# THE IMPACT OF FORIGN DIRECT INVESTMENT (FDI) ON TECHNOLOGY TRANSFER

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## Abstract

Technology has gaining importance as vital factor for competitiveness in the world economy. Technology transfer through Foreign Direct Investment (FDI) has become the predominant channel of technology transfer. FDI can have important technological spillovers in host economies, especially if it takes a joint-venture form subject to local control. Technology transfer has been a subject of considerable interest to many groups, such as policymakers, international funding agencies, and business executives, due to close relationship between technology transfer and economic growth. It has aroused the interest of academic researchers. Despite all this attention, however, the concept and mechanism of technology transfer remains vague, controversial, and inadequately operationalised.

Unfortunately, due to the need for capital and/or absence of appropriate national technology policies, most host developing countries focus on maximizing the quantity of their FDI inflow, while underestimating the importance of appropriateness of technologies transferred through FDI. However, competitive technology has become a basic prerequisite for economic development and growth, and developing countries like Ethiopia should try to achieve best possible technological gains from FDI.

Using a firm-level survey, this study examines effects of FDI on local metal and engineering firms. The survey indicates that technological inflow through FDI is an important conduit in promoting local firms to upgrade and to be competitive in national as well as international market. However, the local technological capability to adopt the technology, the collaboration between foreign based companies and local firms, and the national technology policy are very weak to benefit from FDI. The study also explores the possible contributing factors related to foreign technology transfer, such as domestic competition and linkages (training and consultancy, employee movement, etc). The experience of newly developing countries is reviewed with regard to FDI and technology transfer and the gaps are identified and analyzed.

To address the problem the researcher proposes policy implications and framework by putting the contributors to effectively transfer technologies from FDI.


**Key Words:** Technology transfer, Foreign Direct Investment, Spillovers

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# List of Acronym

| | |
|---|---|
| CCP | Chinese Communist Party |
| COMESA | Common Market for Eastern and Southern African countries |
| DTSC | Domestic Technological and Scientific Capacity |
| EIA | Ethiopian Investment Agency |
| EIC | Ethiopian Investment Commission |
| EPA | Ethiopian Privatization Agency |
| EU | European Union |
| FDI | Foreign Direct Investment |
| FIIA | Foreign Investment Implementation Authority |
| GDP | Gross Domestic Product |
| ICT | Information and Communication Technology |
| IMF | International Monetary Fund |
| LDC | Least Developed Countries |
| MNC | Multi National Companies |
| OECD | Organization for Economic Cooperation and Development |
| OPIC | Overseas Private Investment Corporation |
| R&D | Research and Development |
| TNC | Trans National Companies |
| UILD | Unit for Industry Linkage and Development |
| UNCTAD | United Nations Conference on Trade and Development |
| UNIDO | United Nations Industrial Development Organization |
| WB | World Bank |

# Chapter one

# Problem and its Approach

## 1.1. Introduction

Today, technology has become the most important source of economic growth, competitiveness, wealth, power, prestige, and even independence. For a long time, capital and labor were considered the principal factors of production. With the increasing globalization of business activities, knowledge and information have been gaining importance as vital elements of any firm's success in today's global economy. In fact, we are moving from an industrial age to information age, in which technology has become the most decisive factor of competitiveness.

It is well understood that economic growth results either from accumulation of factors of production or from improvements in technology or both. Developed countries conduct majority of the world's research and development (R&D) and technologies resulting from such R&D spread throughout the world through a multitude of channels like Foreign Direct Investment (FDI), licensing, import of capital good, turnkey plants, cross-border movement of personnel, etc.

Technology transfer through FDI has become the predominant channel of technology transfer. FDI can have important technological spillovers in host economies, especially if it takes a joint-venture form subject to local control. Technology transfer has been a subject of considerable interest to many groups, such as government policymakers, international funding agencies, and business executives, because of the close relationship between technology transfer and economic growth. It has aroused the interest of academic researchers. Despite all this attention, however, the concept and mechanism of technology transfer remains vague, controversial, and inadequately operationalised

The experiences of countries which have built their technological capability in a relatively short period of time show that technology copying is an important vehicle for technological capability building. The rapid catching-up of the East Asians with the developed countries is achieved, to a great extent, with transferred technology; reference is mostly made to Japan, Korea, China, Singapore and other Asian countries. [1][2]The Japanese and Korea's pattern of technology transfer is very similar which is building up the technological capabilities through learning by doing and the Technology transfer through foreign direct investment (FDI) and foreign licensing was limited. Unlike the case of Japan and Korea the main channel for the transfer of technology in China is FDI supported by the preferential policy of the government, which provides tax rebates, lower rate of import duties, and other incentives. Since it launched the economic reforms and called for foreign capital participation in its economy. [3]

For the current era of increasing globalization, latecomer countries should follow the experience of china which serves as foremost example of benefits obtained from adopting FDI based technology transfer. The process of technology transfer to be followed in Ethiopia shall be one that utilizes lessons obtained from experiences of Asian countries taking in to consideration the national context and global changes.

The transfer of foreign technology plays a major role in the current endeavor in Ethiopia to bring rapid and sustainable economic development. As mentioned above, FDI is one of the means to bring foreign technologies to the country. Although Ethiopia does not have a separate policy for FDI the existing institutional and policy arrangements for investment are designed to facilitate the flow of investment from abroad. The country's investment law gives equal treatment for both foreign and domestic investors with some limited exceptions. The present Investment Proclamation No. 280/2002 and its amendment (Proclamation No. 375/2003) aim at, among others, the creation of various opportunities for foreign capital. There are also various tax and other incentives which obviously have a positive impact on facilitating the transfer of technology to Ethiopia via FDI.

The contribution of FDI to the economy of one country will be effective if and only if there is a local capability to absorb the technology owned by the foreign company to other similar industries which potentially dictates a large scale participation of local personnel's in the FDI companies at a critical level. The contribution of FDI in Ethiopian economy has been hindered by the political ideology of the past regimes besides other socio-economic factors. Though the number of foreign investors currently destined to our country might not be small, but most of them are attracted towards labor intensive sectors mainly the agricultural sector. The ultimate objective of the study is to go through local and foreign metal and engineering firms to understand the contribution of foreign firms to the country's economy and specifically to the transfer of technology to local firms.

## 1.2. Statement of the Problem

The government of Ethiopia currently has set strategic plan (Growth and Transformation Plan) for the next five year to reduce (eliminate) poverty and increase the per capita income of the people by focusing mainly on the agricultural led industrial development. The development can be achieved through improvement in technological capability of different sectors. However, the financial and human capability of our country to handle major investment sectors is far limited and the government is eying on foreign investors for the overall growth of the countries agricultural and industrial sectors by facilitating the transfer of technology to the country.

The transfer technology via FDI would be effective if and only if there is a high level of local participation and at the same time if there is binding law in which these companies will engage the locals in capacity building activities. The rapid catching-up of the East Asians with

the developed countries is achieved by shifting their focus from the mere transfer of technology to deeper objectives of domestic absorptive capacity building. The focus on technological capacity building improves the functioning of the dynamic mechanism of technological development.

In this regards, this research tries to investigate and address the following research questions:

- What are the policies and incentives that promote the foreign investors to invest in the country?
- What role does FDI play in the transfer of technology to local companies?
- How does FDI affect local companies in their efforts to grow and to become globally competitive?
- How do technologies introduced by multinational firms diffuse to local firms (engineering industries)?
- What kinds of policies will successfully encouraging technology absorption from FDI projects and why?

## 1.3. Objective of the study

**General Objective:**

The paper tried to find out the level of technology transfer in Ethiopian through FDI to the local industries and identified the most important impediments and challenges that prevents the process and finally represented a framework that can best function as an effective way for technological development in engineering industries.

**Specific Objectives:**

- To identify the policies and incentives that promotes foreign investors.
- To investigate the role of FDI in the transfer of technology to the local companies (engineering and metal industries).
- To investigate the effect of FDI on local companies in their efforts to grow and to become globally competitive.
- To investigate the scale of FDI in Ethiopian to transfer technology to the local industries.
- To investigate the government contract policy and regulation on FDI in a way to assist the local industries to build up their capacities.

## 1.4. Research methodologies

**Desk study**

Literature review has been conducted on the role of FDI on technology transfer. This includes the revision of different books, journals, published and unpublished articles and reports on related literatures in technology transfer and FDI.

**Data collection**

**Questionnaire** is used to concretize the existing situation in the foreign and local companies selected on their sector and the type of industries. Based on the requirement of the study two types of questionnaires are prepared and each is developed for the foreign and local companies. The questionnaire was designed in five parts:

1. Level of local technological capability
2. Industry-Industry relation
3. The effect of FDI in local companies to grow and become globally competitive
4. Diffusion of technology to local firms
5. Policies to encourage technology absorption from FDI

The questionnaire was distributed in engineering firms in Addis Ababa as a study area because the largest FDI recipient (around 40%) and large scale enterprises are concentrated around it. The companies were selected randomly from those engaged in engineering and metal and metal product manufacturers. An employee of a company who has at least one year experience (high level technical and engineering background) was selected from those selected companies. In this study the questionnaire was distributed to 30 local and 25 foreign industries those filled and returned are 25 from local and 22 from foreign with a respondent rate of 85%.

**Organizational yearly reports** are depicted from yearly reports made by Ethiopian Investment Agency, Ethiopian Statistics Agency, UNIDO, UNICAT and World Bank are revised. These reports give an overview of FDI which shows the trend and the existing condition in Ethiopia.

## 1.5. Significance of the Study

Development of technology is expensive. As a consequence it tends to be concentrated among large or specialized enterprises with surplus high enough to finance the R&D, rather than being state funded. This implies that availability of technology often is connected with multinational corporations (MNCs) .It evident that Foreign Direct Investment is an important role in the development effort among developing world as a source of technology and also capital.

The results from the study generate a general frame work to cultivate technology from FDI to the local industry mainly manufacturing and engineering industries and to give policy and regulation guideline for the government on FDI in a way to assist the local industries to build up their technological capacity.

The study benefits local manufacturing industries in attaining the technological capacity of their manufacturing process to become locally and internationally competitive. This intern develops the quality of life of the employee, the owners and totally develops the country. In addition, this study can be used as a reference for further study in the area.

## 1.6. Scope and Limitation of the Project

The project work has been conducted within a short period of time and under a limited financial and human capability and as a result, the survey will include only some selected industries. For this reason, the conclusion of this study might not strictly extend to all industries in the country.

## 1.7. Organization of the Study

This study encompasses six main chapters. The first chapter discusses briefly the problems and its approach. At the same time, the expected results, the scope and limitation of the project work has been stated in this chapter. The second chapter is dedicatedly converse literatures related to technology transfer and foreign direct investment. The third chapter mainly focuses about technology transfer from Ethiopian context which includes the history of modernization, the challenges associated with technology transfer and the contribution of the past regimes and other related issues are discussed in this chapter. The experience of newly industrializing countries on technology transfer from FDI is assessed and the gaps are identified in the fourth chapter. The survey results on the status and the capability of our industries in effectively utilizing foreign technology and a proposed frame work for an effective technology transfer in a way to build local technological capability as a long term goal in relation to the transformation plan of the country has been presented on the fifth chapter. The last chapter, chapter six, presents the findings of the study as a conclusion and a list of activities which should be performed and should be encompassed in future works in order to enhance the development of our science and technology capability are outlined.

# Chapter Two

# Literature review

## 2.1. Technology

The word "Technology" is derived from the Greek words. "Techne" with meaning art, or more descriptively, craft as implied in the definition of the applied arts and "Logos" with meaning word, discourse or knowledge. Thus in meaning, the word technology is knowledge of the practical or industrial arts, or the knowledge of how craft or industry is wrought. [4]

Technology may be defined as the information necessary to achieve a certain production outcome from a particular means of combining or processing selected inputs. Many technologies may generate the same outcome but they may differ in terms of their efficiency. And a given technology may generate multiple outputs. A technology may be quite specific or it may encompass several sub-processes, such as producing intermediate inputs within an overall value chain. Technologies may be particular production processes, intra-firm organizational structures, management techniques, means of finance, marketing methods, or any combination of these. All contribute to the productivity with which outputs are generated from inputs and to the market value of those outputs.

Today, technology has become the most important source of economic growth, competitiveness, wealth, power, prestige, and even independence. For a long time, capital and labor were considered the principal factors of production. With the increasing globalization of business activities, knowledge and information have been gaining importance as vital elements of any firm's success in today's global economy. In fact, we are moving from an industrial age to an information age, in which technology has become the most decisive factor of competitiveness. Factors such as technological leads and lags, product differentiation, and economies of scale and scope play an ever-increasing role in comparative advantage building. In addition, rapid advances in science and technology and increasing accessibility to the fruits of new knowledge both lead to rapid obsolescence, and thus to enhancing the role technology plays in every day's life of the business world.[5]

Technology can be classified as embodied or disembodied. Technology is a physical embodiment of an idea that is helpful for accomplishing a task. Technology can be tools, techniques, or materials. Information may be embodied in the form of particular products, which might be reverse engineered to discover the underlying processes. It may be disembodied as codified technology or as know-how. There is a wide variation in the degree of embodiment across products and services. [6]

Technologies have utility if they are used in tasks that someone believes facilitates living a good life and the metrics measuring better utility can be performance and ease-of-use.

