social infrastructure influences FDI to concentrate in some few locations, and therefore accessible to only a limited number of local firms.

Third is pulling up technological capabilities of local firms through other ways. In this regard, a response from some of the FDI companies is that local firms do not live up to the expectation of the FDI in terms of quality control. Although FDIs are expected to improve quality of suppliers, linkage is much easier if good quality is already there.

Fourth determinant is the availability of and access to Information and Communications Technology (ICT) facilities by firms. ICT is said to help business persons to get connected to other businesses, and have an exposure to local and world markets. Firm websites are increasingly becoming important medium through which business details are easily found. This is important both for suppliers and for buyers of inputs. However, most local firms lacked facilities to provide their profile and avail themselves of the online opportunities to be connected to FDIs.

4.3.5 Level of Technological Capabilities: Local Companies and FDI Compared

The previous section discussed the extent and problems related to market linkage between local companies and FDIs, and we found a very insignificant level of linkage, with number of constraints. In this section, we investigate the extent to which the Tanzanian manufacturing sector has acquired technological capabilities, comparing local and foreign firms. The major objectives are to determine technological capability gap between foreign and local firms as this is important for spillovers effect. To a large extent, spillovers occur if there is a reasonable gap between technological capabilities of

local firms and those of foreign firms. As mentioned in section two technological capabilities are categorized into different levels[6], namely, basic, intermediate and advanced; and they are distinguished between product and process technological capabilities. The following few paragraphs compares technological capabilities of local firms and those of foreign firms

Product technological capabilities

This sub-section provides information about the level of product technological capability in the surveyed manufacturing firms. The firms were asked if they performed activities related to product technological capabilities in the past three years. The activities are categorized into three levels of technological capabilities, and the frequencies of responses are differentiated between firms under FDI and those under local investment. Again, this is a multiple response question, and so total percentage is not expected to add up to 100.

[6] The categorization of levels of technological capabilities was adopted from Lall (1992), Bell and Pavit (1995), and Ariffin and Figueiredo (2003).

Table 4.10: Product technological capabilities

Innovative activities	**Companies under FDI (N=27)**		**Companies under local investment (N=112)**		**Total (N=139)**	
	N	%	N	%	N	%
Basic technological capabilities						
Modification of designs	14	51.8	63	56.2	77	55.4
Introduction of minor adaptations to product technology	12	44.4	47	41.9	59	42.4
Conduct regular quality control to maintain standards and specifications	22	81.4	72	64.2	94	67.6
Intermediate technological capabilities						
Introduction of new design for manufacturing	9	33.3	46	41.0	55	39.5
Improvement of product quality	21	77.7	83	74.1	104	74.8
Advanced technological capabilities						
Conduct of R&D for new product development	12	44.4	31	27.6	43	30.9
Development of entirely new products or components	8	29.6	23	20.5	31	22.3

Source: Field data, 2010.

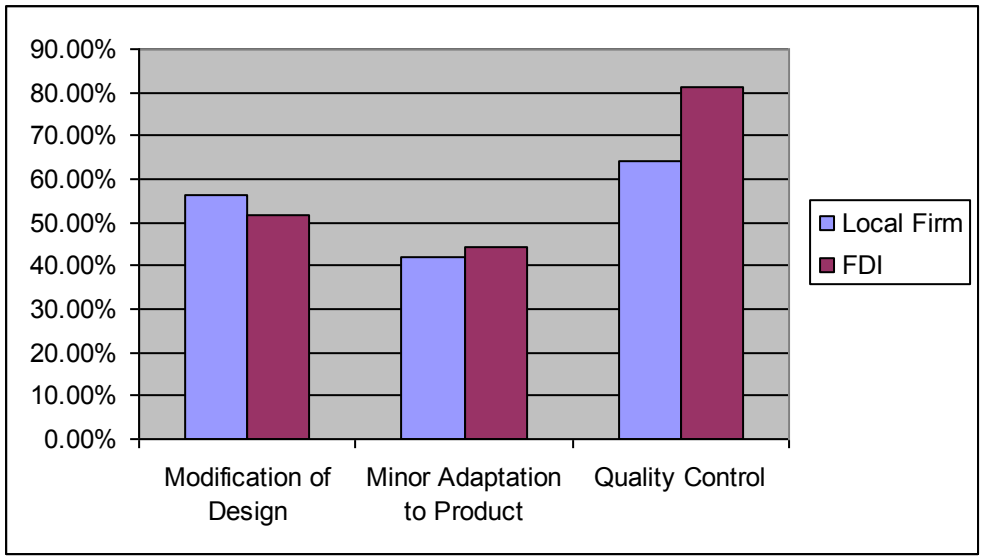

Figure 4.4: Basic Product Technological Capabilities

Source: Field data, 2010.

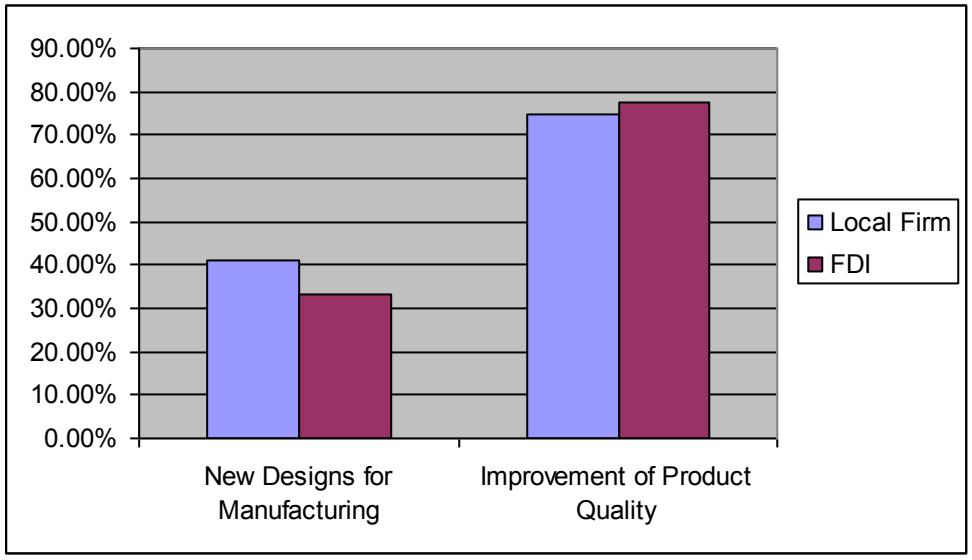

Figure 4.5: Intermediate Product Capabilities

Source: Field data, 2011.

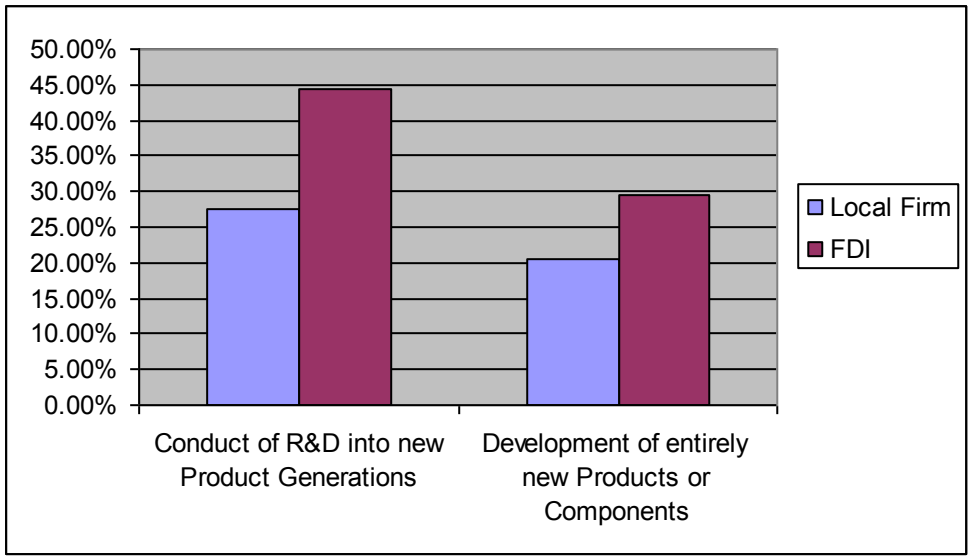

Figure 4.6: Advanced Product Technological Capabilities

Source: Field data, 2010.

Table 4.10 above reveals that during the past three years, firms in the manufacturing sector had acquired some product technological capabilities. These capabilities were shown in the improvement of product quality performed by 74.8% of firms; 67.6% of firms conducted regular quality control to maintain standards and specifications, and 55.4% modified existing designs. Activities related to intermediate and advanced technological capabilities were conducted by much fewer firms, except for improvement of the product quality, which was carried out by 74.8% of all firms. Other activities carried out by a lesser number of firms included introduction of new designs for manufacturing by 39.5% firms.

In addition, 30.9% of firms responded to be involved in R&D activities, and 22.3% developed entirely new products. However, concerning R&D activities in the sense R&D is understood, the number of firms involved can be much smaller or even non-existent. This was revealed by a follow up cases studies of four firms (2 FDI and 2 local private) randomly selected from those who indicated to have performed R&D activities. The case study indicates that none of the four cases is involved in R&D because they do not have R&D department, personnel, nor annual budget allocated for the particular R&D activity. What was referred to R&D activities seems to be just testing activities; one of the FDI

had one individual solely responsible for testing. Similarly, our discussion of R&D activities with two local firms revealed that what was referred to as R&D by the companies is actually merely routine testing activities. The firms depend on the Tanzania Bureau of Standards (TBS) for this activity. These findings corroborate with those by Diyamett (2010), where TBS was found to be a very important partner in innovativeness of firms in the metalworking and engineering sub-sector of Tanzania, through standards setting.