Performance is a measure of functionality. It addresses how the end-user actually completes the task with the aid of this technology. Ease-of-use is a measure of the difficulty an end user will experience when using the technology to attain the promised performance. It is usually measured in ordinal or cardinal scales using characteristics and features of the technology. [7]

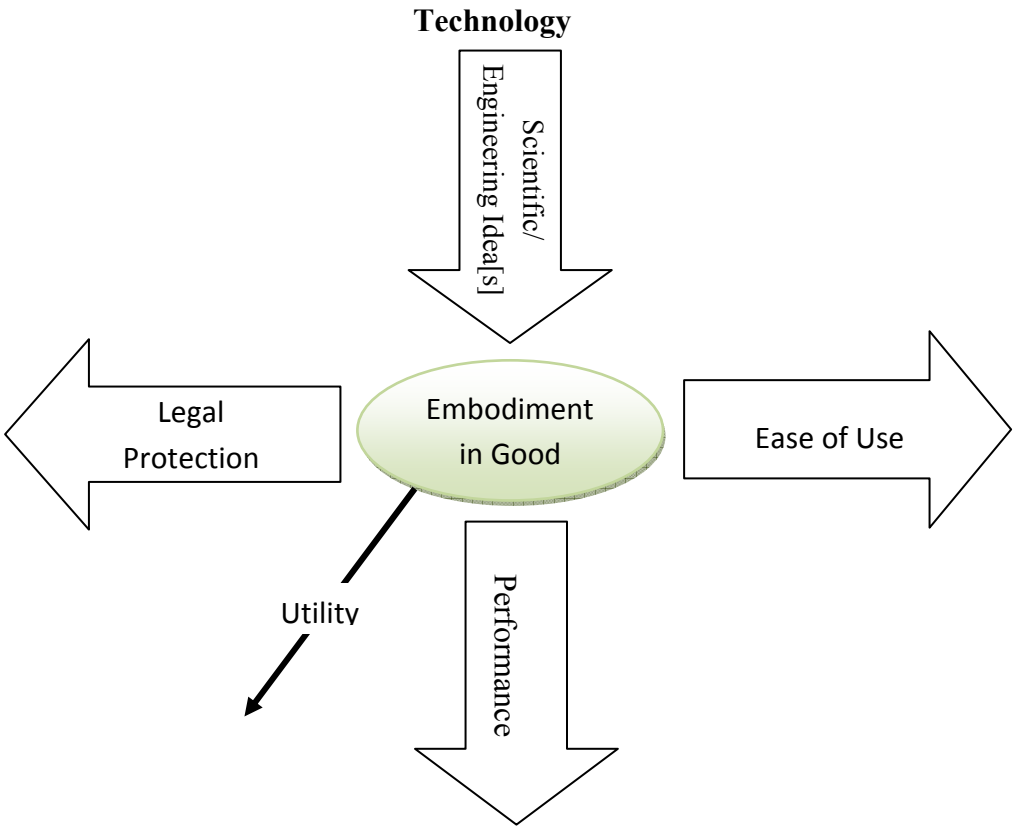


**Figure 2.1** Attributes of a technology [7]

For any production process or provision of a service, technology is an important input. Without the help of technology, no organization or individual could produce a product or provide a service. Moreover the quality of the product or service would substantially depend upon the quality of technology employed. The profitability of an organization is linked not only to the resource availability and its optimum utilization but also to the technological content of its products and services. [8]

### 2.1.1. Knowledge and Technological Gap

In the world economy there is great inequality in technological efforts. An overwhelming proportion of scientific, technology, research and development activities take place in the advanced economies. Almost all patent applications are concentrated in developed countries. The same holds for scientific publications. Large multinational companies take the lead in innovation. Thus the fifty largest multinationals alone account for 26 per cent of all patents in the United States. According to estimates by the World Health Organization, 95 percent of all

medical research focuses on the health problems of the advanced countries.[9] Developing countries invest a much lower part of GDP in research and development (around 0.5%) than the advanced countries (around 2.0 to 2.5 per cent).

Moreover, there is a wide gap between those who have access to technology and use it effectively and those who do not. The technology gap exists between those who can create and innovate to produce new technologies and those who cannot. It also exists between those who can access, adapt, master and use existing technologies and those who cannot. So harnessing the potential of technology for development goes beyond creating new technologies but also finding ways to access, adapt and use technology that already exists for the benefit of all the population. [10]

The technology gap is evident in many areas:

- In Japan there are 861 patents granted per million people. In many developing countries the number is 0.
- 84% of articles published in scientific journals are from developed countries.
- In 2002, only 10 countries accounted for 86% of world total investment in Research and Development (R&D)
- In Finland, 27.3% of university enrollments are in science subjects. In developing countries, this figure is around 0.1%.

The ability of countries to acquire, master, adapts and improve upon scientific and technical knowledge is a major determinant of their capacity to achieve sustainable economic growth. Both mature and new technologies can be applied to address specific local needs. A key area where the technology gap exists is in research and development. R&D capability is essential to develop, access, absorb and master new technologies. Low levels of R&D reinforce the existing technology gap making it harder for countries or companies to compete. [11]

In any case, closing the technological gap is regarded as a necessary step towards economic development. Technology is the most important factor of production and its growth is essential to propel a country into self-sustained growth.

### 2.1.2. Technology as the Engine of Growth

Rapid technological change offers new opportunities for development. In the area of health, advances in medical technology such as vaccines and antibiotics have contributed to an unprecedentedly rapid decline in death rates and improvements in life expectancy in developing countries irrespective of per capita income. Through technological breakthroughs in plant breeding, fertilizers and pesticides, world cereal yields have doubled since the 1960s. Information technologies have enhanced the ability of multinational companies (MNCs) to coordinate cross-border activities. Thus, information and communication technologies create

new possibilities for relocating parts of global production chains to developing countries, to profit from abundant labor. Surprisingly they also allow multinational companies to decentralize research and development activities, in order to profit from the availability of relatively cheap highly skilled labor in developing countries such as India, Brazil or Korea. In the field of education, ICT offers new developments in distance learning and multimedia technologies. The declining costs of communication lower the thresholds for diffusion of scientific, technical and statistical information, especially in countries such as India and China, but also in Sub-Saharan Africa. In this respect, ICT technologies contribute to a reduction of international technology and knowledge gaps.

Importance of technology for development is widely recognized. In industrialized economies, many studies have shown that more than 50 percent of long-term economic growth stems from technological changes that improve productivity and lead to new products, processes or industries. In the East Asian countries, productivity growth, the best proxy for technology progress, accounted for as much as 30 percent of gross domestic product (GDP) growth.[12][13]

Technology progress is the key to international competitiveness and economic growth. Of four inputs to production *capital equipment*, *raw materials*, *labor* and *technology*, technology is the only one that is not physically limited. Though it seems that employing a large quantity of capital equipment increases productivity, it is not necessarily so.

The importance of technology is seen when considering a production function. This function omits raw material as an input and takes value added as an output. Technology is the only source of output increase without increasing capital or labor as inputs. Wealth is increased by technology.

$$dY/Y = dT/T + adK/K + bdL/L$$

Where: dT: Total factor productivity increase (technology progress)
dY: output(value added) increase
dK: capital increase
dL: labor increase
a,b: coefficients where a+b=1

Technology is also important to think of labour productivity as follows.

$$dy/y = dT/T + adk/k$$

Where y=Y/L and k=K/L

Thus, a labor productivity increase rate is determined by a technology progress rate and an increase rate of a capital per labor ratio. As far as capital investment in the form of FDI and others continues, labor productivity increases. [12]

The question arises from where to get a good technology. Possible sources for technologies are:

1. Acquire the technology from outside the organization either from abroad or indigenously.
2. Develop the technology in-house through research and development.
3. Get the technology developed from outside the organization such as R&D laboratory, a technical institute, a manufacturing organization, experts etc.[8]

## 2.2. Technology transfer

Technology transfer can be stated as an exchange of expertise and technology/knowledge from possessor to the recipient of technology. There are two ways of making a transfer: either purchase it or develop it. By definition, a transfer of technology means a definite change in process, in product, in power, in attitude, in want and desires, and also in situations that are political, social, economic, or environmental. Technology transfer occurs because of the existence of buyers (transferees) and the sellers (transferor). In today's world transfer is mostly from developed country to the developing country. [4]

The transfer of technology from advanced countries to emerging economies constitutes one of the fundamental ways to pursue progress towards convergence between the two economies in terms of standards of living. Nevertheless, the level of R&D expenditure that developed countries can afford gives them a clear advantage in the technological field. It therefore seems logical for emerging countries, which have a more limited investment capacity, to try to exploit technological advances with the least possible expenditure.

Undeniably, technology has emerged as a crucial factor in development of markets, which are ever evolving and subject to change at every instant. For any nation/firm to remain competitive in the market and achieve its goals, it is necessary to stay in constant touch with the latest technology and latest consumer needs and requirements. The development experiences of developed nation demonstrate that the technology contributes more to production and productivity than physical inputs like labor and capital. Thus the technology transfer has been of great significance in view of bridging technological gaps and enabling underdeveloped countries to accelerate the pace of development at par with developed nations.

Technology transfer is a system that encompasses the social and economic fabric of a country. Where technology has been effectively transferred, there is a visible change – from the person to the production system as well as compatibility with the needs, in the institutional framework, skills, training, financial capacity, promotion, and active support of endogenous capacity and appreciation of the natural environment of the recipient country.[14]

### 2.2.1. A short history of Technology Transfer

Technology transfer is not a new thing. Researchers have traced back technology transfer process to the prehistory of the human species: where technology transfer largely involved tacit knowledge which is evolutionary prior to explicit knowledge. [15] As there were no written languages until 3000 BC, technology transfer had mainly occurred through language; which were supplemented by equations and diagrams which constitute as the major means of explicit transfer of technological knowledge. The spoken language and gestures have explicitly transferred technological knowledge in friendly encounters. However, much of pre-historic technology transfer between people occurred when people with superior agricultural technology assimilated or eliminated those who could not reproduce as rapidly. [16]

Segman (1989), who conducted a historical review of technology transfer, traced the technology transfer process from the Neolithic times, the role of Arabs played in transferring technologies from East to West and the transfer of English textile expertise to the American textile industry in the 18th and 19th Centuries. In the 18th Century, despite the English law preventing knowledge migration, France eventually managed to obtain 'specialized steel making know-how' by importing English workers and through industrial espionage. [17]

The success of the American textile industry in 18th and 19th Century was due to the transfer of knowledge and expertise by the English textile industry. Previous studies have shown that certain industries collapsed, for example the English clock and watch industry, due to the industry resistance to the opportunities of technology transfer. [18]

The concept of technology transfer originated in 1945. In "Science: The Endless Frontier," an influential report prepared for President Franklin D. Roosevelt, Vannevar Bush emphasized the importance of basic research to a strong economy. Before 1940, little thought was given to the importance of technology. However, the value of technological advances to a strong military defense was recognized during World War II. The emerging needs of the U.S. military resulted in a large increase in government-sponsored research. Government facilities could not accommodate all the R&D projects needed to fulfill U.S. military needs. The government began to contract with qualified companies, universities, and nonprofit organizations, but with no overall plan for handling the intellectual property that would be developed. [19]

Indeed, different approaches to shape and govern the technology transfer efforts have been seen. Technology transfer as a domain covers all activities around technological development. Few technology transfer models were developed after the World War II to govern the implementation of technology transfer activities and their application to marketplace. [20][21]

The connotation of technology transfer is still in the development stage while the study of technology transfer theory has been developed further. With worldwide competition in science

and technology, technology transfer research has a wide range of areas for research and an equally wide scope for increase in the content.

### 2.2.2. The need for technology transfer

There are a number of specific strategies to achieve economic development. Among these are increased savings, international trade, foreign and technology transfer. Increased savings is what is also known as supply side economics. Whether an increase in savings is achieved voluntarily or by force, increased saving methods have not been very popular in developing countries.

International trade has been and is a popular development strategy. Newly developed countries such as Hong Kong, Singapore, South Korea and Taiwan in particular have achieved their current economic status through successful international Trade. However, most developing countries have not been successful in this area and, in fact; there is a little possibility for many of them becoming successful in international trade. Foreign aid is a logical development strategy. However, because of its political implications and much mismanagement that existed in the allocation and utilization of aid funds the outcome has been near zero.

Technology transfer, if successful, implies increased productivity and ability to produce. Regardless whether the newly transferred technology is used to substitute imports, to stimulate exports or just to develop new domestic industries, it plays a profound role in the economic development process.

Thus, of all the key strategies, technology transfer is considered to be the most effective alternative in economic development. It is desirable to fill gap, which is widening, between developed and developing countries of the world, it is of the utmost importance that there must be successful transfer of technology to developing countries.

### 2.2.3. Technology Transfer in Support of Sustainable Development

In the development and sustenance of a community, state, or nation, the advancement of technology is vital for survival; here, the need for technology transfer arises and becomes a critical landmark. There are adapting factors in the process of technology transfer that must be addressed to ensure successful technological developments and their continued progress and sustainability. [22]

Technology transfer must be recognized as a broad and complex process if it is to avoid creating and maintaining the dependency of the recipient, and if it is to contribute to sustained and equitable development. The end result for the recipient must be the ability to use, replicate, improve and, possibly, re-sell the technology. Transfer of technology is more than just the moving of high-tech equipment from the developed to the developing world, or within

the developing world. Moreover, it encompasses far than equipment and other so-called "hard" technologies, for it also includes total systems and their component parts, including know-how, goods and services, equipment, and organizational and managerial procedures. Thus technology transfer is the suite of processes encompassing all dimensions of the origins, flows and uptake of know-how, experience and equipment amongst, across and within countries, stakeholder organizations and institutions. [23]

If the transfer of inadequate, unsustainable, or unsafe technologies is to be avoided, technology recipients should be able to identify and select technologies that are appropriate to their actual needs, circumstances and capacities. Therefore, a key element of this wider view of technology transfer is choice. There is no single strategy for successful transfer that is appropriate to all situations. Desirably a technology recipient will choose a technology which at least meets the definition of being "environmentally sound". Environmental sound technologies are technologies that have the potential for significantly improved environmental performance, relative to other technologies. Environmental sound technologies protect the environment, are less polluting, use resources in a sustainable manner, recycle more of their wastes and products, and handle all residual wastes in a more environmentally acceptable way than the technologies for which they are substitutes. Preferably a technology recipient will go even further, and select a "sustainable technology" i.e. a technology that is not only environmentally sound but also economically viable and socially acceptable. Such technologies contribute for the sustainable development of a given economy. [23]

### 2.2.4. Influencing Factors of Technology Transfer

**Law and Policy Factors**

Technology is a kind of knowledge product; it needs to be protected by the legal system, particularly in the field of intellectual property rights. The degree of protection for intellectual property rights varies in different countries in the cross-border business environment. In some countries, a large number of counterfeit products infringe the international technology transfer and reduce the profit of export. Many companies in these countries can rarely get rid of the infringement problem; the protection of intellectual property rights of technology transfer in the host country or region is an important factor.

The policy system plays a decisive role in the effectiveness of technology transfer. It is difficult for technology transfer to succeed in a country or region, where there are frequent government interventions and many restrictions on foreign-funded enterprises. Policies of technology-importing countries or regions will have a direct impact on technology transfer in scientific and technical content and quality. [24]

**Market Factors**

Market factors are the fundamental factors of technology transfer. The effect of market competition and market size on technology transfer is particularly obvious. If the opening level of the home country or region is low, only a small number of transnational companies operating a monopoly in an industry will be able to maintain the technical advantage of their monopoly status to gain more profits. So the industry slows down the speed of technical progress and hampers the technical development.

The size of the market determines the scale of production. If the market capacity is large, economy grows steadily, and resident's purchasing power is strong in a country or a region, the growing space of technology importing countries or regions will be great. Accordingly, these areas' attraction of investment and technology transfer will be stronger. [24]

**Technology Basis**

A nation or regions technology basis is important for technology transfer. The availability of human resources, the knowledge level, the development of productive forces, and the technology level will have a real impact on the transfer. The countries and regions with a great technology base and high skill levels will be capable of exporting technology. The conditions of technology-importing countries or regions restrict their ability to accept new technologies. If other conditions remain constant, the country with high performance technology and good technical basis is more likely to promote the country's technology transfer. [24]

**Infrastructure Status**

Infrastructure includes transportation, canals, ports, bridges, telecommunications, electricity, water and urban water supply and drainage, gas, electricity, and other facilities. These are substantial engineering facilities to provide public service for production and the residents. It is the common material base for production, management, work and life, and guarantees that the main facilities in a city operate normally. Moreover, it is not only an important condition for material production, but also an important condition for reproduction of labor. As the exporter or recipient of technology, the infrastructure construction must be taken into consideration in the implementation of technology transfer. [24]

### 2.2.5. Process of Technology Transfer

The process of technology transfer begins with assessing the need for it. This may be due to the changes in policies governing social, economic, environmental and political issues. There are various stages in the process of the technology transfer at the transferee perspective, include:

- **Technology Gap Identification** – detection of technological necessities and evaluating it with the existing technologies to assess technological gaps.
- **Source identification** – attend to the gaps identified with a proper stratagem to investigate the potential sources of technology.
- **Selection of Technology** – decide on the technology which satisfies the criteria to bridge the gap.
- **Supplier Selection** – decide on the supplier of the technology, along with proper mechanism of transfer.
- **Transfer Contracting** – negotiate the terms and conditions, commitments, rights and obligations of both the parties concerned, and the mode of payment & price/cost of the transfer. Finalize the contents of the transfer agreement and the mechanism of transfer.
- **Assimilation** – this process is further divided in to three sub processes.
  - **At supplier end**
    - Adoption is a process where technology, which is subject of transfer, is suitably modified, changed or altered keeping in view the needs of the buyer.
  - **At the buyer end,** there are two processes: Adaptation and Absorption.
    - Adaptation of technology is a phase that place after a technology has undergone adoption and ready to use in production activities. During this stage, a number of alterations and modifications are made to suit the indigenous condition and also tolerate to the use of raw materials/components manufactured.
    - Absorption is a process, where technology is said to be absorbed, implies it is fully understood, and is in a position to be further optimized and upgraded. It involves know-how exercises, basic investigations into the product/process, optimization, improvement and up gradation exercises.[14]

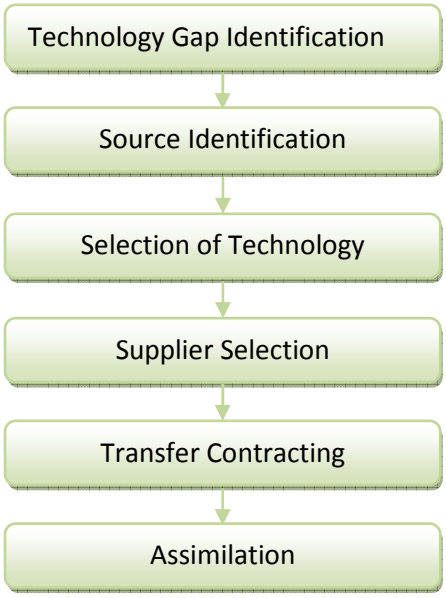


**Figure 2.2** The six stages Process of Technology Transfer

### 2.2.6. Forms of Technology Transfer

Forms of technology transfer are used to give an indication of the transferee's absorption and assimilation capability. The technology acquired is made available to the production division and concurrently should be made an input to the local R&D section aimed at absorbing, adapting and improving the original technology for production of a new or improved product line. Thus the forms of transfer, depending on the transferee's R&D potential to improve the technology and the nature of technology acquired, have been broadly classified as follows:

- Adaptive Transfer
- Full Transfer
- Full Adaptive Transfer
- Pseudo Transfer.

- **Adaptive transfer** – Technology acquired by the transferee in the year 1, is made available to the Domestic Technological and Scientific Capacity (DTSC) so that it is fully absorbed. After the technology is indigenized, it is put to production of P1 (Fig. 2.3 (a)).
- **Full transfer** – Technology acquired or purchased in year-1, is simultaneously used in production [P1), and made the subject of Domestic R&D and Engineering Design. In year-'N', when the technology is required for the production of so-called "Next-Generation Product Line", DTSC will deliver the renovated/ upgraded/indigenized technology. Hence the knowledge as well as the technology both has been assimilated very well (Fig. 2.3 (b)).
- **Full adaptive transfer** – Technology purchased in year-1, is adapted to the domestic environment by the Domestic Technological and Scientific Capacity (DTSC) before

going into production (P1) and is simultaneously made the subject of Domestic R&D and Engineering Design. In year-'N', upgraded/indigenized technology will be made available by the DTSC, so that so-called "Next-Generation Product Line" can be delivered (Fig. 2.3 (c)).

- **Pseudo transfer** – Technology is imported (IT), and functions only as an input with no repercussions whatsoever on DTSC. Strictly speaking, such an "Encapsulated Form" of use of imported technology, does not constitute a transfer at all. Its spill-over effects are minimal; Domestic Skilled Personnel perform a passive role. This is just a simple physical transfer of technology (Fig. 2.3 (d)).

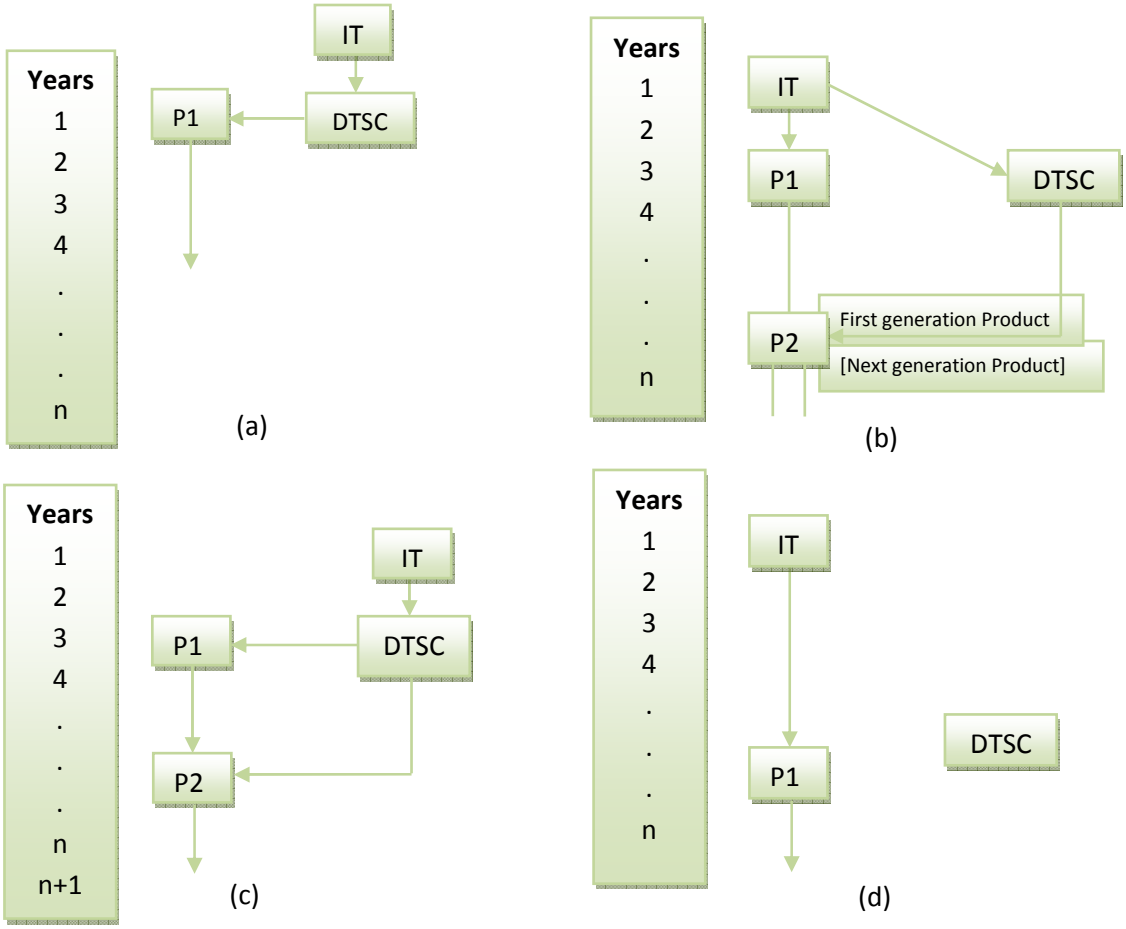


**Figure 2.3** Forms of technology transfer (a) Adaptive Transfer, (b) Full Transfer, (c) Full adaptive transfer and, (d) Pseudo Transfer

### 2.2.7. Channels of technology transfer

There are several methods of classifying technology transfer but the basic types are *domestic* and *international transfer*.

**1. Domestic transfer**

Domestic transfer process is basically involves the flow of technology from one stage of research and development process to another. When the new context or stage in which the technology is to be applied is significantly different from the original one, it is required to adapt the technology. In essence it is the movement of technology along the continuum from basic research to the innovative product where by an adaptation process refines the technology with each transfer stage.

**2. International transfer**

International technology transfer is the movement of technology from one culture of systems and methods that were developed for application into a different culture and locations. The technology is virtually the same in the new location as it was in the original location.

There are different channels to transfer International technology to the recipient country for the purpose of meeting social objective of the people. The main channels are *formal* or *market-mediated channels* and *informal* or *non-market-mediated channels*. [6][25]

**a. Formal or Market-mediated channels**

**i. Foreign direct investment**

Foreign direct investment (FDI) through multinational enterprises (MNEs), in principle MNEs are expected to deploy technology to their subsidiaries in recipient countries that is newer or more productive than the existing technology in the firm. This is because the primary motivation for a firm to become multinational is the ownership of some knowledge-based asset. They may encompass agribusiness (e.g., livestock management and marketing), manufactures (e.g., chemical formulas, machinery design, and factory-floor management), consumer goods and services (e.g., brand names), and numerous producer services (e.g., financial methods and construction blueprints) that provides it with a cost or quality advantage which could be adapted and employed in multiple locations. Thus, FDI is a major channel through which firms compete globally in technology. [6]

For developing countries to acquire technology through foreign direct investment there should be abundance of skilled and semi-skilled workers and also a strong intellectual property right protection to attract investors, these will increase the level of tacit knowledge (know-how) absorption.[26]

FDI is made in four major forms. First, it holds wholly owned enterprises, of the capital that is generally entirely owned by investors of a country or region, foreign investment shares 100 percent; second, foreign ownership buys the stock and achieves a certain proportion of some or all of their control; third, investment and joint venture organized in the host country; fourth, investors reinvest their profits. As the technology is the premise of FDI of transnational corporations, the FDI in general combines technology transfer; in fact the FDI has become a major technology transfer method [24][27]. This channel will be discussed in detail in the next part of the paper.

**ii. Technology(technical) licensing agreement**

Licensing is an important source of international technology transfer for developing countries. It typically involves the purchase of production or distribution rights and the underlying technical information and know-how. The general determinants of decisions on where to license are similar to those involving FDI. Thus, market size, anticipated growth, proximity, the stock of human capital, the ability to repatriate licensing rents, and the investment climate all affect licensing flows. Another factor is the confidence of licensor firms that proprietary technologies will not leak into the host economy. To the extent that transferred technologies are easily copied, industrial espionage is common, or technical personnel can 'defect' to competitor firms, foreign firms may prefer FDI. Where this is not possible, firms may choose not to engage in licensing at all or transfer lagging technologies. Successful transfer typically requires capacity to learn and investments to apply technologies in production processes. This explains why countries with substantial engineering skills and R&D programs for adaptation and learning are greater recipients of licensing flows than others. [6][25]

**iii. Imports of capital goods**

Imports of capital goods provide another way of acquiring the means of production without the transactional costs involved in FDI or technical licensing agreements [28]. Capital goods imports are actually embodied technology flows entering a country. They introduce into the production processes new machinery, other capital equipment and components that incorporate technologies that do not necessarily incorporate high or frontier technologies, but are nevertheless new to the recipient firm. Imported capital goods can prove a cheap way to develop local technological capabilities if they can be used as models for reverse engineering to produce the machines locally. Imitative reverse engineering of existing foreign products became the backbone of Korea's industrialization up to the mid-1980s. [25][29]

### iv. Joint ventures

Licensing and FDI are closely related to the establishment of joint ventures, which are contractual arrangements between two or more firms in which each provides some advantage that should reduce the costs of joint operations. In this context, international firms may provide technically superior production information through licensing, while local partners provide distribution networks, information about labor markets, unique management techniques, brand recognition, or some other local advantages. Some arrangement is reached for sharing any profits or losses from the joint venture. [6]

### v. Turnkey plants

The technology supplier may construct a fully functional facility where the recipient needs merely turn a key to get a facility functioning. A turnkey project is a visual comparison of technology transfer carried out by a whole set of engineering contracts. Technology acceptors are committed to the supplier for the contracted project, such as factory or plant. Technology suppliers are in charge of all the technology and project management of the project, from the design to the equipment and its installation until the test drive qualifies. Ultimately, they hand over the plant or factory, ready to start work at any time. As a result, it is actually a comprehensive international economic cooperation. [24]

### vi. Cross-border movement of personnel

Another significant channel of international technology transfer is cross-border movement of technical and managerial personnel. Indeed, many technologies cannot be effectively or affordably transferred without the complementary services and know-how of engineers and technicians that must be on-site for some period of time. An important advantage of MNEs is the ability to shift such skilled personnel among subsidiaries as needed. Markets for temporary movement of skilled workers among unrelated firms may be more restrictive and less flexible, raising the costs of such transfer and absorption. [6]

International movement of people associated with nationals studying or working abroad for a limited period and applying their new knowledge when they return, or the inward movement of foreign nationals into the country is another potential channel for ITT. A challenge for developing countries is to facilitate temporary movement abroad and to encourage returnees to undertake local research and business development. [27]

It is important to note that FDI, trade, licensing, joint ventures, turnkey plants and personnel movements are interdependent processes. These decisions are made jointly by firms seeking to maximize returns on their technological assets. Policy environments

affect these decisions, both in overall scope and in their substitution among channels, an important observation to which I will devote some attention on FDI.

**b. Informal or non-market-mediated channels**

Through the informal channels, foreign technology is transferred to local without mediation by the market. Technology transfer then takes place without formal agreements include:

**i. Imitation**

The most significant non-market channel is the process of imitation, in which a rival firm learns the technological or design secrets of another firm's formula or products. Imitation may be achieved through product inspection, reverse engineering, decompilation of software, and even simple trial and error. Whether imitation is legal or illegal depends on the scope of intellectual property protection and the security of trade secrets from unfair competition. What distinguishes it from the earlier channels is that imitation bears no compensation to the technology owner in formal markets. As such, it seems an attractive form of learning and diffusion from the standpoint of developing economies. However, imitation may be a costly process and tends to divert attention from local innovation, so a full accounting of its impacts is more complex. [30]

**ii. Departure of employees**

A related form of learning is for technical and managerial personnel in whom knowledge of one firm's technologies has been entrusted leave the firm and join or start a rival firm based on that knowledge. Such competition can be a significant form of information diffusion in industries and locations where cross-fertilization of knowledge is important and employees are mobile. Again, the technology is transferred without formal compensation to the original owner and the scope for this activity depends on the legal treatment of labor mobility, "non-compete clauses", and the like. [30]

**iii. Data in patent applications and test data**

Yet another means of acquiring technology without compensation is to study available information about those technologies. Patent applications, both those registered in a country and (more likely) registered abroad, are available for this purpose. Rival firms in principle can read such applications, learn the underlying technologies, and develop competing processes and products that do not infringe the claims of the original applicants. Thus, patents provide both a direct source of technology transfer, through FDI and licensing, and an indirect form through inspection. However, there is much debate over whether such patent disclosures provide sufficient information that rival engineers can understand the technologies.