Generally, the study findings indicate that Tanzanian manufacturing firms acquired technological capabilities at a basic level, with much fewer firms with intermediate and advanced levels of technological capabilities. This was somehow expected given the level of development of the country. An important policy challenge here is how to enable more firms to move into higher technological capabilities and be able to compete effectively in the global market. One way to build such capabilities – as argued in this work - is through FDIs. Normally, FDIs are considered to have higher technological capabilities compared to local firms, which is the reason they are normally thought to be a spring boat for the acquisition of higher levels of technological capabilities for local firms, who learn from them. This in turn depends on a number of things including the level of technological capabilities of FDIs entering Tanzania. In this regard, comparing the level of technological capabilities of FDIs and those of local companies in Table 4.10 above, one notes a negligible difference between technological capabilities of local firms and those of FDIs: It is only in two areas of capabilities where FDI remarkably have more capabilities than local firms. These capabilities include conducting regular quality control, where 81% of FDIs as against 64.2% of local companies achieved these capabilities. Other areas include R&D activities, where about 44.4% of the FDIs were involved as against 27.6% of local firms. However again, as explained above, what has been perceived by firms to be R&D activities is not in the real sense of the concept, although for the foreign companies this could indicate R&D in the home country as one of the case firms explained that R&D is conducted at the parent firm in the home country.

Process technological capabilities

This sub-section provides information about the level of process technological capabilities in the surveyed manufacturing firms. Like in the case for product technological capabilities, the firms were asked if they performed process innovative activities in the past three years. In the following table, the activities are categorized into three levels of technological capabilities, and the frequencies of responses are differentiated between firms under FDI and those under local investment.

Table 4.11: Process technological capabilities

Innovative activities	**Companies under FDI (N=27)**		**Companies under local investment (N=112)**		**Total (N=139)**	
	N	%	N	%	N	%
Basic technological capabilities						
Introduction of minor changes to process technology to adapt it to local conditions	12	44.4	40	35.7	52	37.4
Maintenance of the machinery and equipment	24	88.8	87	77.6	111	79.9
Introduction of planning and control of production	19	70.3	64	57.1	83	59.7
Improvement of efficiency in existing work tasks	18	66.6	70	62.5	88	63.3
Intermediate technological capabilities						
Selection of one among many options of technology	6	22.2	21	18.8	27	19.4
Manufacture of components	3	11.1	16	14.2	19	13.6
Introduction of automation of processes	7	25.9	25	22.3	32	23.0
Advanced technological capabilities						
Performance of own-design manufacturing	11	40.7	29	25.8	40	28.8
Development of new production processes	9	33.3	29	25.8	38	27.3
Development of new equipment	6	22.2	21	18.7	27	19.4

Introduction of major improvements to machinery	9	33.3	32	28.5	41	29.5
Introduction of major improvement in work organization	13	48.1	46	41.0	59	42.4

Source: Field data, 2010.

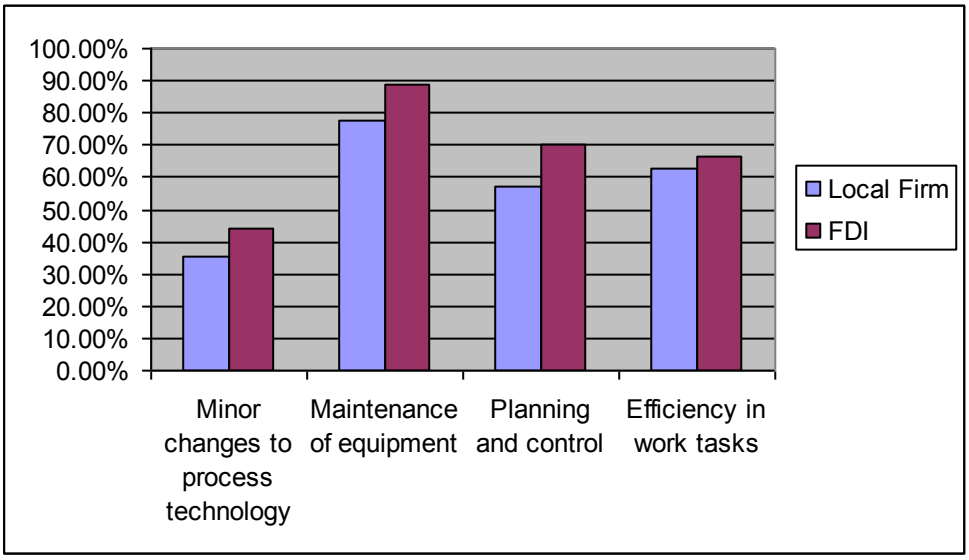

Figure 4.7: Basic Process Technological Capabilities

Source: Field data, 2010.

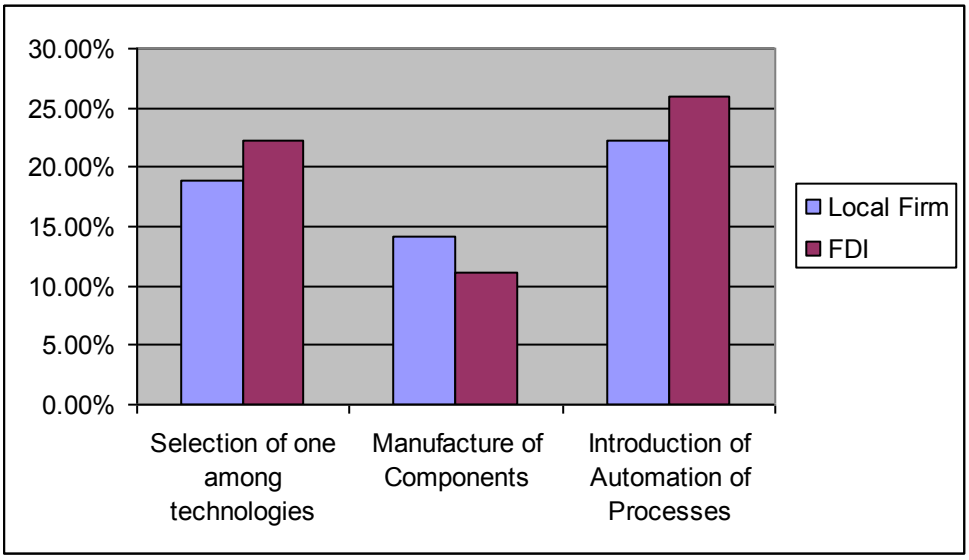

Figure 4.8: Intermediate Process Technological Capabilities

Source: Field data, 2010.

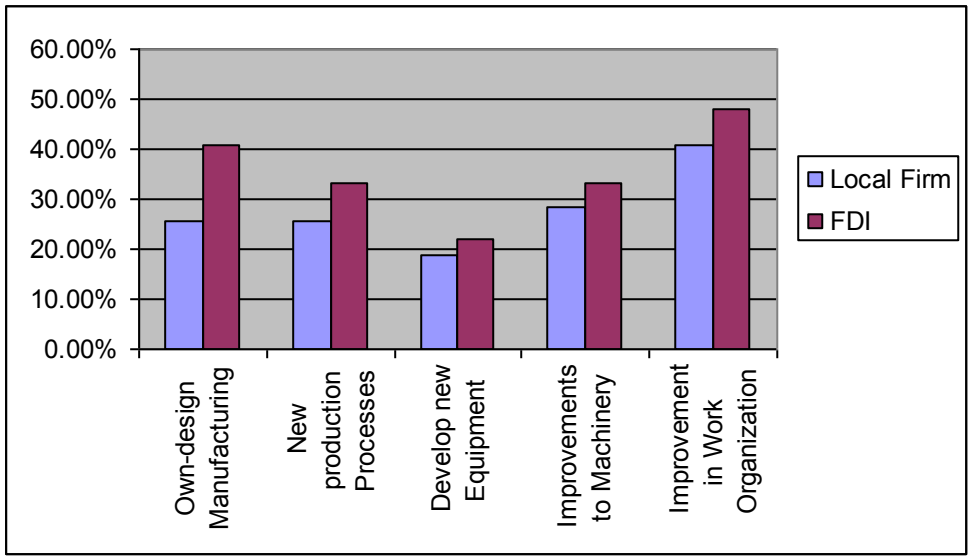

Figure 4.9: Advanced Process Technological Capabilities

Source: Field data, 2010.

Table 4.11 above reveals that during the past three years firms in the manufacturing sector achieved some process technological capabilities. These capabilities included maintenance of machinery and equipment performed by 79.9% of all firms; improvement of efficiency in existing work tasks, performed by 63.3% of all firms, and the introduction of planning and control of production, performed by 59.7% of all firms. Other capabilities acquired, although by fewer firms, included introduction of major improvement in work organization, achieved by 42.4% of all firms and introduction of minor changes to process technology to adapt it to local conditions, achieved by 37.4% of all firms.

Here again activities at the basic level had highest scores than those at intermediate and advanced levels, and there is no major difference between FDIs and local firms in terms of level of technological capabilities achieved by firms. However, in comparison to product technology, FDIs performed slightly better than local companies in all levels of process technological capabilities. According to Chudnovsky and Lopez (1999), MNCs may not necessarily bring their latest technologies to the host countries: This depends, amongst other things, on the relative price factors, the intensity of competition in the host

country market, the requirements of industrial and final customers. Given the current state of the Tanzanian economy, all these factors are unfavorable, and it might not be expected FDIs of higher quality to flow in the country on their own accord. There is therefore a need to influence them through incentive structures.

4.3.6 Extent of FDI contribution to Local Product and Process Technological Capabilities

The previous sections have revealed that firms in the manufacturing sector have acquired some level of technological capabilities. As earlier observed, there is negligible level of backward and forward linkage between foreign and local firms, especially from the perspectives of the local firms. This section assesses the extent to which FDIs have contributed to local technological capability building. The study probed for sources of knowledge for the acquired capabilities, comparing other sources and FDIs. The respondents were asked to select among the following options for learning from FDIs: through business linkage such as buying and selling (forward and backward linkages), by seeing and imitating. Due to small number of FDIs in the sample, the responses were not disaggregated in terms of these categories, but lumped together as positive impact of FDI. Table 4.12 below indicates the outcome.

Table 4.12: Sources of product technological capabilities

Innovative activities	**Acquired from FDI sources**		**Acquired from other sources**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**
Modification of existing designs	11	14.3	66	85.7	77	100
Introduction of minor adaptations to products	9	15.3	50	84.7	59	100
Conduct of regular quality control to maintain standards and specifications	10	10.6	84	89.4	94	100
Introduction of new design for manufacturing	8	14.5	47	85.4	55	100
Improvement of product quality	15	14.4	89	85.6	104	100
Conduct of R&D into new product generations	9	20.9	34	79.1	43	100
Development of entirely new products or components	7	22.6	24	77.4	31	100

Source: Field data, 2010.