A related source of information is confidential test data provided by patent applicants to governments. Government agencies may choose to share such data, possibly after a period of exclusivity awarded to the original applicants, to domestic rivals in order to avoid research duplication costs and accelerate generic competition. [30]

**iv. Temporary migration**

Technology appears to be transferred through the temporary migration of students, scientists, and managerial and technical personnel to universities, laboratories, and conferences located mainly in the developed economies. Note that in-depth training in science and engineering may be gained this way, suggesting that it is a particularly long-lasting form of ITT. The challenge for developing countries in this context is to encourage its expatriate students and professionals to return home and undertake local scientific, educational, and business development. [27]

## 2.3. Foreign Direct Investment

The theoretical explanations of FDI largely stem from international trade that is based on the theory of comparative advantage and differences in factors endowments between countries. Multinational companies are usually attracted to a particular country by the comparative advantage that the country or region offers. An agreed framework definition of FDI is an investment made to acquire a lasting management interest (normally 10% of voting stock) in a business enterprise operating in a country other than that of the investor defined according to residency. [31] Such investments may take the form of either "Greenfield" investment or merger and acquisition, which entail the acquisition of existing interest rather than new investment.

Foreign direct investment is one of the most striking features of the global economy today. One of the most salient features of today's globalization drive is conscious encouragement of cross-border investments, especially by transnational corporations and firms. Many countries and continents (especially developing) now see attracting FDI as an important element in their strategy for economic development. This is most probably because FDI is seen as an amalgamation of capital, technology, marketing and management.

FDI is particularly important for developing countries since it provides access to resources that would otherwise be unavailable to these countries. Moreover, the advantages of foreign direct investment are extremely positive for a country or region: [32]

- *Technology transfer:* improvements in access to excellent technology
- *Employment:* creating new and sustainable jobs
- *Capital:* investors bringing in capital to Ethiopia while investing in a new factory or company

- *Revenue benefits*: widening local tax bases and contributing to government revenues
- *Higher local investments:* increasing domestic investments as local companies gain access to distribution channels or become suppliers
- *Improved exports:* FDI is often export-oriented, using their access to overseas marketing and distribution networks
- *Improved labor skills:* more training, knowledge transfer
- *Increased competition and competitiveness:* improving overall economic growth by increasing competition; raising quality levels and delivery reliability

As a result of these benefits of FDI, many developing countries are now actively seeking foreign investment by taking measures that include economic and political reforms designed to improve their investment environment.

According to Dunning, four main motives can be identified that are prompting firms to undertake FDI (Dunning, 1993):

- **Resource-seeking FDI:** The availability of abundant or cheap production factors in a developing country is a motivation for transnational corporation (TNC) presence in that country. Natural resources are a type of production factors that traditionally has attracted greatest interest among foreign investors. Especially, in the first wave of globalization, colonial powers invested in their colonies to extract natural resources and they subsequently used them in their home countries.

  Natural resource-seeking is still the main FDI motive for TNCs operating in sectors such as mining, mineral extraction and operating in large-scale agricultural business. Countries with an abundance of the relevant natural resources, especially, least developed countries are potential investment regions for investors seeking natural resources in TNCs. TNCs may seek natural resources for three reasons: to meet the needs of its own downstream refining or manufacturing activities, to sell the minerals directly in host, home or international markets, or to secure the strategic requirements of energy or other minerals for its home country (as formulated by the country's government)(OECD, 2002; UNCTAD, 2007).Human resource-seeking motive for FDI arouse due to the potential of obtaining cheap labor. Human resource-seeking FDI depends on the relative pricing of labour with a given level of qualifications. Besides natural resource seeking, the availability of skilled inexpensive labor in developing countries is becoming an increasingly important motivation among foreign investors. On the other hand, since TNCs generally respond to rising wage pressures at home by shifting labour-intensive production processes to developing countries, this type of FDI is also related with the efficiency-seeking approach.

- **Market-seeking FDI:** Especially in the manufacturing sectors of developing countries, where import-substitution and related policies hinder direct export from the home countries, market-seeking FDI is an important motive to access to host country markets for processed goods. However many developing countries have liberalized their import regime after 1980s and this liberalization policy enabled TNCs to choose between exporting and undertaking FDI. According to Nunnenkamp(2001), there may be a decline in purely market-seeking FDI due to liberalization policies, but it should also be taken into account that the possible decline of market seeking FDI is largely restricted to FDI in manufacturing industries. The opening of service industries to FDI is the reason behind the existence of market-seeking FDI motive today. Some other reasons of market-seeking FDI are transport costs, differences in consumer tastes and the total magnitude of the host economy.

- **Efficiency-seeking FDI:** TNCs invest in developing countries to boost efficiency beyond the simple reallocation of labor-intensive production. Key factors for efficiency seeking investment include labor costs, skills and availability, and access to international markets. Efficiency-seeking FDI is often made with the specific objective of accessing low-cost labor for labor-intensive production or taking advantage of relatively abundant supplies of educated and skilled workers. Efficiency-seeking FDI is motivated by creating new sources of competitiveness for firms and strengthening existing ones whereas market-seeking FDI aims at penetrating the local markets of host countries. Investment related to efficiency seeking may be seen in different forms. One form is that firms in developing countries undertake to supply TNCs with fully manufactured products that will bear the TNCs' brand names. Another form is that foreign enterprises try to provide products adapted to local tastes and quality requirements. The composition of this form of FDI may be either Greenfield investment or M&A. This kind of FDI mostly goes to large or economically advanced developing countries.

- **Strategic asset-seeking FDI:** FDI is a means to acquire strategic assets such as technology, marketing, and management expertise available in a host country. Companies investing abroad with the purpose of acquiring strategic assets aim at a competitive edge, as well a degree of a monopoly just at the beginning. Strategic asset-seeking FDI is popular among medium income and fast-growing industrializing countries as they seek to establish a speedy presence in the innovative and dynamic markets of the advanced countries (Dunning et al., 1996). Developing countries may make themselves more attractive to such FDI by investing in human resources and infrastructure. (OECD, 2002).

Table 2.1 below shows the predominant motivation factors and the modes of FDI entry to the recipient economy. According to this table, resource-seeking FDI comes mostly on the form of Greenfield investments while efficiency-seeking and strategic asset seeking FDI are shown in M&As mode.

**Table 2.1**Predominant motivation factors and modes of delivery

| | Greenfield Investment | Mergers and Acquisitions(M&As) |
|---|---|---|
| Resource-seeking FDI | Yes | Rare |
| Market-seeking FDI | Yes | Yes |
| Efficiency-seeking FDI | Rare | Yes |
| Strategic-asset seeking FDI | Rare | Yes |

*Source:* OECD (2002)

FDI motives such as resource-seeking and efficiency-seeking FDI are due to the comparative advantage of the host country. If the FDI motive is the host country's comparative advantage instead of by-passing trade barriers in the host country, then it may contribute positively to the export growth. Thus, resource-seeking and efficiency-seeking FDI would promote exports while market-seeking FDI and strategic asset-seeking FDI may not be a catalyst to export growth.

### 2.3.1. Determinants of FDI

Nowadays, virtually all countries are actively seeking to attract FDI, because of the expected favorable effect on income generation from capital inflows, advanced technology, management skills and market know-how. It would be useful to review the key determinants and factors of FDI.

The review of host country determinants is closely linked with the role of national policies and especially the liberalization of policies, a key factor in globalization, as FDI determinants. Location-specific determinants have a crucial influence on a host country's inflow of FDI. The relative importance of different location-specific determinants depends on at least three aspects of investment: the motive for investment (e.g., resources, market or efficiency-seeking), the type of investment (e.g., services or manufacturing), and the size of the investors (small and medium MNEs or large MNEs). [33]

Dunning (1993) and Sanjaya Lall(1997)identified three key determinants and factors associated with the extent and pattern of FDI in developing host countries: *attractiveness of the economic conditions in host countries*; *the policy framework towards the private sector and the investment strategies of MNEs*.[34][33]

**Table 2.2** Host country determinants of FDI

| | | |
|---|---|---|
| **Economic conditions** | • Markets | Size; income levels; urbanization; stability and growth prospects; access to regional markets; distribution and demand patterns. |
| | • Resources | Natural resources; location. |
| | • Competitiveness | Labor availability, cost, skills, trainability; managerial technical skills; access to inputs; physical infrastructure; supplier base; technology support. |
| **Host country policies** | • Macro policies | Management of crucial macro variables; ease of remittance; access to foreign exchange. |
| | • Private sector | Promotion of private ownership; clear and stable policies; easy off entry/exit policies; efficient financial markets; other support. |
| | • Trade and industry | Trade strategy; regional integration and access to markets; ownership controls; competition policies; support for SMEs. |
| | • FDI policies | Ease of entry; ownership, incentives; access to inputs; transparent and stable policies. |
| **MNE strategies** | • Risk perception | Perceptions of country risk, based on political factors, micromanagement, labor markets, policy stability. |
| | • Location, sourcing, integration | Company strategies on location, sourcing of products/inputs, integration of affiliates, strategic alliances, training, technology |

*Source:* Sanjaya Lall, *Attracting Foreign Investment: New Trends, Sources and Policies,* Economic Paper 31 (Common wealth Secretariat, 1997).

As a consequence of globalization and economic integration, one of the most important traditional FDI determinants, the size of national markets, has decreased in importance. At the same time, cost differences between locations, the quality of infrastructure, the ease of doing business and the availability of skills have become more important [35]. Traditional economic determinants, such as natural resources and national market size for manufacturing products sheltered from international competition by high tariffs or quotas, still play an important role in attracting FDI by a number of developing and developed countries as well as economies in transition (e.g., China, Australia and Kazakhstan).[36]

The economic determinants related to large markets, trade barriers and non-tradable services are still at work and account for a large share of worldwide FDI flows. Although FDI remains strongly driven by its traditional determinants, the relative importance of different location determinants for competitiveness-enhancing FDI is shifting. While low-cost labor remains a location advantage, the increasingly sought-after advantages are competitive combinations of wages, skills and productivity. [36]

### 2.3.2. Foreign Direct Investment and Economic Growth

Foreign direct investment is an important part of the massive private investment which is driving economic growth around the world, particularly in the past two decades. FDI is being sought by most, if not all, developing countries as a means of complimenting the level of domestic investment, as well as securing economy wide efficiency gains through the transfer of appropriate technology, management knowledge, and business culture, access to foreign markets, increasing employment opportunities, and improving living standards.

FDI involves a combined flow of capital and technology. From growth and trade theory we know that capital inflows may increase GDP per capita in the capital importing country. Moreover, access to better technology, broadly defined, is the only source of sustained growth. Hence, the way in which more advanced technology spillovers to the local economy, and the empirical importance of these spillovers, have been areas of intense research in recent years. [37]

Many empirical works are available that shows the relationship between FDI and growth. At the firm level, several studies provided evidence of technological spillover and improved plant productivity. At the macro level, FDI inflows in developing countries tend to "crowd in" other investment and are associated with an overall increase in total investment. Most studies found that FDI inflows led to higher per capita GDP, increase economic growth rate and higher productivity growth. [38][39][40]

Policy makers have considered various incentives and policies to attract FDI, and to ensure its consistency with the domestic economic development objectives. The competition for the worlds FDI flows is fierce. Foreign private investors look for certain important pointers such as freedom to control investments, convertible currencies, greater privatization, stock market reforms, greater political stability, and a legal framework for doing business. Beyond these general characteristics of well functioning market economy, investments in infrastructure particularly transport and telecommunications are also important. [41]

Evidence indicates that countries which offer safe and profitable investment opportunities win in the global competition for this floating capital. Indeed, most FDI in the world today takes place among developed countries and investment in developing countries also increasing. Since the mid 1970s, many developing countries, especially the newly industrializing Asian countries and more recently some Latin American countries, are successfully developing by opening up their economies to FDI under outward oriented development policies. Although outward orientation alone is not a sufficient condition for rapid growth, it does create a climate favorable for FDI inflows bringing in modern managerial, production and marketing technologies which are necessary for the development of the private sectors and industrial modernization.

## 2.4. Foreign Direct Investment as a channel of Technology Transfer

Foreign direct investment plays an extraordinary and growing role in global business. It can provide a firm with new markets and marketing channels, cheaper production facilities, access to new technology, products, skills and financing. For a host country or the foreign firm which receives the investment, it can provide a source of new technologies, capital, processes, products, organizational technologies and management skills, and as such can provide a strong impetus to economic development.

FDI has become a more dominant international technology transfer channel than ever. Although non-FDI forms of international technology transfer have been growing since the 1960s, FDI forms have become dominant since the 1980s and are expected to become even more dominant in the foreseeable future. Factors accounting for this shift include, among others, the ongoing global trend of FDI liberalization, large-scale abolition of international trade barriers, increased globalization of economic activities, and the growing need for technological competitiveness in order to survive and grow economically. While admitting the importance of the level of FDI inflows, developing countries could, and should, make better technological exploitation of these inflows.

Reacting to changes in technology, growing liberalization of the national regulatory framework governing investment in enterprises, and changes in capital markets profound changes have occurred in the size, scope and methods of FDI. New information technology systems, decline in global communication costs have made management of foreign investments far easier than in the past. The sea change in trade and investment policies and the regulatory environment globally in the past decade, including trade policy and tariff liberalization, easing of restrictions on foreign investment and acquisition in many nations, and the deregulation and privatization of many industries, has probably been the most significant catalyst for FDI's expanded role.

The 1999 World Investment Report points out that FDI is of major importance to economic development. FDI provides financial resources and links to export markets. Furthermore, an inflow of foreign capital may contribute to the upgrading of both managerial and technological effectiveness and improve human capital. This way FDI may trigger industrialization in developing countries. [42]

The most profound effect has been seen in developing countries, where yearly foreign direct investment flows have increased from an average of less than $10 billion in the 1970's to a yearly average of less than $20 billion in the 1980's, to explode in the 1990s from $26.7billion in 1990 to $179 billion in 1998 and $208 billion in 1999 and now comprise a large portion of global FDI. Driven by mergers and acquisitions and internationalization of production in a range of industries, FDI into developed countries last year rose to $636 billion, from $481 billion.

Proponents of foreign investment point out that the exchange of investment flows benefits both the home country (the country from which the investment originates) and the host country (the destination of the investment). Opponents of FDI note that multinational conglomerates are able to wield great power over smaller and weaker economies and can drive out much local competition.

There are a number of key constituents of technology transfer process, namely, the technology sender, the technology receiver, home and host country governments and environments, and technology itself. A basic model of international technology transfer through FDI incorporating these elements as presented below in the figure.

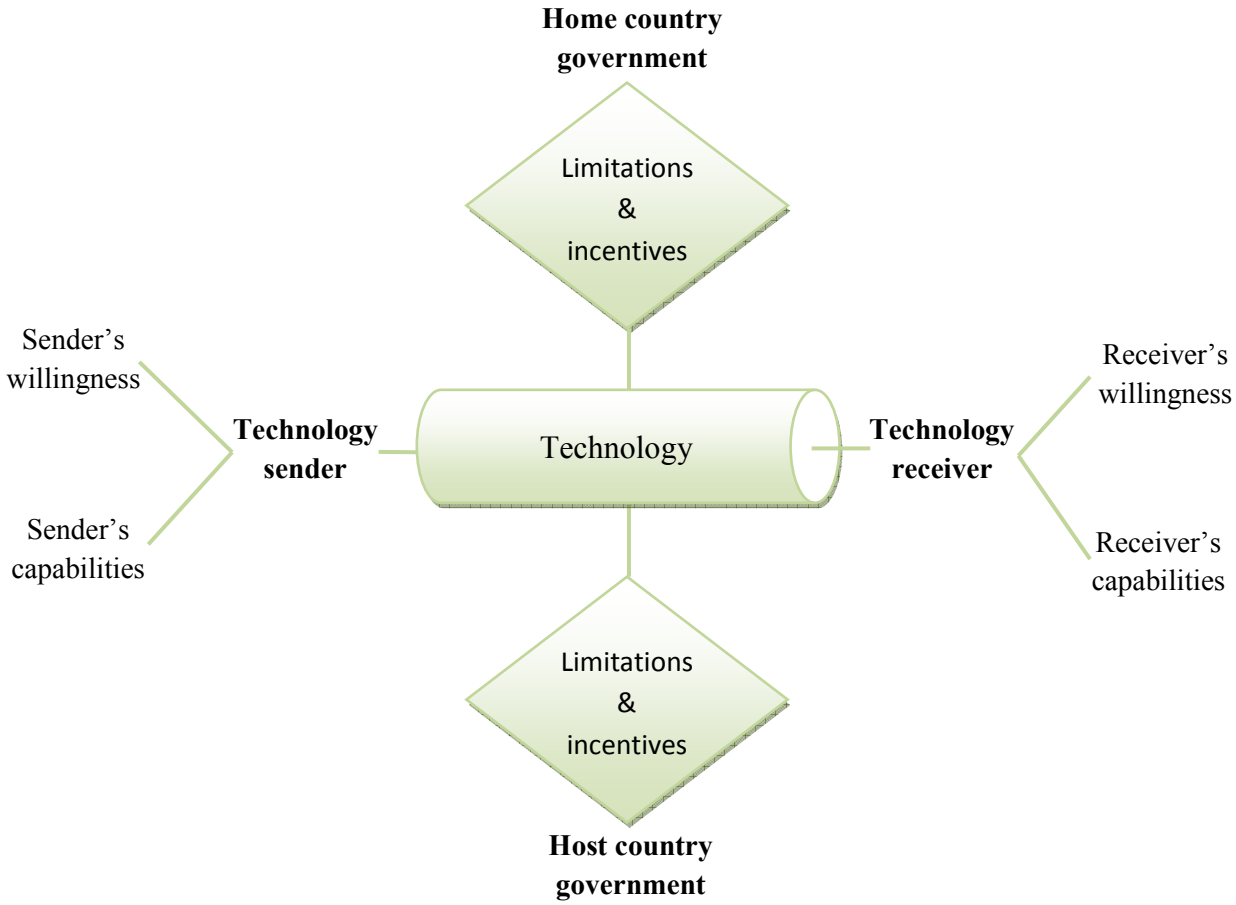


**Figure 2.4** Basic model of international technology transfer through FDI [43]

The effective transfer of technology will depend upon the capabilities and the willingness of the technology sender/supplier and the capabilities and willingness of the technology receiver/recipient. In turn these will be influenced by characteristics of the home and host country, including government, FDI and technology policies, and both demand and supply-side characteristics of the economies.

The technology sender/supplier refers to foreign investors who may be technology owners. The sender's capabilities refer to the technological level of the foreign investor and the technological gap between supplier and recipient firms. The sender's willingness will be determined by a number of factors including the perceived need to internalize control over proprietary know-how; the incentive to exploit knowledge and skills abroad including the availability of scientifically and technically trained manpower, often at lower costs; and on occasion an inability to un-package technology.

The technology receiver/recipient may be a private enterprise, a state-owned firm or local personnel in developing countries, and will include most obviously the foreign affiliate (wholly or majority owned or a joint venture) as well as supplier, customer and competitor enterprises. The receiver's willingness to obtain foreign technology may seem clear-cut but, also depends upon the motives of, for instance, local partners. The receivers' capabilities are critical and include the ability to select from available technologies, market imported technology and introduce a degree of novelty in products of processes. Thereafter, the assimilation of outside technology is heavily dependent upon the development of in-house technological capabilities. Given that technology transfer is a complex process usually requiring material receiving, design receiving and capacity receiving capabilities, a range of skills and know-how are required and technology receiving needs time to evolve.[44][43]

Home and especially host country factors are important in technology transfer. In particular the role of government is a critical one, not only in ensuring sound management of the macro economy, but also in the implementation its macro-organizational strategy. Included within the latter are policies on technology, trade and FDI, education and training, transportation and telecommunications, competition, the environment and so on, many of which are designed to upgrade the level of created assets. By these means the host country is more attractive as a location for FDI (including higher value added functions such as research and development) and the technology transfer assimilation and innovatory capabilities of the economy are increased. [45]

### 2.4.1. FDI related spillovers and Technology transfer

Foreign firms in developing countries – mostly affiliates of transnational corporations – are a valuable source of new technology for domestic firms. Indeed, they possess intangible assets (technological know-how, marketing and management skills, export contacts, reputation) which enable them to compete successfully with local firms endowed with better knowledge of local economic conditions. These intangible assets, because of their non-rival and only partially excludable nature, can spillover to local firms and increase their productivity levels.

Foreign firms can influence the productivity of domestic firms through a number of channels. Two major types of technology spillovers are *horizontal* and *vertical technology spillovers*, respectively and each type involves different spillover generating mechanisms. [46]

**a.** ***Horizontal or intra-industry spillovers***

Horizontal spillovers occur through three major channels. *First*, when foreign firms with advanced technologies enter a local market they introduce new technologies to the industry. Through direct contacts with foreign affiliates of multinationals, local firms can imitate the way foreigners operate and become more productive. *Second*, the entry of foreign firms may lead to more intense competition in the local industry, so that domestic firms are forced to use more efficiently existing technologies or introduce new technologies in order to maintain their market shares. Increased competition may also lead to the elimination of monopolistic profits and enhance the welfare of a country. However, there is also a possibility that the competition effect is harmful to the host economy if local firms are not efficient enough to compete with foreign entrants. *Finally*, the costly effort to train workers carried out by foreign firms may lead to productivity improvements in domestic firms through labor turnover, i.e. through hiring by local firms of employees who worked previously for foreign firms.[46][47]

**b.** ***Vertical or inter-industry spillovers***

As for the vertical or inter-industry spillovers, they may occur when foreign affiliates enter in transactions with local suppliers and customers, and provide them with technical assistance, train local suppliers, or assist them in purchasing raw materials so as to maintain the quality of intermediate goods (backward linkages). Also, as technical complexity increases, domestic producers may seek to purchase intermediate or capital goods from foreign suppliers whose goods are superior to those available from local suppliers and who may provide local firms with information required to use these inputs productively (forward linkages).[47]

These two types of spillovers can occur through any of the five main channels: demonstration/imitation, labor mobility, exports, competition, and backward and forward linkages with domestic firms.

**i.** ***Demonstration/imitation:*** Spillovers may take place when domestic firms improve their efficiency by copying technologies of foreign affiliates operating in the domestic market via observation channel. Either demonstration of TNCs or imitation by domestic firms is the most spillover channel. After the observation of a product innovation or a new form of organization adapted to local conditions, local entrepreneurs may attempt to imitate the innovation. The introduction of a new technology into a given market may be too expensive and risky for a domestic firm to undertake, due to the costs inherent in acquiring its knowledge and the uncertainty of the results that may be obtained. However, as domestic firms interact with existing technology users; this interaction reduces their innovation and imitation costs. Thus, information is diffused, uncertainty is reduced, and

imitation levels increase. [48] Finally, the improvement in total factor productivity speeds up. Imitation of the technology either by reverse engineering or any other way works mainly among firms within same industries and referred as intra-industry spillovers.

ii. ***Labor mobility:*** The second channel is related to the possibility of hiring workers who have knowledge and experience of the technology and who are able to apply this in that firm by domestic firms. This type of spillovers is also intra-industry spillovers such as the ones caused by demonstration effect. Domestic firms' internalization of improved management practices and organizational efficiency of TNCs is expected to be the result of training of local employees in TNCs. Even supporting staff acquires skills, attitudes and ideas on the job through exposure to modern organization forms and international quality standards. These people make a significant contribution by raising productivity when working for domestic firms or when setting up new entrepreneurial businesses. The productivity improvements caused by the movement of labor from TNCs to other existing or new domestic firms are realized through two mechanisms: through direct spillover to workers engaged in the same type of job and through knowledge carried by workers who move to another firm.

   Nevertheless, it is important to note a possible negative impact arising through this channel, as TNCs may attract the best workers away from domestic firms by offering higher wages and leaving them with less-skilled employees. The market-stealing effect and the skill-stealing effect could be large enough to offset the positive effect of FDI. Also, the influence of labour mobility on the efficiency of domestic firms is difficult to evaluate, as it involves tracking the workers in order to investigate their impact on the productivity of other workers. For this reason, if TNCs and domestic firms compete in the same labor market, domestic firms may have to pay higher wages to attract workers.

iii. ***Exports:*** The third channel through which the presence of TNCs may benefit domestic firms is exports. TNCs enable domestic firms to become more successful exporters by spreading their knowledge of global markets to domestic firms. According to Görg and Greenaway (2004), domestic firms' exports can be affected through three primary channels. Firstly, export activity involves costs associated with the establishment of distribution networks, transport infrastructures or knowledge of consumers' tastes in foreign markets and TNCs have better access to information about foreign markets. This can spill over through their export activities. Secondly, demonstration effect also increases the export performance of domestic firms. They can learn the TNCs' superior production or management techniques through observation and this enables them to compete more successfully in export markets by reducing the entry costs in the foreign market. Finally, competition with TNCs at home and in foreign markets can induce domestic firms to improve their export performance.

iv. ***Competition:*** When TNCs decide to penetrate a new market through directly investing in the country, they tend to bring with them more sophisticated technology and superior managerial practice in order to compete with domestic firms who tend to be more familiar with the consumer preferences and business practices in the local market. Since FDI promotes efficiency through the economy by increasing competition in domestic industries, an increased competition induced by TNCs becomes the fourth channel of spillovers from FDI. Technology advances due to increased competition may be both intra- and inter-industries spillovers. Competition with TNCs may force domestic firms to increase their competitive capacity by reforming management styles and updating production technology.

While competition between TNCs and domestic firms in the domestic economy is an incentive for the domestic firms to make a more efficient use of existing resources and technology or even to adopt new technologies, on the other hand, it may restrict the market power of domestic firms.

The efficiency of domestic firms may also be negatively affected through this channel, if foreign firms with advanced technologies produce at a lower marginal cost. By taking market share from domestic firms and forcing them to operate on a less efficient scale, with a consequent increase of their average costs, TNCs may lower the productivity of domestic firms. However, domestic firms may also react to foreign competition by using the existing technology more efficiently or by investing in new technology in order to maintain their market shares. [48]

v. ***Linkages:*** The final channel is backward and forward linkages between TNCs and domestic firms. Domestic firms may learn by observing TNCs when there are close relationships between them, and may benefit from the technical support, the demand, and the supply provided by the TNCs with which they have an upstream or downstream relationship in the business chains. The relationship that domestic firms establish in local markets as suppliers to TNCs is referred as backward linkages and the relationship that domestic firms establish in local markets as customers of intermediate inputs produced by TNCs is referred as forward linkages. Spillovers caused by backward or forward linkages are referred as inter-industry spillovers.
    - ***Backward linkages:*** With increasing returns to scale, if TNCs increase the demand for local inputs to save transportation costs or to accommodate local content requirements, this may benefit domestic suppliers by creating a backward linkage since they want to ensure a certain quality pattern. TNCs provide technical support for the improvement of the quality of goods or for the introduction of innovations by training personnel (supply-side). TNCs demand suppliers to meet standards of reliability and speed of delivery; which in turn creates a pressure on domestic suppliers (demand-side). Acquisition of raw materials, and support at the

organizational and management levels are also provided by TNCs. Competition to become TNC suppliers also increases the efficiency of domestic firms.

- ***Forward linkages:*** Forward linkages refer to relations with buyers, either consumers or other firms using the TNC's intermediate products in their own production process, as with machinery. These buyers can also be distributors, which can benefit from the marketing and other knowledge of TNCs. Forward linkages are observed when TNCs supply higher quality inputs to domestic producers or end-user consumer goods to consumers at a lower price.

Technology spillovers related with FDI are more likely to be vertical rather than horizontal in nature. The reason of vertical spillovers is that although TNCs have an incentive to prevent information leakage that would enhance the performance of their local competitors, they may want to transfer knowledge to their local suppliers. On the other hand, TNC affiliates established through M&As or joint ventures are likely to source more locally than those taking the form of Greenfield investments. Since full foreign ownership is a proxy for Greenfield investments, it is expected that fully owned foreign affiliates may rely more on imported inputs, while M&As with local capital participation will tend to source more locally due to the advantages of the supplier relationships established by the acquired firm or their local partner. Then, M&As or joint ventures result in greater vertical spillovers than Greenfield investments.

# Chapter Three

# Preliminary assessment

## 3.1. Foreign direct investment involvement in Africa

Africa is highly endowed with natural, especially land resources. Over the past few years investing in land has particularly become interesting for foreign investors against the background of the global (food and financial) crises. Between 2005 and 2007 the overall FDI inflows grew by nearly 80% from $29 billion to reach $53 billion, their highest level so far, despite the global financial crises (UNCTAD, 2008). This is the highest percentage increase of FDI inflows within the developing countries[1].

Figure 3.1 shows the development of total African FDI inflows independent from a specific sector between 1997 and 2007. Further the regional distribution of the FDI inflows among the five main sub-regions of Africa is stated. In the World Investment Report 2008 by UNCTAD, this strong growth is explained as a consequence of the booming global commodities market, rising corporate profitability of investment and an increasingly FDI-friendly environment.