The above table implies that on average, only about 16% of local firms acquired product technological capabilities from FDIs, while about 84% acquire these capabilities from other sources. This is clearly indicated in figure 4.10 below

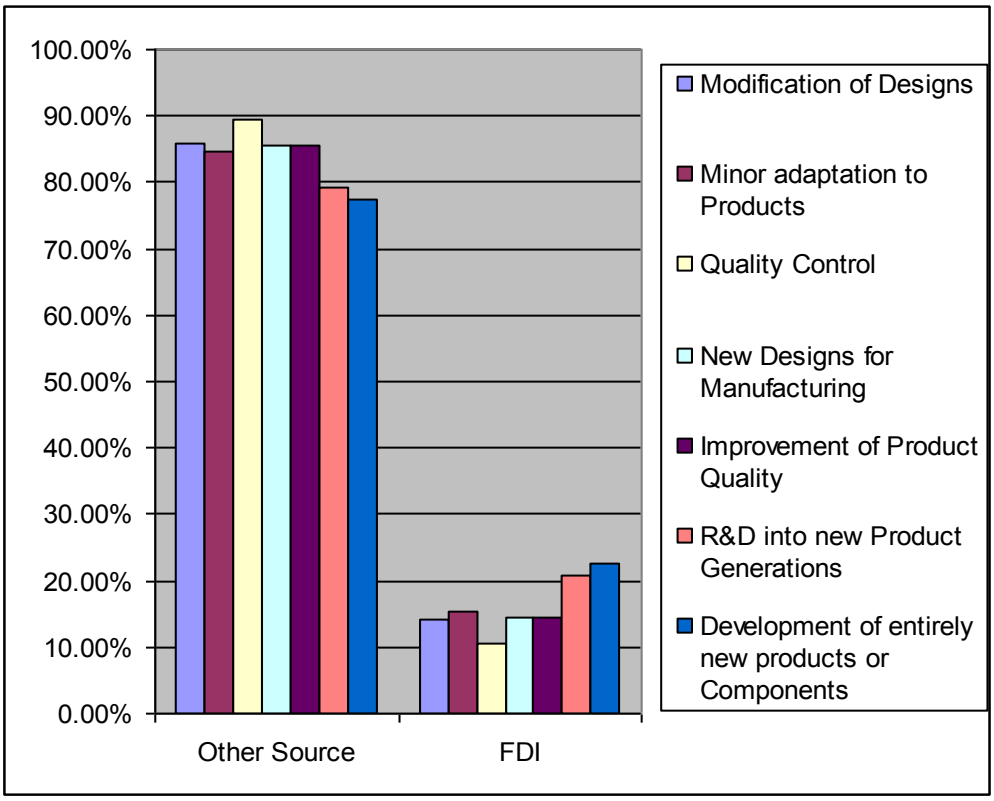

Figure 4.10: Sources of Product Technological Capabilities

Source: Field data, 2010.

Table 4.13: Sources of process technological capabilities

Innovative activities	Acquired from FDI sources		Acquired from other sources		Total	
	N	%	N	%	N	%
Introduction of minor changes to process technology	7	13.5	45	86.5	52	100
Maintenance of the machinery and equipment	11	9.9	100	90.1	111	100
Introduction of planning and control of production	7	8.4	76	91.6	83	100
Improvement of efficiency in existing work tasks	9	10.2	79	89.7	88	100
Selection of one among many options of technology	6	22.2	21	77.8	27	100
Manufacture of components	2	10.5	17	89.5	19	100
Performance of own-design manufacturing	6	15	34	85	40	100
Development of new production processes	8	21.1	30	78.9	38	100
Development of new equipment	3	11.1	24	88.9	27	100
Introduction of major improvement to machinery	5	12.2	36	87.8	41	100
Introduction of major improvement in work organization	6	10.2	53	89.8	59	100

Source: Field data, 2010.

Just like product technological capabilities, FDI contribution to local process technological capabilities is very small and on average only about 13% of local firms acquired process technological capabilities from foreign firm. The comparison between foreign firms and local sources of process technological capabilities is indicated in figure 4.11 below.

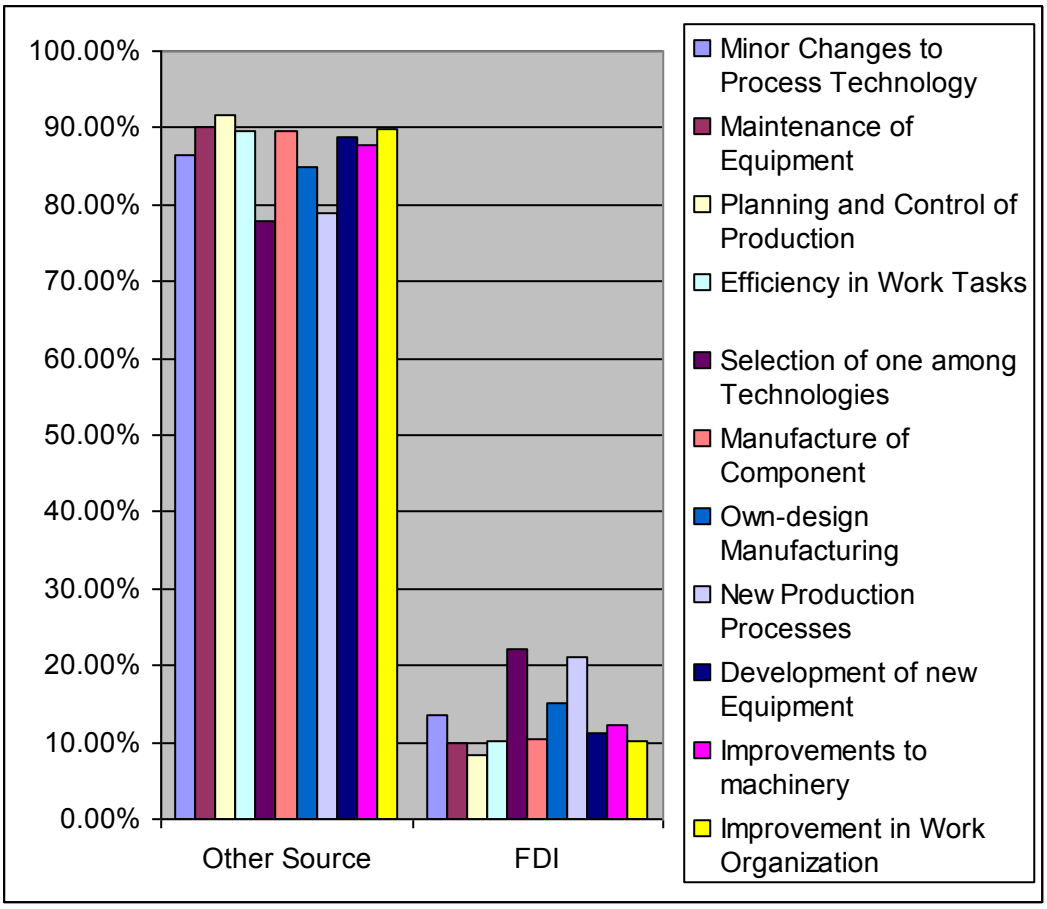

Figure 4.11: Sources of Process Technological Capabilities

Source: Field data, 2010.

Table 4.12 and Table 4.13 above indicate relative importance of FDIs and other sources as sources of acquired technological capabilities. In terms of modifying existing designs, only 14.3% firms acquired knowledge from FDIs while knowledge for 85.7 firms was from other sources. This was the case for the rest of product and process technological capabilities where the proportion of firms acquiring the capabilities from FDIs is under 23%, and on average 16% for product innovation and 13% for process technological capability. The most reliable source for innovative activities therefore was other sources than FDIs. The other sources mostly mentioned by the sample firms included suppliers of equipments, which was mentioned by 57% of the companies, fairs and exhibitions (49%), buyers (46%), Chambers of Commerce and Industry Associations (43%) and fellow firms (competitors) (39%). Other less mentioned actors include R&D organizations and universities.

The above results can be explained in two major ways: First – according to local firms this is because most of them are not aware of the FDI firms in the local market. The second reason could be because of the technological distance between local and foreign firms – as indicated above, which is negligible. According to existing literature, the greater the technological distance between the FDIs and local firms, the greater the available opportunities for local firms to learn from FDIs (see for instance, Holstein et al. 2010; Bouoiyour, n.d). This notwithstanding, other scholars argue that if the technological distance is too large then it will be difficult for local firms to learn from FDIs (see for instance Flores et al. (2000). The implication here is that there has to be some appropriate level of technological gap between FDIs and local companies: not too small and not too large either. In fact according to existing literature, knowledge spillovers are maximized at intermediate levels of technological distance (see for instance Girma, 2005; Lai, Wang and Zhu 2008). Of course too large is almost impossible for socio-economic environment existing in Tanzania as, high tech and efficiency seeking FDIs rarely locate in least developed countries. This study found out there is none in the sample firms, implying that to a large extent efficiency seeking FDIs are non existence in Tanzania.

4.4 Summary, Conclusion, and Recommendations

4.4.1 Summary and Conclusions

FDIs have elsewhere been found to be important channels through which international diffusion of knowledge and technology takes place and are especially being regarded as one of the driving forces integrating underdeveloped countries into the globalization process that has characterized the world economy over the past decades. This study sought to understand the contribution of FDIs in technological capability building in the Tanzania, and specifically for this section is its contribution in the manufacturing sector.

The findings of the study indicate that most of the FDIs in Tanzania are Greenfield, with major location motives to be close to markets, followed by cheap labor. There were no FDIs which mentioned efficiency of production as major objective of locating business in Tanzania.

Regarding extent of linkage with the local firms, about 50% of the FDIs responded that they both buy inputs from local firms and sell inputs to them. However, from perspectives of the local firms, there is very limited linkage between local firms and FDIs, since on average only about 15% said they both sell and buy from FDIs. This could be because of the smaller number of FDIs in the sample compared to that of local firms, which are 27 as against 112 local firms. Other reasons could be as indicated on section on constraints to linkage where local firms are not aware of the existence of the foreign firms in the local economy. Additional reasons as explained by the local firms, include inadequate financial resources to attend fairs and exhibitions where they can meet foreign firms, and lack of ICT facilities in industrial firms.

With regards to technological capabilities, there is negligible difference between technological capabilities of local firms and that of FDIs; and most of the capabilities so far acquired by both type of firms are those that are basic. Regarding the questions on the extent to which FDIs contributed to local technological capability building, the study findings indicate that this has happened to a very small extent. Very few firms (On average 16% for product and 13% for process) indicated their sources of knowledge for technological capabilities achieved were from FDIs.

It is most important also to note in this concluding section that most of the manufacturing FDIs located in Tanzania are market seeking. The fact that these have far-reaching implications for Tanzania necessary actions must take place. Globalization, with lowering tariffs, can be expected to induce a shift from market-seeking FDIs to efficiency-seeking FDIs. Traditionally, FDI was the only reasonable means to penetrate local markets in various developing countries. For instance, exporting to Latin America was not a promising alternative than to investing there, as local industries were heavily protected with globalizations and less protectionism, but this tendency is changing (Nunnenkamp, 1997). If this turns out to be the case world wide, international competitiveness of local production will turn out to be a decisive factor shaping the distribution of future FDIs. For Tanzania, this has immediate implication as we enter into a common market with

four other East African countries, which imply that market-seeking FDIs will locate in an East African country that has better environment for efficient production and freely access other markets, including Tanzanian from there.

4.4.3 Policy implications

There are a number of policy implications and recommendations that can be derived from the findings of this study. These are outlined below.

i) There is a need to find means and ways of forging more and strong linkages between FDIs and local firms. For instance, a policy of some minimum local content can be applied. If this is applied, those FDIs which have been avoiding sourcing from local firms because of low quality of products can engage in upgrading of local technological capabilities. This has been found to have worked elsewhere.

ii) There is also a need to coordinate information between suppliers of inputs and producers. As argued by some of the respondent, there is considerable information gap between suppliers of inputs and producers, especially the FDIs. FDIs may not know that good local supplies are available, or they do not know what the actual quality of the supplies is. The provision of information on the presence and quality of suppliers and sourcing opportunities can help.

iii) Tax incentives can also be applied so as to attract FDIs to locate in parts of the country that is hitherto not attractive to most FDIs.

iv) Tax incentives can be used to attract FDIs that are engaged in relatively high tech production.

5.0 STUDY FINDINGS: MINING SECTOR

5.1 Introduction

The mining industry has traditionally been a major recipient of foreign direct investment in sub-Saharan Africa, and has commonly been an important foreign exchange earner for the region. Over the past forty years to 1993 however, Africa's share by value of world mining output declined from 23% to 10%, because of poor policies, political interference and lack of investment (Allaoua and Atkin, 1993). Specifically this decline can be attributed to lack of investment in systematic geological mapping, poor technical data on mineral endowment, weak institutions and policies, poor infrastructure, the lack of cheap and reliable energy resources, deteriorating commodity prices, poor investment climates and the scarcity of indigenous technical and professional manpower (Quashie, 1996).

According to URT (n.d[7]), the mining sector in Tanzania contributes about 2.3% of the Gross Domestic Product (GDP). It is one of the leading components in generating foreign exchange earnings within the non-traditional exports category. The mineral sector in general earned the country $111.5 million in 2009, contributing 3% to GDP. The national goal is to have the mining sector account for 10 percent of Tanzania's GDP by the year 2025.

Recent investments, particularly in gold mining and exploration have led to the rapid expansion of the sector, and Tanzania is now on target to become an important producer in the African context. Other mineral resources include diamonds, colored gemstones, coal, salt and limestone. FDI flows to Tanzania were very scanty before the early 1990's. However after the liberalization and changes in the investment laws in the early 1990s there has been an increase from US$ 12 million in 1992 to US$ 183,4 million in 1999 (Boocock, 2002).

[7] http://www.tanzania.go.tz/mining.html#Gemstones

According to Ngowi (2009), Tanzania is among the countries which host the most vibrant exploration and mining scene in Africa. It is the fastest growing sector in Tanzania in terms of its contribution to GDP and its share of exports. Tanzania is set to become the continent's third largest gold producer after South Africa and Ghana. The country has a wide variety of minerals such as diamonds, gold, base metals, gemstones and industrial minerals.

Most investments in mining in Tanzania are through FDIs. There was huge inflow of FDIs in the mining sector immediately after economic liberalization that started during the 1980's and early 1990: FDIs in mining sector hit the tune of USD 296.5 million in 1999. Although this declined substantially years after**,** it has recently started growing again. It therefore goes without saying that much of the investments in mining is by foreign direct investment. For sustainability purposes, it should be in the interest of the country to also increase investment by local entrepreneurs; and one of the most important aspects in this is, technological capability. Just as it was done for the manufacturing sector, this study also endeavored to examine the extent to which FDIs in Tanzania have contributed to technological capability building in local mining companies.

5.2 Findings

For the mining sector 50 local firms surrounding the large FDI mining companies were surveyed between March and April 2011. These firms were located in Mwanza and Shinyanga regions. Large foreign mining companies located in the same areas included African Barrick gold, Bulyanhulu gold mine limited, Geita gold mine, El-Hillal minerals limited and Williamson diamond limited. The following is the finding of the study for this sector.

5.2.1 Basic Information about Surveyed Mining Firms

Ownership

As expected, all the sampled companies 50 (100%) were owned by local private entrepreneurs.

Age of Sample Firms

The age of the sample firms is indicated in Table 5.1 below. Looking at the table, one realizes that the trace of some local investments in mining sector was made as far back as mid 1970s. The table further indicate a sudden increase in 1996: 16% of the companies were established during this year; followed by 10% companies established in 1989. Otherwise, there is almost even distribution in the rest of the time. Like the companies in the manufacturing sector, the sudden increase in 1996 can partly be attributed to the philosophy of market and private sector-led economy that Tanzania embraced from around mid 1980s and mid 1990. The reforms under such philosophy made it easier for private firms to establish businesses including those in the mining sector.

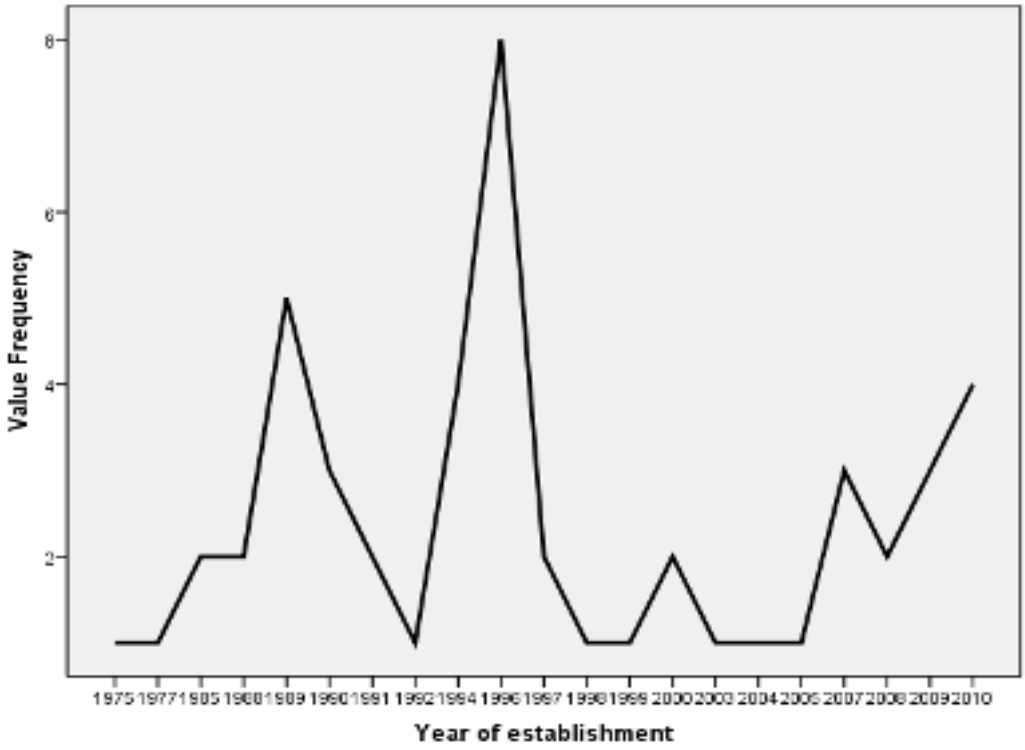

Figure 5.1: Year of Establishment
Source: Field data, 2011.

Size of mining companies

The study also documented the size of the sample companies in terms of number of employees and capital investment. The findings are shown below: Table 5.2 is for the

size in terms of employees, and Table 5.3 for the size in terms of capital investments.

Table 5.1: Size in terms of number of employees

Number of employees	**Frequency**	**Percent N=50**
Between 1 and 4 (micro enterprise)	14	28
Between 5 and 49 (small enterprise)	31	62
Between 50 and 99 (medium enterprise)	2	4
100 and above (large enterprise)	3	6
Total	50	100

Source: Field data, 2011.

Table 5.2: Size in terms of capital investment

Capital investment	**Frequency**	**Percent N=50**
Up to 5 million (micro enterprise)	16	32
Above 5 million to 200 million (small enterprise)	33	66
Above 200 million to 800 million (medium enterprise)	0	0
Above 800 million (large enterprise)	1	2
Total	50	100

Source: Field data, 2011.

It is interesting to note that, there is a close resemblance between size in terms of employment and capital investment. It is however important to note that employment here do not really mean the normal salaried workers we know, but people who have registered with the company to mine with it, and the salary being an agreed proportion of the daily proceeds produced by the employee. Both of the tables (Table 5.2 and Table 5.3) show that more than 60% of surveyed mining firms are small sized enterprises, followed by those of micro sized enterprises (30%) and the few remaining are large and medium sized enterprises. This suggests that most of the surveyed mining companies belong to the small size enterprise category going by both the number of employees and capital investment indicators.

Types of minerals

This sub-section is intended to show the proportion of the types of mineral in the surveyed companies. Respondents were asked to list three main minerals they were mining. As indicated in table 5.3 below, these minerals are gold, diamond, and gypsum.

Table 5.3: Types of minerals in the surveyed mining companies

Minerals	**Number of companies**	**Percent of total companies (N=50)**
Gold	38	76
Diamond	34	68
Gypsum	2	4

Source: Field data, 2011.