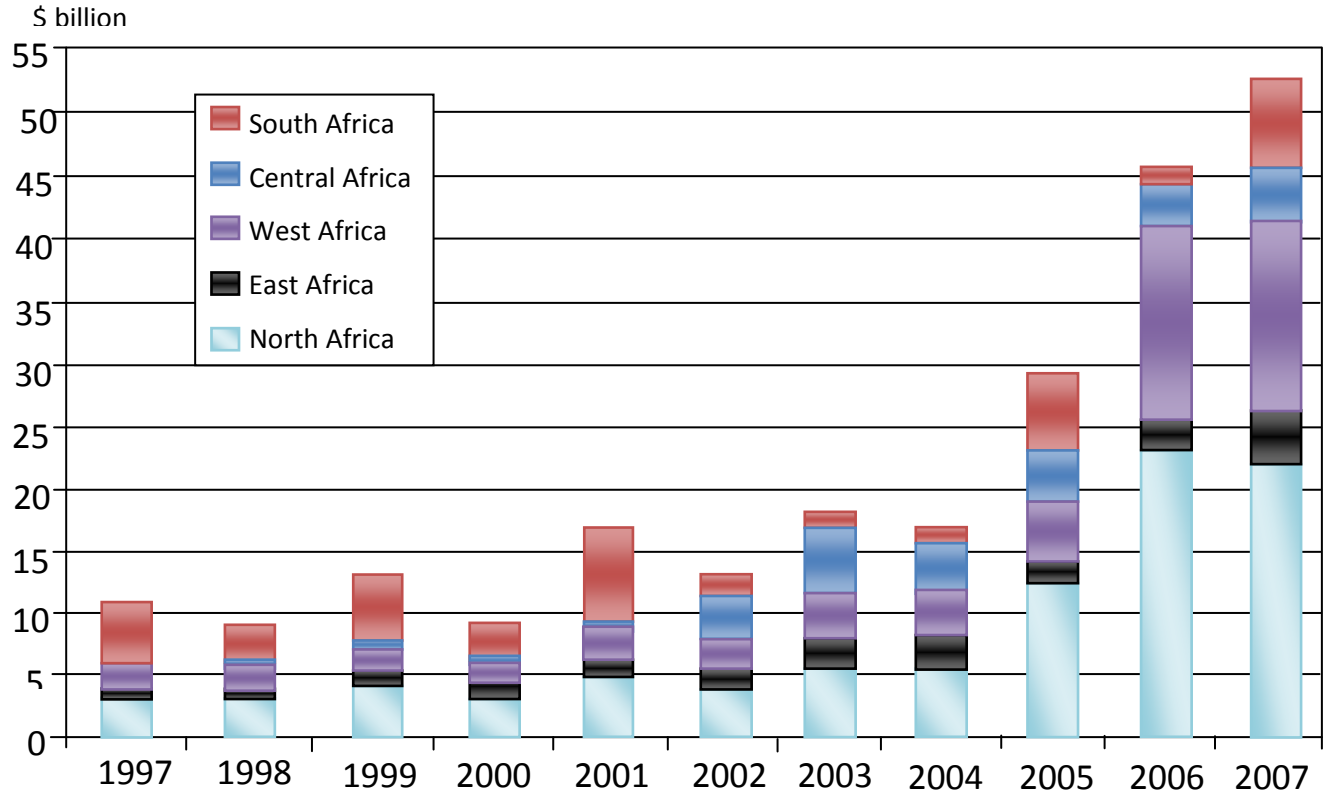


**Figure 3.1** African FDI inflows, 1997-2007, *Source:* UNCTAD, 2008.

[1] Developing countries incorporate all countries from Africa, Latin America and the Caribbean as well as Asia and Oceania[UNCTAD]

The African growth of FDI inflows is spread across 35 countries, and includes many natural resource producers that have been attracting flows in the past few years, as well as new host countries. North Africa attracts 42% of the FDI to the region in 2007 compared with 51% in 2006 and Sub-Saharan Africa attracts 58% of the flows, up from 49% in 2006. [49]

**Table 3.1** distribution of FDI inflow among African host countries, by range, 2007

| **Range** | **Host countries** |
|---|---|
| Over $3.0 bn | Nigeria, Egypt and South Africa |
| $2.0 bn to $2.9 bn | Morocco, Libyan and Sudan |
| $1.0 bn to $1.9 bn | Equatorial Guinea, Algeria and Tunisia |
| $0.5 bn to $0.9 bn | Madagascar, Zambia, Ghana. Kenya, Democratic Republic of Congo, Namibia, United Republic of Tanzania, Chad and Burkina Faso |
| $0.2 bn to $0.4 bn | Botswana, Mozambique, Côte dÌvoire, Uganda, Mali, Congo, Mauritius, Cameroon, Gabon, *Ethiopia* and Seychelles |
| Less than $0.2 bn | Djibouti, Cape Verde, Mauritania, Somalia, Guinea, Lesotho, Sierra Leone, Senegal, Togo, Zimbabwe, Rwanda, Gambia, Malawi, Benin, Liberia, Swaziland, São Tomé and Principe, Central African Republic, Niger, Guinea-Bissau, Comoros, Burundi, Eritrea and Angola |

*Source:* UNCTAD, 2008

FDI inflows in 2007 to the five sub-regions of Africa differed with respect to their level, growth and geographic distribution. North Africa is the main region into which FDI flows go, accounting for $22 billion in 2007. The major industries that attracted FDI in North Africa were processing industry and the financial sector. West Africa experiences a boom in the primary sector[2] and in the telecommunication sector, leading to another year of large inflows ($15.6 billion in 2007 and $15.8 billion in 2006).

The sub-region that ranks the lowest when looking at FDI inflows in Africa is East Africa (including Ethiopia). Of course there are some countries that state an exception, as Madagascar, Kenya or the Seychelles. The main sector that attracts FDI is the primary sector which drove FDI inflows in 2007 to $4 billion compared to $2.4 billion in 2006. Central Africa receives FDI inflows mainly from Asian investors in the primary and services sector. It's total FDI inflows increase by 26% to $4 billion in 2007. The last sub-region is Southern Africa. It experienced the highest growth among the sub-regions to $7 billion in 2007. Its main investors are from Asia (China) in the finance sector and processing industry. [49]

[2] The primary sector includes the agricultural and the mining sector in the world investment reports by UNCTAD

## 3.2. Ethiopian overview

### 3.2.1. Overview of Ethiopia's Economy

Ethiopia, with the total population of over 80 million in 2007, is the third populous country in Africa after Nigeria and Egypt. Ethiopia is a federal democratic republic composed of 9national regional states: Tigray, Afar, Amhara, Oromia, Somali, Benishangul-Gumuz, Southern Nations-Nationalities and Peoples Region (SNNPR), Gambella and Harari, and two Administrative states: Addis Ababa city administration and Dire Dawa Council.

Ethiopian economy is based on agriculture, which in 2008/09, contributed about 43% of the gross domestic product(GDP), 86% of foreign currency earnings, and 85% of rural employment. Numerous macroeconomic reforms have been implemented with the objective of achieving macroeconomic stabilization and growth since 1991. The macroeconomic reforms include privatization of state owned enterprises, liberalization of trade policy, reduction of import tariff rates, elimination of non-tariff barriers, devaluation and deregulation of price and exchange rate controls. (World Bank 2009)

After 2002/03, economic growth took off, with an average of 11%during the subsequent five years. As shown in figure 3.2Per capita GDP increased from US$ 107 in 2003 to US$ 330 in 2009. This growth has been fuelled by inflows of official development aid, including soft loans from China and India, by remittances from the Diaspora, and by foreign direct investment (FDI). Furthermore, Ethiopia has recently benefited from a series of good harvests. As a result of development aid and other inflows, public investment – primarily in roads, dams, education, and health – has grown much faster than private investment. This has spurred employment growth, but also provoked a foreign exchange crisis.

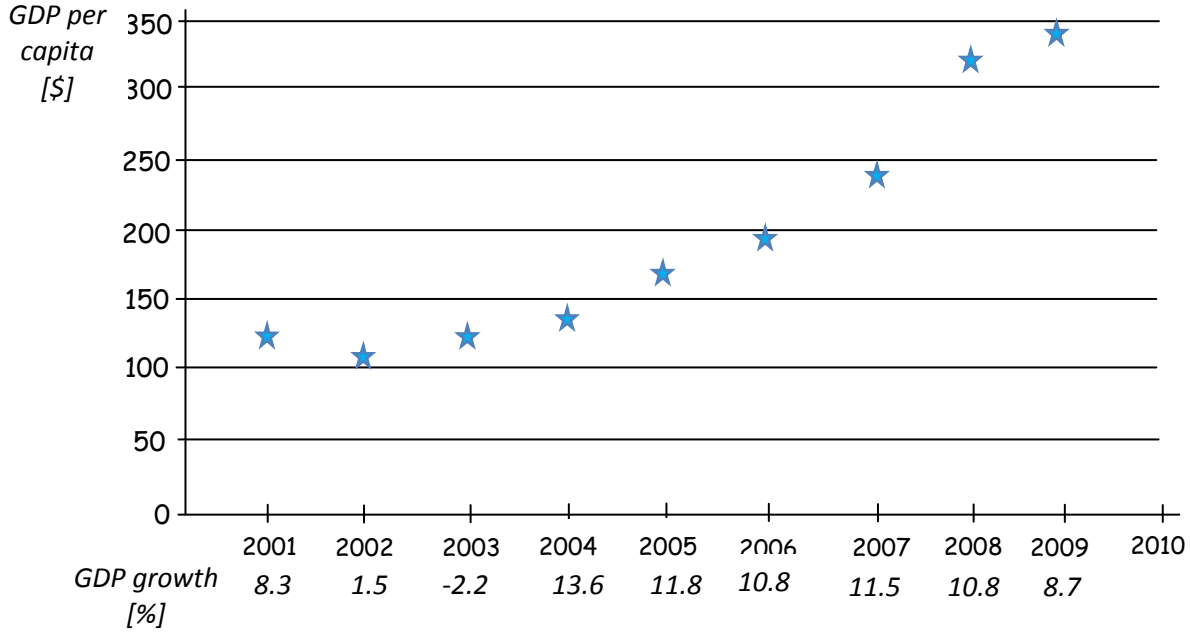


**Figure 3.2** GDP per capita

The structure of the economy can be decomposed into three main economic sectors: the agriculture sector, the industrial sector and the service sector.

***1. The Agriculture Sector***

Agriculture is the mainstay of the Ethiopian economy. In 2010 the sector contribute to the GDP of the country is close to 50%, and more than 80% of the population engaged in some form of agricultural activities. Furthermore, agriculture generates 60% of foreign exchange earnings. Coffee is the major source of foreign exchange. As a result, the sector overwhelmingly influences the performance of the economy. The performance of the agriculture sector, however, is highly determined by availability of suitable weather condition. Recurrent drought and traditional cultivation practices this is due to technological deficiency, land fragmentation, low level of fertilizer application and high population growth rate are the prime problems of the sector.

***2. The Industrial Sector***

Ethiopia is one of the least industrialized economies in the world. In 2010 the industrial sector contributes 11 percent to the GDP, and the growth rate of the sector is very little compared to the agricultural sector. The employment contribution of the industrial sector is nearly 8 percentage points in 2005.Surprisingly, manufacturing goods export accounted for less than 1% of the total exports.

***3. The Service Sector***

The service sector is the second largest sector after agriculture. This sector includes trade, hotels and restaurants, transport and communication, banking and insurance, public administration and defense, education, health and other services. In 2010 the service sector accounted for 39% of the GDP of the country, and the employment share of the sector is slightly higher than 10%.

### 3.2.2. FDI performance in the Ethiopian history (1941-2010)

The FDI performance over the period (1941-2010) can be reviewed on the basis of the three regimes that have been in place in the country. The first period, 1941-1974 relates the period when policies that were in place in the imperial Haile Selassie regime. The second period1974-1991 relates to the period when policies that were in place were more or less in line with the command system of economic management. The third period, the post-1991 period, signify some move away from the command system and commenced with the Stabilization and Adjustment Programs (SAP) of the World Bank (WB) and the International Monetary Fund (IMF). Some of the major feature of these periods in terms of FDI trend and policy framework in Ethiopia is reviewed.

### 3.2.2.1. The Era from 1941-1974

The last decades of Menilek's regime marked the beginning of Ethiopian's modernization, which had been delayed, among other reasons by almost a century of internal or external warfare. An unprecedented period of peace after the battle of Adwa, the opening up of foreign contacts in the aftermath of the Italian defeat, and the advent of increasing numbers of foreign craftsmen, created an entirely new climate for economic and technological development. This owed much also to the emperor's almost child like interest in innovations of all kinds.

After the Menilek regime a number of technologies were introduced by Emperor Haile Selassie in and around Addis Ababa. These include the establishment of schools and universities as well as roads, the airline and TV transmissions. The imperial government has enacted legislation and implemented a new policy to encourage foreign investments.[20] This policy provided investor benefits in the form of tax exemptions, remittances of foreign exchange, import and export duty relief, tax exemptions on dividends, and the provision of financing through the Ethiopian Investment Corporation and Development Bank of Ethiopia. In addition, the government guaranteed protection to industrial enterprises by instituting high tariffs and by banning the importation of commodities that might adversely affect production of domestic goods. Protected items for foreign investments in that era include sugar, textiles, furniture, and metal products.

In this era, the government's policy has attracted considerable foreign investment to the industrial sector. For instance, in 1971/72 the share of foreign capital in manufacturing industries amounted to 4l percent of the total paid-up capital which many foreign enterprises operated as private limited companies, usually as a branch or subsidiary of multinational corporations. According to this report [20], the Dutch had a major investment (close to 80 percent) in the sugar industry. Italian and Japanese investors participated in textiles; Greeks maintained an interest in shoes and beverages while Italian investors worked in building construction and agricultural industries.

### 3.2.2.2. The Era from 1974-1991

This period marked the introduction of the command system of economic management in 1974. The mainly liberal policies of the pre-1974 Imperial/feudal era were replaced with centralized policies that discouraged market economy and private property. The land reform measure that was undertaken in 1975 was one of the major policy reforms that took place immediately. Land was nationalized and private ownership of land ceased. Medium-size and large enterprises were also nationalized.

Manufacturing in l975 accounted for less than 5 percent of GDP and employed only about 60,000 people. Handicrafts, such as weaving, pottery, blacksmithing, leather working, and jewelry making, along with other small-scale industries, accounted for another 5 percent of

GDP. In 1984/85 manufacturing and handicrafts together accounted for 11.4 percent of GDP. With the ten years period the growth of industrial/manufacturing sector is almost stagnant compared with the signs shown in the policies and some actions. There are many reasons that resulted to this outcome.

Though most of the enterprises nationalized in the Derg regime, the basic metal and engineering sector has been established as National Metal Corporation with the objective to create self-sufficiency in industrial spare parts, tractors, pumps, and other agriculture mechanisms. Akaki Spare Parts and Hand Tools S.Co., Nazareth Tractor Factory and Pump Factory are the leading metal engineering industries established in the Derg regime. The emergence of Maru Metal Plc from the private sector is also the other prominent private industry development observed in the time.