In terms of proportion, the table indicates that 76% of companies mined gold, 68% mined diamond, and only 4% of the companies mined gypsum.

5.2.2 Level of Technological Capabilities of Local Mining Companies

As earlier stated the major objective of this study is to gauge the extent to which mining FDIs in Tanzania contribute to building technological capabilities of local mining companies. However, before going into this, it is important to assess the extent to which the companies have been able to build technological capabilities. Capabilities are measured in terms of innovative activities the companies have been able to introduce in their production process. The following table summarizes the study findings on this.

Table 5.4: Level of Technological Capabilities in the Tanzanian Local Mining Companies

Innovative activities	Frequency	Percent N=50
Introduce minor adaptations to product	0	0
Improve product quality	0	0
Conduct regular quality control to maintain standards and specifications	0	0
Introduce minor changes to process technology to adopt it to local conditions.	13	26
Maintain machinery and equipment	31	62
Introduce planning and control of production	19	38
Improve efficiency in existing work tasks	21	42
Introduce automation of processes	18	36
Obtain international certification	0	0
Improve layout of product	0	0
Develop new production process	17	34
Introduce major improvement to machinery	17	34
Introduce major improvement in the way the work is organized	17	34
Introduce new marketing strategies	10	20
Enter new markets	5	10

Source: Field data, 2011.

As indicated in Table 5.4 above, a good number of local mining firms have been able to acquire some level of technological capabilities. Most of these are basic capabilities such as maintaining machinery, where about 62% of all companies carry out this activity. Next is improving efficiency in existing work tasks (42%), and planning and control of production (38%). Others with appreciable proportion of companies involved is automation of processes, achieved by 36% of companies, development of new production process, introduction of major improvement to machinery and introduction of major improvement in the way the work is organized, all of which where achieved by 34% of all companies. Introduction of new marketing strategies, which is another important component of innovation capabilities, has been achieved to a much lesser extent.

Some examples of the innovative activities carried out by the sample firms include:

i) Introduction of crushing machines

Before introducing crushing machines, and for some of the companies even now, the

entrepreneurs used manual hand tools to crush the stones. The crushing machines (crushers) were made by local entrepreneurs by using metal scraps and diesel engines of the milling machines. According to the respondents, the machines passed through several prototypes before they could manage to make and use the current much bigger and stronger version.

ii) Introduction of water pumping machine

Before the introduction of this machine, miners were using baskets to take water out of the holes, which was an inefficient and tedious process.

iii) *Introduction of excavating machines*

This type of machine had substituted the use of manual hand tools such as hammers, which were inefficient and tedious. Other innovative activities included introduction of metal detectors instead of traditional method of just using naked eyes to detect minerals. In addition, local miners introduced the use of compressors instead of hand tools. All the three innovations above indicate a move away from labour to capital-intensive production technique. The latter (capital-intensive technique) is more efficient than the former (labour intensive technique). In the following section, we present the sources of knowledge for the implementation of those innovative activities.

5.2.3. Sources of Knowledge for Acquired Technological Capabilities

For this item, respondents were asked to mention the channel through which the knowledge and information used to implement the above-mentioned innovative activities were communicated to them. The alternatives were through market linkages (forward and backward linkages), observation and reverse engineering, collaboration, and exchange of human resources. A major interest here was to gauge the extent to which the local mining firms have been able to use close proximity[8] to foreign mining companies to learn from them through any of the above channels; but also any other foreign investor as supplier of inputs and equipments and buyers of outputs from the local firms. The following table

[8] It must be noted that the local mining companies that were surveyed are those close to the foreign mining companies.

summarizes and presents the outcome of the study as far as this item is concerned.

Table 5.5 Sources of knowledge for the Implemented Innovative Activities

		Acquired from FDI		Acquired from other sources	
	N	**Frequency**	**%**	**Frequency**	**%**
Introduce minor adaptations to product	0	0	0	0	0
Improve product quality	0	0	0	0	0
Conduct regular quality control to maintain standards and specifications	0	0	0	0	0
Introduce minor changes to process technology to adopt it to local production	13	3	23	10	77
Maintain machinery and equipment	31	2	6.5	29	93.5
Introduce planning and control of production	19	1	5.3	18	94.7
Improve efficiency in existing work tasks	21	0		21	100
Introduce automation of processes	18	0		18	100
Obtain international certification	0	0	0	0	0
Improve layout of product	0	0	0	0	0
Develop new production process	17	0	0	17	100
Introduce major improvement to machinery	17	1	5.9	16	94.1
Introduce major improvement in the way the work is organized	17	0	0	17	100
Introduce new marketing strategies	10	0	0	10	100
Entered new markets	5	0	0	5	100

Source: Field data, 2011.

From the above table 5.5 it can be noted that FDIs have been a very negligible source of information and knowledge for local companies in implementing innovations they had achieved. As can be seen from the table, 23% of respondents said that they got knowledge/information on introduction of minor changes to process technology from

FDIs as opposed to 77% who got it from local sources. Only 5.9% as against 94.1% of firms introduced major improvements to machinery because of information and knowledge from FDIs. Others are 6.5% as against 93.5% for maintaining machinery, and 5.3% as against 94.7% for introducing planning and control of production.

The few companies, who reported some level of engagement with FDI, acquired the knowledge through the following channels: One FDI had conducted mineral exploration research with a local mining company thereby imparting exploration skills to the local company, and another FDI company conducted training on general mining skills and strategies for a group of local small miners. In addition, one FDI company gave specifications of the needed minerals when it bought minerals from the local companies. This therefore implies that joint exploration activities, training and buyer-seller relationship can be appropriate ways of imparting and improving technological capabilities of local mining firms if at all, these practices can be expanded to accommodate more other local companies.

Little FDI's engagement with local mining firms implies existence of limited (almost absence) forward and backward linkages between local mining companies and FDIs. Lack of these linkages can partly be explained by the fact that the mining industry does not use intermediate inputs intensively, which would have created backward and forward linkages. In addition, most of the foreign mining firms import their machinery and export their products. The opportunities that would have created some linkage with the local companies include FDIs to process minerals locally. Local processing of minerals would have provided local miners with reliable market for their products. In addition, local processing of minerals would extend linkages both within and outside mining sector for intermediate goods. This has happened elsewhere. For instance, the emergence of copper processing firms in Chile strengthened local linkages and improved competitiveness of local mining companies (Rudolf and Buitelaar, n.d).

The understandable linkages problem notwithstanding, it was the expectation of the study that – given the close proximity of the local firms to FDIs, there would have at least been

some form of spillovers in terms of imitation of processes from FDIs, collaboration, as well as through exchange/turnover of human resource, where the former employees of FDIs would start their own mining companies or be employed in the local mining firms thereby transferring knowledge from foreign to local firms. However, such engagement has been extremely limited, with only one foreign firm that conducted exploration with a local company. Better working conditions and pay in foreign firms compared to their local counterparts prevents movement of employees from foreign to local firms. In addition, it is rather difficulty for employees to establish their own mining companies based on the knowledge, experience and skills from foreign firms. Among other things, this requires entrepreneurial skills and ability, which include risk-taking and this also calls for adequate capital.

Innovations achieved through local channels include hiring of equipments from local agents located in nearby towns like Mwanza and Shinyanga and joint engagement within the mining companies through exchange of information, sharing of equipments; this being of typical of what happens in a cluster setting.

5.2.4. Determinants and Constraints to Linkages and Knowledge Exchange between FDI and Local Companies

This section sums up respondents' opinions over the determinants and constraints of joint engagement and knowledge exchange between firms undertaking FDIs and their local companies. In terms of determinants of joint engagement and knowledge exchange, respondents pointed out local marketing of minerals as an important strategy that brings together foreign and local companies together. According to them, markets for minerals and for input materials facilitate contact and long-term linkages among actors. However, in the opinion of the authors, this is only possible if there is local processing of minerals.

Furthermore, respondents mentioned training and seminars as among the determinants of joint engagement and knowledge exchange between local and foreign firms. Conceptually, business workshops and forums in which firms undertaking FDIs and local

companies participate are among the avenues for these actors to be connected and to share exploration, production and market information and opportunities. The policy implication here is to put incentives for such joint actions.

In relation to constraints, respondents mentioned several factors that hindered joint engagement and knowledge exchange between foreign and local mining firms. One of these factors is language. As opposed to most foreign investors, local miners are not fluent English speakers, if at al. Another constraint mentioned is lack of intermediaries between FDIs and local companies. Most of the respondents claimed that there are neither personal nor institutional efforts to facilitate linkages between the two. According to them, local governments are well positioned to facilitate such linkages, but to a large extent are weakened by contracts between FDIs and the central government. Although the foreign mining companies are undertaking their activities in Local Government Authorities (LGAs) jurisdiction, their contacts are mostly with the central government (Ministries, Departments and Agencies – MDAs).

In the broader sense, the MDAs would include the Ministry responsible for minerals and energy for policy issues, Tanzania Investment Centre (TIC) for investment issues; Tanzania Revenue Authority (TRA) for taxation matters; National Environmental Council (NEM) for environmental issues in general and Environmental Impacts Assessment (EIAs) in particular. However, as things stand to day, there is hardly a space in which foreign investors encounter the LGAs.

The third constraint is low level of technology in local companies. Local entrepreneurs claimed that their technologies are far below the level of technology employed by their foreign counter parts. This has often prevented them from seeking collaboration and even borrowing best practices from FDIs. According to them, the big differences in the level of technologies could have caused FDIs to neglect the local companies.

The other constraint that was mentioned is the existence of frequent conflicts between local people and foreigners over natural resources - such as land ownership and access. Such conflicts had resulted into mistrust between companies under local investments and

those under foreign investments.

5.2.5 Summary and Some Concluding Remarks

The study has indicated that in terms of capital investments, the size of local investment in mining is sizeable and can reach 15 billion Tshs capital investment in one company. In terms of technological capabilities, most of them are still using rudimentary technologies. However, a good number of companies have introduced modern technologies, demonstrating an appreciable level of technological capability.

But in relation to our major research question, extremely few of these capabilities can be attributed to the presence of FDIs in the country.

Despite of the close geographical proximity, there is conspicuous absence of joint engagements between the foreign investors and local entrepreneurs. This has been blamed on lack of government strategies to create space for linkages between foreign investors and local entrepreneurs. On the other hand, however, there seems to be an opportunity to enhance existing linkages between and among small mining companies to learn among themselves and even collaborate on issues on technology acquisition and marketing.