In l975 the Provisional Military Administrative Council (PMAC) nationalized more than l00 industries and took partial control of some of them. The main characteristics of the manufacturing sector inherited by the revolution included a predominance of foreign ownership and foreign managerial, professional, and technical staffing; heavy emphasis on light industries; inward orientation and high tariffs; capital-intensiveness; underutilized capacity; minimal linkage among the different sectors; and excessive geographical concentration of industries in Addis Ababa. [38]

Issued in l983, the PMAC's Proclamation No. 235 (the Joint Venture Proclamation) signaled Ethiopia's renewed interest in attracting foreign capital. The proclamation offered incentives such as a five-year period of income tax relief for new projects, import and export duty relief, tariff protection, and repatriation of profits and capital. It limited foreign holdings to a maximum of 49 percent and the duration of any joint venture to twenty-five years. Although the proclamation protected investors' interests from expropriation, the government reserved the right to purchase all shares in a joint venture "for reasons of national interest." The proclamation failed to attract foreign investment, largely because foreign businesses were hesitant to invest in a country whose government recently had nationalized foreign industries without a level of compensation these businesses considered satisfactory. Even the renewed interest of Ethiopia, shown by the proclamation, reserved free participation and offered less protection for investors in the sector.

In l989 the government issued Special Decree No II a revision of the l983 proclamation. The decree allowed majority foreign ownership in many sectors, except in those related to public utilities, banking and finance, trade, transportation, and communications, where joint ventures were not allowed. The decree also removed all restrictions on profit repatriation and attempted to provide more extensive legal protection of investors than had the l983 proclamation. However, the political instability and the prolonged civil war at the time further discouraged

FDI. The political instability got worse and it consequently led to the overthrow of the regime in 1991. [50][51]

#### 3.2.2.3. The post-1991 period

The post-1991 period began with the coming to power of TPLF/EPRDF in 1991 and the adoption of the WB/IMF sponsored Structural Adjustment Program soon after. Among the stated objectives of the new government were/are: reducing macroeconomic imbalances, eliminating structural distortion, improving the country's human capital and infrastructure as well as poverty reduction. The government implemented a series of reform measures in order to change the command economic system that had been in place to a free market economy, to speed up the integration of the economy into the world economy and to encourage the wider participation of the private sector in the development process of the national economy (FDRE-MOFED, 2002).

Increasing the role of the private sector in the economy being one of the main objectives of the government, the privatization program was started in 1994. The Ethiopian Privatization Agency (EPA) which has the power and duties of transferring state-owned enterprises to private ownership was established. To date, the government had privatized 200 enterprises to domestic and foreign investors this gives opportunities for foreign investors to invest in the country.

The domestic investments constitute the main component of capital formation in Ethiopia, accounting for about 64 percent of total investment; FDI has started to play some role in the country following the 1992 liberalization program**.** The reforms as well as the government introduction of investment guarantee schemes and incentives helped to raise the share of inward FDI in total investment form 0.04 percent in 1992 to 27 percent in 1997**.** However, the war with Eritrea in particular has disrupted the rising trend of FDI inflows. [51]

### 3.2.3. FDI trends in Ethiopia

#### 3.2.3.1. Total inward and outward flow FDI

The government of Ethiopia has recognized the importance of FDI for the country and opens many economic sectors for foreign investors. Despite the numerous attempts by the government to encourage foreign investors, the flows of FDI are quite low. The average annual FDI flows to Ethiopia from 2003 to 2006 were only $399 million, which is only 1.56% of FDI flows into Africa. Ethiopia accounted for only 1% of Africa's inward FDI stock, while representing close to 9% of the population of the continent. Ethiopia's per capita inflows were $5 in 2006, compared with $ 39 for African countries as a whole. FDI as a percentage of GDP of Ethiopia was 0.81% in 2006, compared with 1.6% for African countries as a group.

FDI flows to Ethiopia increased in absolute terms from an annual average of $131 million in 1995 to 2000 and $312 million in 2001 to 2006 although there are fluctuations. The unstable political environment of the country may be one of the reasons of the fluctuations. As we can see from Figure 3.3 during the Ethio-Eritrea war (1998-2000) the inflow of FDI had fallen to a large extent. Besides, in 2005, during the country's election crisis, the FDI flows declined to $221 million from $545 million in the preceding year of 2004.

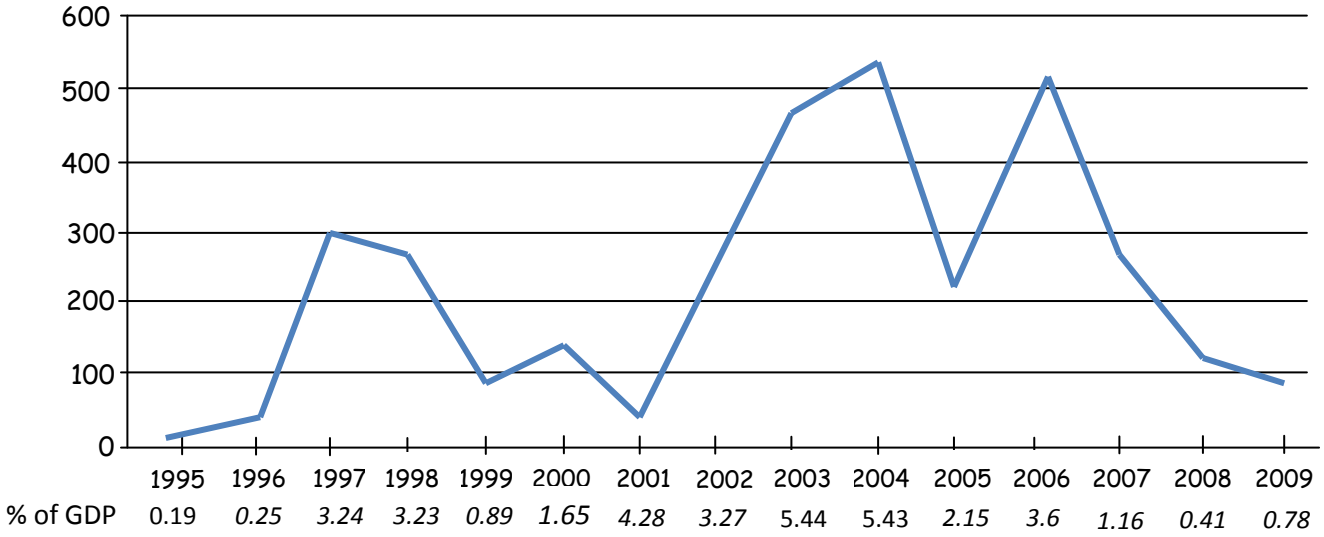


**Figure 3.3** Trends in the FDI flow to Ethiopia
*Source: world investment report 2001, 2003, 2006 and 2007, UNCTAD*

It's an undeniable fact that Ethiopia has made a considerable progress in economic and social development as a result of the implementation of favorable policies and strategies that are instrumental in improving the national economy.

The Government of Ethiopia in recognition of the role of the private sector in the economy has revised the investment code three times over the last eighteen years to make it more transparent, attractive and competitive. Major positive changes regarding foreign investment have been introduced through investment proclamation No. 280/2002 and regulations No. 84/2003.

As a result of the implementing policies and strategies in the agricultural and industrial sector investment and export trade are growing steadily from year to year both in-terms of variety and volume. Due to the investment friendly environment created in the country, the inflow of FDI has been increased over the last years. Accordingly, out of the total investment projects licensed between 1992-2009 FDI shares about 15.2%.

The Federal Investment Bureau of Ethiopia prepared a database where all investments are registered before they get licensed to operate in Ethiopia. Based on these registrations, the bureau prepares data spreadsheets including information on the name of the company

investing, its home country, the Ethiopian region in which it invests, the sector, the investment year and what form the investment is of (implementation, operation, per-implementation).

The total FDI inflows into Ethiopia have increased continuously from 135 million US$ in 2000 up to 545 million US$ in 2004. Since then up to 2007 the yearly FDI inflows have varied between 545 million US$ and 265 million US$. [49] According to the UNCTAD (2008) total FDI inflows remain quite constant after 2005.

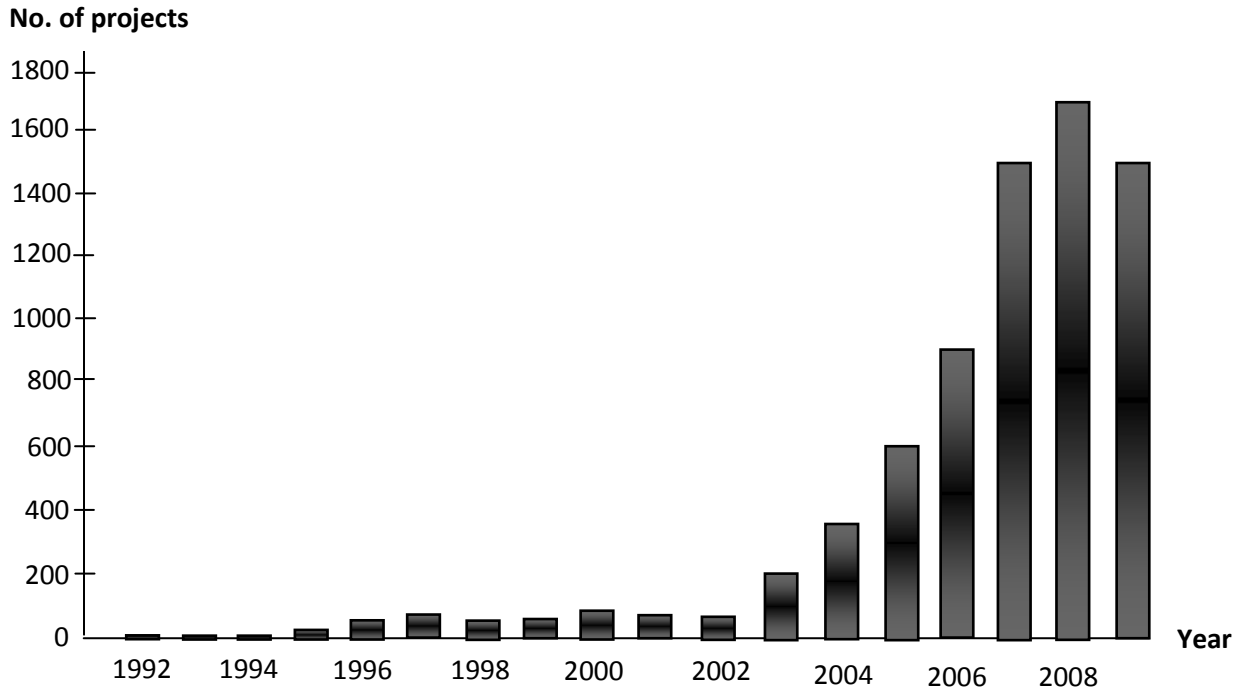


**Figure 3.4**FDI projects aproved by Ethiopia between 1992-2009

*Source:* Ethiopian Investment Agency

**Table 3.2**Total inward and outward FDI flow

| *Year* | *1992* | *1993* | *1994* | *1995* | *1996* | *1997* | *1998* | *1999* | *2000* | *2001* | *2002* | *2003* | *2004* | *2005* | *2006* | *2007* | *2008* | *2009* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FDI inflows (Millions of US$)** | 0.17 | 3.5 | 17.2 | 14.14 | 21.9 | 288.5 | 260.7 | 70 | 134.5 | 349 | 255 | 465 | 545.1 | 265.1 | 545.3 | 222 | 108 | 93 |
| **FDI, net inflows (% of GDP)** | 0.001 | 0.04 | 0.25 | 0.19 | 0.258 | 3.24 | 3.23 | 0.89 | 1.65 | 4.28 | 3.27 | 5.44 | 5.43 | 2.16 | 3.60 | 1.16 | 0.41 | 0.78 |

*Source:* UNCTAD

### 3.2.3.2. Regional and Sectoral Distribution of FDI

The largest FDI recipient regions in the country are Addis Ababa (the capital city), Oromia and Amhara regions take the largest share of FDI flows to Ethiopia. For the period from July 1992-July 2005, in terms of planned capital, Addis Ababa, Oromia and Amhara regions have attracted 36%, 28% and 15% of the total FDI inflows to Ethiopia respectively. In other words, these three regions accounted for 80% of FDI flows to the country. Conversely, Gambella, Afar, Somali and Benishangul-Gumuz performance in attracting FDI is very poor.

In general, FDI flows to Ethiopia have been unevenly distributed among the regions. Even though the incentive system encourages foreign investors to invest in the least developed regions (Gambella, Afar, Somali and Benishangul-Gumuz) of the country by providing especial benefits including provision of land free of any charge, their performance in attracting FDI is very poor. (EIA, 2008)Addis Ababa is the major destination for FDI flows to Ethiopia, as it has better infrastructure, stable political environment and better supply of trained man power. Oromia Region has attracted sizable amount of FDI due to its proximity to Addis Ababa, availability of natural resource (arable land) and market. (FIAS, 2001)

The FDI flow to Ethiopia is fairly diversified into the three main sectors: The primary sector, the secondary sector and tertiary sector. The primary sector includes all types of agricultural activities, mining and quarrying. The secondary sector encompasses all kinds of industrial activities. The tertiary sector includes electricity generation, construction, real estate development, trade, hotel and tourism, transport service, education and health service.

The secondary sector and the tertiary sector accounted for about36% each of the total FDI flows to Ethiopia in July 1992-July2005, while the primary sector accounted for 28%. Unlike many African countries, FDI flows to the mining and quarrying subsector are very small, as the country does not have sufficient deposit of some important minerals like petroleum.

### 3.2.3.3. FDI Flows by Country of Origin

Saudi Arabia accounted for half of the FDI flows to Ethiopia for the period from 1992-July 2005. The second largest source is the United Kingdom, accounting for9.4%. France, USA, China and India are the other major source countries in the period.

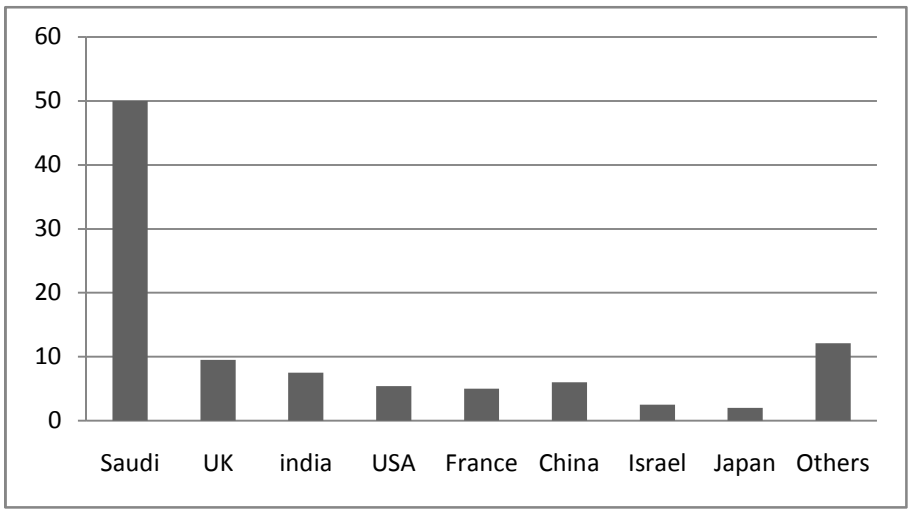


**Figure 3.5** FDI flows to Ethiopia by country of origin from 1992-2005(%)

### 3.2.3.4. Forms of investment

The EIA maintained information on the country of origin of foreign investors (both corporate and private) invests in new wholly-owned or joint-venture projects.