5.2.6 Recommendations

A number of policy recommendations can be made based on the findings of this study.

First is to find avenue for bringing together foreign investors and local mining companies from time to time. There can be things like annual mining investors forums where local and foreign firms can meet, discuss pertinent issues and ultimately build long term linkages and interactive learning. There has to be incentives for these meetings; otherwise they might not take place.

Second, the avenues for interaction such as training and joint mineral exploration that have already taken place should be encouraged and sustained through incentives structures.

Third important policy recommendation is the government to initiate an innovative

cluster around the mining sites. This is because from the findings of this study one can already see a potential cluster around mining sites. Experience elsewhere indicates that clusters have enabled enterprises to overcome many binding constraints in the areas of capital, skills, technology and markets that helped enterprises to grow and compete. Clusters can be anchored around big FDI companies since the benefits of cluster approach lies in a holistic and comprehensive view of what is needed in order to build local economy around the mining cluster. It will also involve looking at the mining companies themselves, processing of minerals and suppliers of inputs and other services including environmental issues. Clusters also involve buyers of the end products as well. However, to implement a cluster approach, there is need to conduct a comprehensive study of the current situation with respect to an innovative cluster. The following questions should be asked:

1. What are the competitive advantages of mining clusters in Tanzania?
2. How has mining clusters elsewhere in the world have evolved over time and what determined that evolution?
3. What has been the role for public policy in the performance or lack of performance of the existing mining clusters elsewhere in the world?
4. What strategies and collective actions, public and private, could stimulate the potential for the emergence of an innovative mining cluster in Tanzania?

6.0 AGRICULTURAL SECTOR

6.1. Introduction

Agriculture is the leading economic sector in Tanzania. It accounts for about 50% of GDP, 75% of merchandise exports, is source of food, and provides employment opportunities to about 80 percent of Tanzanians. A future vision for Tanzania agriculture sector is to have a highly efficient and economically viable market-driven large scale farming sector, characterized by a wide range of farming enterprises of varying sizes having a positive influence to the rest of the economy. Among the recent initiatives to revive the agricultural sector in Tanzania include the Kilimo Kwanza (Agriculture First Initiative). Development of science and technology, which is the focus of this study, is one of the ten pillars of Kilimo Kwanza.

As discussed in earlier sections, one way to build local technological capability is through foreign direct investment. Although foreign direct investment in agriculture is hitherto very low, it is likely to increase in the near future because of the Kilimo Kwanza Initiative that encourages commercial investments. It is therefore important to look at the relationship between foreign investments and technological capability building of local farmers, and this is precisely what this study seeks to achieve. For the purpose of this study on the agricultural sector, the survey targeted local small scale farmers located near large scale FDI plantations. Two agricultural study sites were purposively selected. These are Kibosho in Moshi rural where small scale coffee farmers surround large FDI coffee plantation. A total of 60 small scale farmers in Singa, Sungu and Mweka villages were randomly selected and interviewed.

The second study site was in Mkamba village in Kilombero area in Morogoro region where small scale sugarcane farmers surround large FDI sugarcane plantation and processing facility. A total of 50 farmers in Mkamba village were also randomly selected and interviewed.

The major objectives for the agricultural sector, as in other two sectors, were to asses the

contribution of FDIs in technological capability of local people, in this case the farmers. The other related objectives were: 1) To gauge the extent to which famers in these two locations are innovative and; 2) To gauge the extent to which forward and backward linkages and other forms of collaboration have helped farmers to be innovative. The outcome of the study is presented in the following sections, starting with basic information on the farmers and their farms.

6.2 Study Findings

6.2.1 Basic Information about the Surveyed Farmers

Gender

The gender distribution among farmers is indicated in Table 6.1 below. The table indicates that out of the 110 farmers that were surveyed, 80 of them or 72.7% were men and 30 or 27.3% were women. Given the fact that it is the household heads that were interviewed the findings are not strange for the study areas. These are predominantly male dominated societies where the household head is normally a man. In some few cases however there were some female-headed household for various reasons including death of the man in the household.

Table 6.1: Sex Distribution among farmers

Sex	**Frequency**	**Percent N=110**
Males	80	72.7
Females	30	27.3
Total	110	100

Source: Field data, 2011.

Education level

The study also sought to identify education levels of farmers. The result is indicated in Table 6.2 below. The table indicates that the majority of respondents (73.6%) had primary education level, followed by 20% with secondary education and 2.7% with college education. Only 0.9% of the respondents had university level education. These findings are encouraging as a 20% of post primary education as farmers is not a small

thing in Tanzania. At the very least interactive learning can very easily take place among farmers themselves, and farmers with other relevant actors.

Table 6.2: Education levels of farmers in the study sites

Education level	Frequency	Percent	Valid percent N=107
Primary	81	73.6	75.7
Secondary	22	20.0	20.6
College	3	2.7	2.8
University	1	0.9	0.9
Total	107	97.3	100
No responses	3	2.7	
Total	110	100.0	

Source: Field data, 2011.

Size of farms in terms of acres

The study also endeavored to determine the size of the farms in the study sample. The results are indicated in Table 6.3 below. The table shows that the majority of the respondents (72.7%) had farm sizes of between 1 and 5 acres. About 16.4% of respondents had farm sizes of between 6 and 10 acres. Very few (0.9%) respondents had farm sizes ranging between 31 and 40 acres. Cumulatively, about 99.1% of respondents had farms ranging between 1 and 30 acres. For the respondents in Kibosho (Moshi rural) the farm sizes were smaller than those in Kilombero. The majority of farms in the former were between 1 and 5 acres with some having even less than 1 acre.

Table 6.3: Size of farms in terms of acres

Farm size	Frequency	Percent N=110
Farm between 1 to 5 acres	80	72.7
Farm between 6 to 10 acres	18	16.4
Farm between 11 to 20 acres	8	7.3
Farm between 21 to 30 acres	3	2.7
Farm between 31 to 40 acres	1	0.9
Total	110	100.0

Source: Field data, 2011.

6.2.2 Innovative Activities

There are various innovative activities that farmers can engage themselves in. Farmers were asked to indicate innovative activities that they are actually involved with in the past four years. Findings indicate that out of the 13 possible innovative activities farmers were involved in eight (8) of them. These are 61.5% of all the possible innovative activities. The following table presents more detailed and specific innovative activities that were performed by framers.

Table 6.4: Innovativeness among farmers

Innovative activities	**Frequency**	**Percent N=110**
Introduce new and/or improved seeds	54	49.1
Introduce new kind of fertilizers	5	4.5
Introduce new kind of pesticides	6	5.5
Introduce new irrigation systems and techniques	0	0
Introduce new methods of tilling the land	6	5.5
Introduce new methods of weeding	0	0
Introduce new methods of applying pesticides	0	0
Introduce new harvesting techniques/procedures	47	42.7
Introduce new packaging methods	1	0.9
Introduce new storage facilities and systems	0	0
Maintain farm machinery and equipment	1	0.9
Enter new markets	0	0
Use new marketing strategies	1	0.9

Source: Field data, 2011.

From the above table 6.4, it can be seen that the majority of the surveyed farmers (49.1%) introduced new and improved seeds. The next most innovative activity that farmers were involved in was introducing new harvesting techniques and procedures. This was done by 42.7% of the surveyed farmers. A much smaller proportion of farmers carried the rest of the innovative activities. The next section provides detailed information about the sources of innovative activities performed by surveyed farmers.

6.2.3 Sources of ideas and knowledge for the above implemented innovations

The innovative activities that the respondents had been involved in had different sources.

The ideas and knowledge could come from multinationals undertaking FDIs or from other sources. The following table 6.5 presents the findings for this research questions.

Table 6.5: Sources of Ideas and Knowledge for Innovation

Innovative activities		Knowledge acquired from FDI		Knowledge acquired from other sources	
	N	**Frequency**	**%**	**Frequency**	**%**
Introduce new and improved seeds	54	49	90.7	5	9.3
Introduce new kind of fertilizer	5	3	60	2	40
Introduce new kind of pesticides	6	6	100	0	0
Introduce new irrigation systems and techniques	0	0	0	0	0
Introduce new methods of tilling the land	6	0	0	6	100
Introduce new methods of weeding	0	0	0	0	0
Introduce new methods of applying pesticides	0	0	0	0	0
Introduce new harvesting techniques/procedures	47	47	100	0	0
Introduce new packaging methods	1	1	100	0	0
Introduce new storage facilities and systems	0	0	0	0	0
Maintain farm machinery and equipment	1	0	0	1	100
Enter new markets	0	0	0	0	0
Use new marketing strategies	1	0	0	1	100

Source: Field data, 2011.

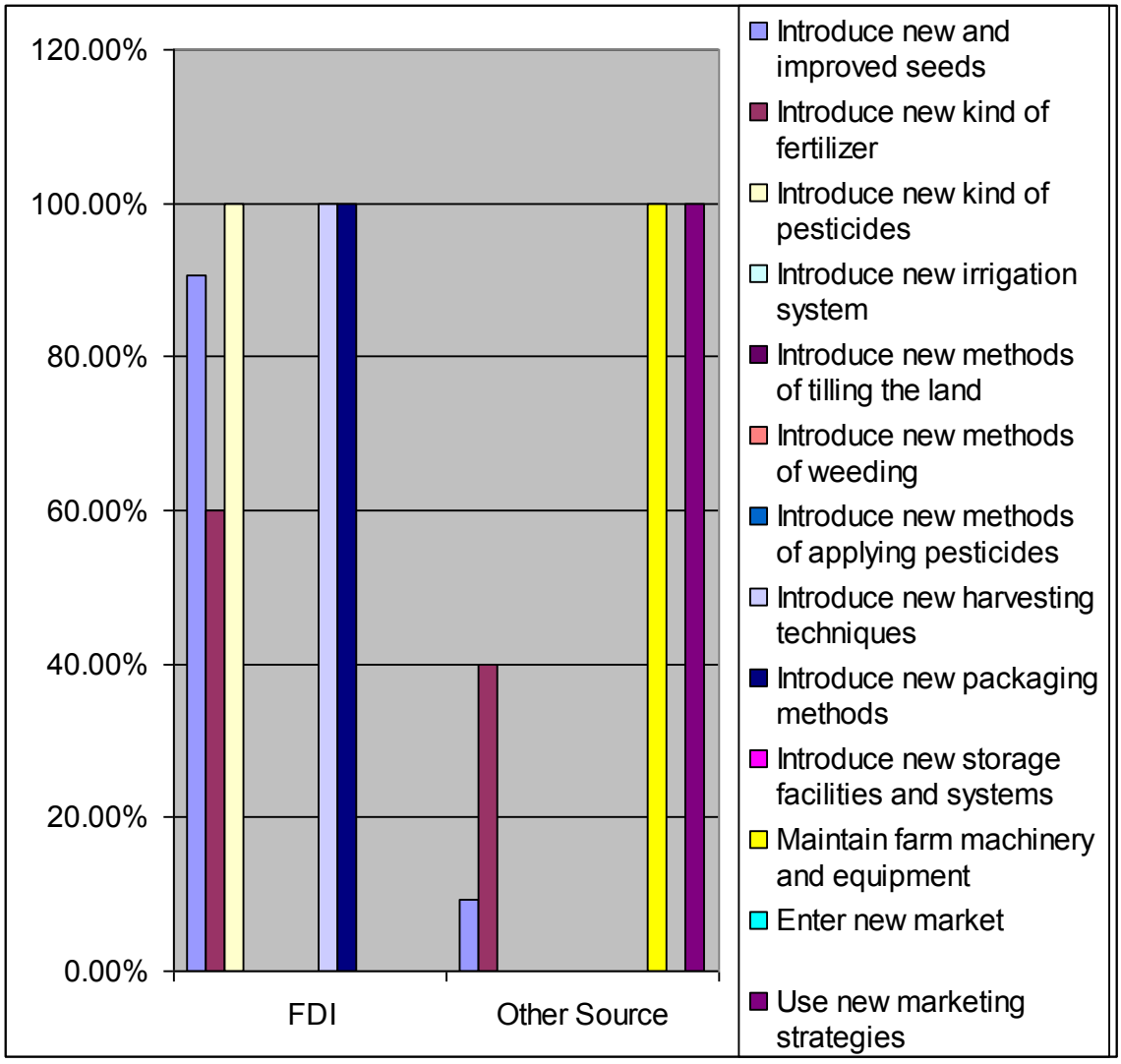

Figure 6.1: Sources of Ideas and Knowledge for Innovation

Source: Field data, 2011.

It can be seen from Table 6.5 above that FDI projects have been responsible for most of the ideas for innovation that were carried out by farmers. For instance, for the most popular innovation (introducing new and improved seeds where about 49% of farmers were engaged in) FDIs were responsible for 90.7%, where other sources contributed only 9.3%. Next most popular innovation introduced is new kind of fertilizers, which was carried out by 42% of all farmers; and for this FDI projects were sources of ideas and knowledge for innovation for 60% of the farmers while other sources were responsible for 40%. The findings indicate that, compared to the other two sectors, FDI had a better

spillovers effect for technological capabilities in the agricultural sector.

Spillovers for ideas for innovation normally occur during backward and forward linkages, and other forms of collaboration. In the next sections, the authors will endeavor to indicate the extent to which backward and forward linkages and other forms of collaboration were responsible for the innovations achieved. This is in terms of FDIs and non- FDIs.

6.2.4. Backward and Forward Linkages

The study attempted to identify linkages between the small-scale farmers and various other actors. The other actors included large FDI plantation farmers, local companies, and importers, exporters, buyers and farmers associations. Both backward and forward linkages were investigated, and the findings are presented in what follow below.

Backward Linkage

Conceptually, backward linkages are the use by one firm or industry of produced inputs from another firm or industry. Table 6.6 below indicates the extent of backward linkage between farmers and other actors.

Table 6.6 Backward Linkages

Backward linkages	**Frequency**	**Percent N=110**
With Local Companies	32	29.1
With FDI	0	0
Import	1	0.9
With Farmers Associations	79	71.8

Source: Field data, 2011.

From Table 6.6 above, it can be noted that 29.1% of farmers had backward linkage with local companies. This implies that local companies supplied their outputs to the local farmers as inputs in their production systems. On the other hand, respondents indicated that, there were no linkages with FDI projects. This means that the local farmers did not

buy their inputs from the FDI firms. This indicates either low level of FDI investments in agro inputs such as fertilizer, or inputs as FDIs were not in the vicinity of the farmers. The greatest linkage was noted to exist between the farmers and farmers' associations at 71.8%. This implies that farmers' associations supplied to farmers substantial factor inputs, indicating that probably linkage with inputs from FDIs was through farmers association.

Forward linkages

Forward linkage occurs when the products of one industry is used as raw materials of another industry. This can involve an industry in primary production linking with an industry in secondary production. It happens when an industry is producing raw materials for another. Table 6.7 below indicates the forward linkage between farmers and other actors.

Table 6.7: Forward Linkage

Forward linkage	**Frequency**	**Percent N=110**
With Local Buyers	36	32.7
With FDIs	49	44.5
Export	0	0

Source: Field data, 2011.

As indicated in Table 6.7 above, farmers seem to have more forward linkages with FDIs (44.5) than local buyers (32%). The percentage of linkage with FDIs might have been raised by the case of sugar cane where there is only one processor who is an FDI – the Illovo Sugar Company.

The table also indicates that no farmer was exporting. This is natural given the scale of operation of these farms, which are relatively too small to warrant a venture in the export market. Although coffee from the small scale farmers may be exported, this was not done by the farmers directly, but by export companies that bought coffee either directly from the farmers or indirectly via the Moshi Coffee Auction.

6.2.5 Extent of Suppliers' Influence on Innovation

The respondents were asked to give their views on the extent to which suppliers of inputs did influence their innovative activities. Out of the 104 respondents to this question, a total of 91 or 87.5% were of the opinion that the suppliers did not influence their innovations at all. A total of 12 or 11.5% were of the opinion that somehow the suppliers influenced their innovations while only one (1) or 1% was of the opinion that suppliers contributed a great deal into their innovation.

Generally, it was found that suppliers of inputs have not influenced innovations substantially. Typically, the immediate suppliers of such inputs as seeds, fertilizers, pesticides and small farm equipments like hoes and spraying machines are supplied by agro-dealers. These generally do operate small agro-vet shops both in rural and urban centres and some medium agro-vet shops in urban centres. The agro-vet dealers on the other hand get their supplies from agro-vet companies. The most important thing to note here is that, there was no backward linkage between farmers and FDIs. The details of the findings are presented in table 6.8 below.

Table 6.8 Extent of Suppliers Influence on Innovation

	Frequency	**Percent**	**Valid percent N=104**
Not at all	91	82.7	87.5
Somehow contributed	12	10.9	11.5
Contributed a great deal	1	0.9	1.0
Total	104	94.5	100.0
No responses	6	5.5	
Total	110	100.0	

Source: Field data, 2011

The majority of the local farmers in Kilombero also pointed out that, suppliers (farmers associations and local retailers) did not play any role in influencing the innovations they made. The relationship was only of buyer-seller relationship. However, few stated that the local retailers provided them with the information on how to use the farm inputs like fertilizer application and when to apply.

The Kibosho local farmers bought their farm inputs from Tanganyika Farmers Association (TFA) and Kilimanjaro Native Cooperative Union (KNCU). According to the respondents, these suppliers have not been able to influence any type of innovation in their farms.

6.2.6. Extent of Buyers' Influence on Innovation

The respondents were asked to give their views on the extent to which buyers of their outputs (produce) did influence their innovative activities. Out of the 103 respondents to this question, a total of 51 or 49.5% were of the opinion that the buyers did not influence their innovations at all. A total of 31 or 30.1% were of the opinion that somehow the buyers influenced their innovations while 21 or 20.4% were of the opinion that the buyers contributed a great deal to the innovations they achieved.

The findings indicate that buyers had substantial influence on innovation achieved by farmers. Cumulatively, farmers who found that somehow and to a great deal that their buyers influenced innovation made in their farms represent an important proportion of surveyed farmers. Among the ways in which buyers influenced innovation include setting and demanding higher quality standards of farmers' outputs. For instance, the buyers were keen on the sugar contents of the sugarcane. For this reason, farmers strived for new and better seeds to maximize the sugar contents of their sugar cane. According to farmers, buyers influenced innovations largely on harvesting techniques. The techniques learned include quick harvesting, more careful sugarcanes cutting techniques, the time to keep canes from the time they have been harvested and handling procedures. All those helped to maintain high sugar content. In addition, some local farmers got improved seed, a high quality seed that increased their sugar cane production from FDI.

For the case of coffee, buyers set price based on quality. Among the measures of quality, include cleanness of the coffee. This pushed farmers to adopt new ways of drying coffee in order to adhere to buyers' cleanness quality standard. Instead of drying the coffee by spreading it on bare ground, farmers spread the beans on top of huge sisal bags, plastic or canvas materials to reduce dust and sand. Some even used some wire mesh popularly

known as '*chekecheke*' and hung them above ground to avoid coffee beans contacting dust, sand or any other dirty materials. Empirical findings on the respondents' views on buyers' influence on innovation are presented in the table below.

Table: 6.9 Extent of Buyers' Influence on Innovation

	Frequency	**Percent**	**Valid percent N=103**
Not at all	51	46.4	49.5
Somehow contributed	31	28.2	30.1
Contributed a great deal	21	19.1	20.4
Total	103	93.6	100
No responses	7	6.4	
Total	110	100.0	

Source: Field data, 2011

6.2.7. Collaboration with other actors

Apart from forward and backward market linkages, it was expected that farmers would be collaborating with actors on non-market issues in their innovation process. The respondents were asked to indicate whom they collaborated with out of a list of eight (7) different actors. The table below presents the findings for this question.

Table 6.10: Level of Collaboration with Other Actors

Actors	**Frequency**	**Percent N=110**
Suppliers of equipment and other inputs	9	8.2
Public research centers	6	5.5
Private research centers	0	0
Universities	0	0
Fellow farmers	84	76.4
TCCIA	0	0
Other actors	21	19.1

Source: Field data, 2011

The majority of the surveyed farmers (76.4%) collaborated with their fellow farmers. This finding is not surprising given the communal nature of most rural settings in Africa in general and Tanzania in particular. In a place like Kibosho for example most of the

respondents live in very close neighborhood with each other. Some are even close family members both immediate and extended. It is natural therefore that they would collaborate more with each other than with the other actors.

The next most mentioned collaborator was the group of other actors (19.1%). The most mentioned actors were crop associations, financial institutions, and to a lesser extent, extension service and FDIs. About financial institutions, Kilombero sugarcane farmers reported to be collaborating with the National Microfinance Bank (NMB), the CRDB Bank Ltd and the Tanzania Investment Bank (TIB). These institutions provided loans and trained farmers on how to use the loans effectively. These financial institutions extended loan to Udzungwa SACCOS. This then lent the money to its individual farmers. With regard to extension service, The Kibosho farmers collaborated with the Tanzania Coffee Research Institute's (TACRI) extension officers in the areas of knowledge sharing in the application of pesticides, coffee harvesting and irrigation activities.

Concerning FDI, both the Kilombero sugarcane farmers and coffee farmers mentioned that they had collaborated with FDI. Such collaboration consisted of working in the FDI plantations where farmers acquired some advanced skills and techniques from FDI. For the Kilombero farmers, this also included employment in their factory and market offered by the factory for their products (sugarcane), provision of social services like health and education facilities.

Other groups with low levels of collaboration with farmers include suppliers of equipment and other inputs (8.2%). These normally include agro-dealers such as seed and pesticide suppliers. According to the respondents, these actors would not only supply the farm implements and equipments but also give instructions on how to apply the same. In some rural places, village agro-vet leaders are among the well-to-do in most villages. They stand to offer credit and lend money to their less well off (or more worse off) counter parts. Farmers therefore naturally prefer to collaborate with them.

For research centers, only 5.5% farmers admitted to have collaborated with these centers. It is very unfortunate that there is rather low collaboration between farmers and research

centers because it is precisely these centers who can help farmers develop new ideas, processes and products, and can improve further collaboration with FDI. In fact, Kilombero farmers were complaining of the inadequacy of skills to improve sugar contents of their sugar canes, and experts for the research organizations and universities were not available to help them. This is where research centers could have helped.

6.2.8. Constraints to Linkage and Collaboration between FDI and Local Farmers

The major interest of the overall study was to gauge the contribution of FDIs in the technological capability building of local farms. Largely, this is through linkages and other forms of collaboration. The study therefore sought to identify constraints to these linkages and collaborations. The constraints are disaggregated in terms of crops and location as discussed in the following paragraphs.

Coffee farmers in Kibosho Village

The constraints that hinder much linkages and collaboration in Kibosho can be categorized as rather being a bad relationship, actual or perceived, between the small scale farmers and the plantation owners. A number of discontents of the farmers as partly outlined as follows:

1. The foreign farmers in Kibosho did not seem to like any sort of collaboration with local farmers. For instance issues related to irrigation skills and technology, the plantation owners had instead taped a lot of water from River Nsoo so that it flowed into the plantation at the expense of farmers who were depending on water from the same river via Makoyaa stream. This somehow created tension that hindered meaningful linkages and collaboration.
2. Villagers were being harassed by the FDI plantation owners when they pass through the plantation as they were accused of being thieves. The villagers felt abused. This too was not good for linkages and collaboration
3. Workers in the plantation, some of whom come from the surveyed villages of Singa, Mweka and Sungu claimed that they were not provided with protective gears like masks and hence pesticides affected their health.

4. Poor communication due to language barriers. Most of the small scale farmers did not speak English as did the plantation owners.
5. The local farmers used to cut grass for their animals and fetch firewood from the plantation before it was privatized. They also used to plant vegetables and beans within the coffee plantations. But after the plantation was privatized to the foreigners all these practices are no longer allowed.
6. The terms of engagement of the foreigners with the government were not known to the local people.

Sugarcane Farmers in Kilombero

The following is a list of Kilombero sugarcane farmers' constraints to better linkages and collaboration between them and the foreign investors:

1. Low level of education (mostly primary school education) on part of local farmers and lack of collaboration skills and courage on part of local farmers and partly on foreign investors
2. Both sugarcane growers' association and union leaders failed to communicate effectively with the foreigners (language problem)
3. Failure of local farmers to understand their business contracts under contract farming and out-growers' schemes
4. Late and rather low payment for the local farmers' produce
5. Low financial capacity of the farmers
6. Lack of sufficient and appropriate representation by union leaders to various forums in the plantation and factory
7. Delayed buying (crops remain in the farm for some time)
8. Failure for the plantation and factory to help in irrigation of sugarcane
9. Lack of transparency on the part of the foreign investors. For instance, cheating on sucrose level and cane weighting on part of local farmers. This resulted into bad relation with foreign investors.

6.2.9. Summary and Conclusion

The key findings indicate that the main type of innovative activity in the agricultural

sector is the introduction of new and improved seeds. The next most innovative activity is introducing new harvesting techniques and procedures. Very few farmers introduced innovation in terms of introducing new packaging methods, maintaining farm machinery and equipment and using new marketing strategies.

Most important to note however, as far as this study is concerned, is that FDIs projects have been the major sources of farmers innovation compared to other actors. For instance for those who introduced new seeds, which is the majority, more than 90% said that they acquired the knowledge from FDIs. Next most prevalent innovation is introduction of new kind of fertilizer, and in this too 60% of farmers said that they got information and knowledge from FDIs. In terms of linkage, forward linkage with buyers (most of whom are FDIs) had greatest influence on innovation. Although in this case one can argue that even if it were local processors, they would still influence innovativeness of farmers so as to have access to high quality inputs.

However, these benefits of FDI notwithstanding, there are very serious misunderstanding and consistent conflicts and quarrels between local farmers and FDI projects. In a way, this could have stemmed from the fact that FDIs in these areas are almost monopolies, with very little competition from the local investors. It is therefore important to lure local entrepreneurs to open processing plants near the two areas. In fact, farmers in Kilombero complained that the available processing capacity is not adequate for the volume of sugar cane that is produced.

6.2.10. Recommendations

1. There is need to encourage more FDIs and local companies too, to invest in agro processing
2. There is a need also to encourage collaboration and linkage that goes beyond market between framers and buyers and suppliers

3. However, and above all, the government should find a way of ensuring harmony between local farmers and foreign investors. This alone will improve linkage and spillovers of knowledge from FDIs to Farmers.
4. In-depth research is required on the working of innovation systems in agriculture

7.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary and Conclusions

This study has argued that FDI, if properly harnessed, can be an important channel through which international technology transfer and technological capability building can take place. Important channels include backward and forward linkages between foreign and local firms, demonstration and competition effects and mobility of human resource between foreign and local firms. The study has examined the contribution of FDI in local technological capability building in Tanzania through all of the above channels, and in three sectors of manufacturing, mining and agriculture.

The major findings indicate that the contribution of FDIs in local technological capability building, especially for mining and manufacturing is very small. There are various reasons to this, depending on the sector. For the manufacturing sector the most important is the quality of FDIs the country has so far been able to attract. The study indicated that most of the technological capabilities that the manufacturing firms have so far been able to achieve, including FDI companies, are those that are basic. This fact is supported by the fact that none of the foreign companies had located in Tanzania for the efficiency seeking motive. Efficiency-seeking companies are more advanced technologically. Other reasons, as indicated in the research findings could be limited to linkages between foreign firms and local firms, and concentration of FDI in very few location in the country and therefore hindering spillover through demonstration effect, which is limited to only those locations favored by FDIs. Other reason, from the perspectives of foreign firms is poor quality of inputs from local firms.

For the mining and the agricultural sectors, constant conflicts between foreign investors and local communities must have contributed a great deal to the lack of linkages and learning between the two actors. This notwithstanding, potentials for linkages between the two sectors is different. This is because of the nature of investments in the mining sector that does not intensively use intermediate goods, backward and forward linkages with local investors are not expected; unless the companies embark on the processing of minerals locally. However, this notwithstanding, given the close proximity, some sort of

collaboration or spillover effects were expected between FDIs and local entrepreneurs. However these were found to be absent. On the other hand forward and backward linkage between local farmers and foreign agro-processors has a great potential. In fact according to this study, interactive learning and technological capability building through FDIs has taken place more in the agricultural sector than the other two sectors. For instance for those who introduced new seeds, which are the majority, more than 90% said that they acquired the knowledge from FDIs. This is both from backward and forward linkages and spillovers as a result of local farmers working in the foreign farms. This is far more than those in the manufacturing where on average only 16% of product technological capabilities are from FDIs and only 13% of process technological capabilities were from FDIs sources; and far less for the mining sector.

In addition, the fact that most of the FDIs located in Tanzania are market seeking (except for mining) can have a far-reaching implication for Tanzania if necessary actions cannot be taken. Globalization, and lowering of tariffs, can be expected to induce a shift from market-seeking FDIs to efficiency-seeking FDIs. If this turns out to be the case, then international competitiveness of local production will turn out to be a decisive factor shaping the distribution of future FDIs across countries. For Tanzania, this has immediate implication as we enter into a common market with the four other East African countries. This implies that market-seeking FDIs will locate in an East African country that has better investment environment for efficient production, while freely accessing markets of other countries including Tanzania..

7.2 General Policy Recommendations

Specific policy recommendation for each sector was provided under each section of the individual sector. Here the authors emphasize the following.

i) There is need to encourage linkage between foreign and local investors. This can be in the form of minimum local contents for foreign investments. This policy if is put in place, is what will facilitate foreign investors to invest in local technological capability building. Other countries have successfully used this.

ii) There is need to government to invest in information brokerage. From the findings of the study it appears that information between producers and suppliers of appropriate inputs is not perfect. It also appears that for some production, appropriate suppliers are not available locally; there is therefore a need to do some kind of auditing to identify such gaps so as to facilitate investments in the same.

iii) There is a need to provide incentives for foreign investors to locate in the regions that are otherwise not attractive to foreign investors

iv) Also there is a need to provide special incentives for foreign investments in relatively high tech sectors or investments. It is only when FDI demonstrated capabilities are appreciably higher than those of local firms, that some meaningful spillovers can take place.

v) There is a need to work towards putting in place an innovative cluster around mining sites. The clusters should include foreign mining firms. The most important aspect here is to encourage processing of minerals locally.

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