A ***joint venture*** is a business agreement in which parties agrees to develop, for a finite time, a new entity and new assets by contributing equity. They exercise control over the enterprise and consequently share revenues, expenses and assets. There are other types of companies such as JV limited by guarantee, joint ventures limited by guarantee with partners holding shares.

A foreign investor may team up with a domestic investor or company for a joint investment, usually in the form of a partnership, or private limited company or a share company. Nevertheless, under Ethiopia's Investment Proclamation No. 37/1996, a minimum equity capital of USD 300,000 is required from any foreign investor who intends to enter into a joint venture partnership with a domestic investor. The foreign partner is required to satisfy this minimum equity capital either in cash or in kind, in the form of capital goods such as machinery, equipment or other tangible assets, imported specially and exclusively to establish the enterprise or in both cash and in kind. The share of the domestic partner(s) cannot be less than 27% in a joint investment.

The ***Wholly Foreign Owned Enterprise*** is a limited liability company wholly owned by the foreign investor(s). The registered capital of a Wholly Foreign Owned Enterprise (WFOE) should be subscribed and contributed solely by the foreign investor(s).

In Ethiopia a foreign investor, who intends to invest on his own except in engineering and other technical consultancy services, is required to invest not less than USD 500,000 in cash and/or in kind as an initial investment capital to start his business. The minimum capital

required of a foreign investor investing in engineering or other technical consultancy services is USD 100,000 which may be in cash and/or in kind. A foreign investor investing in wholly foreign owned enterprises or joint ventures is not allowed to invest in areas reserved for Ethiopian nationals and domestic investors.

#### 3.2.3.5. Main characteristics of investors

While not all enterprises follow the same path of development, one typical path for an MNC is that a firm originally begins exporting to a foreign marketing or distribution agent, then acquires its own marketing and distribution affiliate abroad, begins exporting to a final assembly affiliate, develops more elaborate manufacturing operations overseas, and finally transfers part of its core functions, such as research and development (R&D), to foreign affiliates. MNCs are generally thought of as large firms, since it would usually require the capabilities of a large firm to engage in most of the types of activities just described. However, some SMEs do become MNCs. Such firms have a deeper and more elaborate form of global engagement than SMEs that simply export. Most of the foreign investors in Ethiopia are engaged in large and medium scale enterprises.

### 3.2.4. Determinants of FDI in Ethiopia

The frontrunner countries in attracting FDI in Africa are Angola, Chad, Congo, Egypt, Equatorial Guinea, Morocco, Sudan and Tunisia. Egypt, Morocco and Tunisia have received diversified FDI, and FDI flows to these countries are highly determined by availability of hospitable investment climate like better infrastructure services, market, skilled labor force and a stable political environment. Whereas, FDI flows to Angola, Chad, Congo, Equatorial Guinea and Sudan are significantly determined by availability of strategic resources mainly oil and gas, regardless of their political and economic environment.

The determinant factors to attract FDI into Ethiopia include, but are not limited to:

**1. Natural Resource**

Ethiopia is endowed with many natural resources. The livestock population of Ethiopia, for instance, is the largest in Africa and the tenth largest in the world. This shows that the country has great potential to attract foreign investors involved in the leather goods/garment manufacturing, footwear manufacturing, livestock farming and tanneries. The country also has massive arable land, immense potential for cultivation of large variety of cash crops, substantial hydro-power potential and small reserve of gold, copper, platinum, potash and natural gas.

## 2. Political Environment

Political stability is among the chief determinants of FDI particularly to non-extractive FDI. Unfortunately, the history of Ethiopia is the history of civil conflict, war and famine. Besides, relative to the other sub-regions of Africa, East Africa is politically unstable. Consequently, the regional political instability has great impact on FDI flows to Ethiopia.

As we have seen from the trend of FDI flows to Ethiopia, during the period of Ethio-Eritrea conflict the number of foreign investors registered to invest in Ethiopia decreased substantially. The border conflict more impedes FDI flows to some regions neighboring Eritrea like Tigray Region. In 2000, during the war time, no foreign enterprises registered to invest in Tigray Region. As the border conflict stopped foreign investment started to increase significantly. In addition, "Election 2005 crisis" had impact on the FDI flows to the country.

## 3. Infrastructure Development

As availability of adequate and efficient infrastructure services is a chief factor that determines the transaction costs of a business, certain level of infrastructure development is a necessary condition for a country to draw sizeable FDI. Inadequate supply of basic infrastructure services discourages the inflows of FDI to Ethiopia.

UNCTAD (2002) reported that Ethiopia's road density is one of the lowest in Africa, and most rural areas are not connected to main roads. The report indicated that only 14% of the population has access to electricity. With regards to financial infrastructure, domestic banks limited lending capacity, absence of foreign banks and stock markets are the critical problems of the financial sector.

**Table 3.3** Infrastructure development from 2003-2008

| Infrastructure | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|
| Electric consumption (KWh/ capita) | 29 | 31 | 34 | 38 | 41 | 42 |
| Internet user (access to worldwide network) | 613,077 | 681,207 | 827,635 | 238,000 | 291,000 | 360,000 |
| Roads in good and fair conditions (%) | 62 | 65 | 65 | 69 | 71 | 73 |
| Telecommunication investment(% of revenue) | 92.7 | 55.5 | 82.1 | 17.8 | - | - |
| Improved water source, rural(% of rural population with access) | - | - | - | - | 31 | - |
| Improved water source, urban (% of rural population) | - | - | - | - | 96 | - |

*Source:* Encyclopedia of the Nation (African Development Indicator)

### 4. Human Resource Development

Shortage of skilled workforce reduces the productivity of investments there by discouraging inflows of FDI. In terms of gross primary, secondary and tertiary enrollment ratio as percentage of relevant age group and adult literacy rate as percentage of total population is very low. In addition to shortage of skilled labor force, out migration of skilled human resource is also one factor that affects the competitiveness of the country negatively, though it is difficult to secure the exact figure.

**Table 3.4** Human resource development from 2003-2009

| Human resource development | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|
| School enrollment, primary (% gross) | 65.4 | 69.0 | 81.6 | 87.4 | 95.1 | 102.7 | 102.5 |
| School enrollment, secondary (% gross) | 20.1 | 22.3 | 24.9 | 28.9 | 32.1 | 33.4 | 34.4 |
| School enrollment, tertiary (% gross) | 2.4 | 2.7 | 2.9 | 2.6 | 3.6 | 3.6 | - |
| labor force | 32,394,495 | 33,595,136 | 34,856,067 | 35,924,730 | 36,996,181 | 38,152,271 | 39,952,287 |

*Source:* encyclopedia of the nation (African development indicator)

### 5. The Domestic and Regional Market

Ethiopia is the third most populous country in Africa after Nigeria and Egypt. In addition, Ethiopia is a member of the Common Market for Eastern and Southern African Countries, which is a regional trading group incorporating 23 countries. This creates an opportunity to investors to sell their product in the member countries (about 400 million people) with preferential tariffs. A large domestic or regional market, other things being equal, is attractive for local investment. It offers easy entry opportunity as well as the opportunity to understand market conditions and is also attractive to foreign investment. Given the fact that, at present, modern sector goods and services are accessible to only one-third of the Ethiopian population, the potential for industrial expansion through investment and acquisition of technology even within the country is great. In Ethiopia there are many products being imported while they can be produced with domestic resources.

### 6. The Business Environment

A hospitable business environment includes efficient judicial system, liberalized regulatory frame work, efficient and transparent bureaucracy and an environment with less corruption.

Lack of liberalization is among the main factors that deter inflows of FDI to Ethiopia. Restriction of private investment in telecommunication, electricity transmission and supply,

large air transport sectors is a serious disincentive for investors in all economic sectors. In addition, investment in banking and insurance sector is allowed only to national investors. This also highlights lack of sufficient liberalization in the financial sector as well.

- **Trade and investment agreement**

It is important to take a look at the existing trade and investment agreements between the main investor countries and Ethiopia. The range of the investment and trade agreements show how FDI-friendly the environment is or whether high regulations are in place. As one assumed reason for the increase in FDI inflows is food security, favorable trade agreements between Ethiopia and the investor countries would have a positive effect on investment decisions.

On a multilateral level, Ethiopia has applied for becoming a member country of the WTO in 2003. At the moment negotiations are still carried out. Next to this, Ethiopia has few bilateral trade agreements, the main ones are: Ethiopia- EU, Ethiopia- Africa, Ethiopia- USA, Ethiopia-India and Ethiopian investment agreements

Over the past few years, African countries have increased their efforts to develop or enhance their national policies and laws with a view to improving the investment climate. COMESA adopted an agreement for a Common Investment Area, which envisages a free investment area by 2010. The Agreement aims at attracting and promoting sustainable FDI by gradually eliminating restrictions and conditions relating to investment and operation of projects.

Ethiopia on its own, established bilateral investment treaties with China, Denmark, Italy, Kuwait, Malaysia, Netherlands, Russia, Sudan, Switzerland, Tunisia, Turkey, Yemen and only recently with Djibouti. Furthermore, double taxation treaties are implemented between Ethiopia and Italy, Kuwait, Romania, Russia, Tunisia, Yemen, Israel and South Africa.

The USA has bilateral investment protection agreements with Ethiopia. The investment incentive agreement with the United States provides investment support through its Overseas Private Investment Corporation (OPIC) in the form of investment insurance and reinsurance, debt or equity investment and investment guarantees. On the other hand the government of Ethiopia provides exemption of taxes for all operations and activities undertaken by OPIC in connection with any investment support, and all payments, whether of interest, principal, fees, dividends, premiums or proceeds from liquidation of assets or any other nature. In addition, OPIC will not be subject to any taxes in connection with any transfer which occurs as a result of OPIC role as a creditor in support of investment in Ethiopia.[52]

### 3.2.5. FDI Regulatory Framework

The present regulatory regime governing FDI in Ethiopia is based on a series of Investment Proclamations issued between 1996 and 2003, principally Proclamations 7/1996, 37/1996, 35/1998, 36/1998, 116/1998 and 280/2002. In combination, these establish the economic sectors open to FDI; the financial limits and requirements for FDIs; the monitoring and reporting requirements; and the financial incentives that are available. It is worth briefly summarizing the main features of the present regulatory regime in each of the above areas.

#### 3.2.5.1. Economic sectors open to FDI

In Ethiopia there is no separate policy governing FDI, and the present regulatory regime governing FDI is a part of the national investment law. Successive amendments to the national Investment Code have reduced the number of industries that are closed to foreign investors. FDI is now, in principle, welcome in most sectors. Activities still closed to foreign participation include a number of services, small-scale manufacturing and sectors considered to be of national interest (the latter are reserved for the state). To facilitate private investment, both domestic and foreign, and to provide a one-stop-shop for investors, the government established the Ethiopian Investment Authority (EIA) renamed Ethiopian Investment Commission (EIC) in 2003. [53]

Foreign investors can invest in all economic sectors other than some sectors exclusively reserved for national investors and the government. Sectors exclusively reserved for the government include transmission and supply of electricity, large domestic air transport, postal service excluding the courier services. The government rationale for most of the restrictions is based on largely on national security considerations. Investment in telecommunication services and manufacturing of weapon and ammunition is allowed only in joint venture with the government.

Ethiopia also restricts parts of its economy exclusively to its domestic investors, either nationals or permanent residents. [53][56]

- **Financial services**: Commercial banking and insurance companies remain exclusively reserved for Ethiopian nationals.
- **Manufacturing:** Sectors reserved for domestic investors include certain kinds of construction companies (excluding grade one contractors); building maintenance companies; tanning hides and skins; grain mills; batteries and the printing sector.
- **Primary sectors:** Sectors reserved for domestic investors include saw milling and timber making products.
- **Other services:** Sectors reserved for domestic investors include: retail trade and product brokerage; wholesale trade and distribution (excluding fuel and the domestic sale of locally produced goods from FDI plants); importing; exports of raw coffee, oil seeds,

pulses, hides and skins, and live sheep, goats and cattle; hotels other than star designated; motels, tearooms, coffee shops, bars, night clubs and restaurants excluding international and specialized restaurants; tour and travel operators; car-hire, taxis and commercial road and water transport; barber and beauty shops; goldsmiths; and non-export tailoring.

In addition, radio and television broadcasting; small domestic air transport services(less than 20 passengers); and forwarding and shipping agency services, are reserved for national investors.

#### 3.2.5.2. Ownership requirement and limitation

Under Proclamation 280/2002 a minimum investment sum is required for both wholly-owned operations and joint-ventures with Ethiopian companies or individuals. The value of the investment must be in either cash or in-kind.

Foreign companies should obtain an approval from Ethiopian Investment Authority or regional investment authorities to invest in Ethiopia. With regards the initial capital requirement, a wholly foreign-owned enterprise should invest a minimum of USD 100,000. But wholly foreign-owned consultancies and publishing companies can obtain the investment license with USD 50,000. To invest jointly with Ethiopian investors, foreign investors should invest a minimum of USD60,000 and the national investors should acquire at least 27 percent of the equity. To encourage export-oriented FDI, foreign enterprises that export at least 75% of their output are not required to meet the minimum capital requirement. Nevertheless, the investment code does not indicate the initial investment is whether in cash or in kind.

If the Government wishes to give priority to attracting larger FDI projects, it may be right to have a threshold level to ration the presently limited FDI promotional and management capability in EIA and the regional promotion agencies. However, a minimum investment requirement is not a common feature of investment regulatory regimes of most host countries that are competing to attract FDI.

Apart from these minimum capitalization conditions, the investment code does not require FDI to meet specific performance goals or guidelines through their operations. There are no requirements in terms of export levels, minimization of foreign trade balances, foreign exchange restrictions for imports, minimum local content levels in manufactured goods, or employment limits on expatriate staff. Once an investment project is established and operational, it is clearly left to a company's managers to make all key decisions without Government authorization or interference. [54]

### 3.2.5.3. Incentive for FDI

To encourage investment, the Ethiopian government has developed a range of incentives for investors engaged in new enterprises and expansion across a range of sectors. The incentives include:

**Customs Import Duty**

A 100% exemption from the payment of import customs duties and other taxes levied on imports is granted to all investment capital goods, such as plant, machinery and equipment, as well as spare parts worth up to 15% of the value of the imported investment capital goods, provided that the goods are not produced and not available locally in comparable quantity, quality and price.

Investment capital goods imported without the payment of import customs duties and other taxes levied on imports may be transferred to another investor enjoying similar privileges.

Exemptions from customs duties or other taxes levied on imports are granted for raw materials necessary for the production of export goods. Taxes and duties paid on raw materials are drawn back at the time of export of finished products. The duty drawback scheme applies to all taxes at the time of import and to those paid on local purchases.

**Income Tax Holiday**

Any income derived from an approved new investment (made pursuant to Proclamation No. 37/1996) is exempted from income tax for periods ranging from 1 to 5 years, depending upon the priority of investment activity and the location in which the investment is undertaken.

Income derived from an expansion whose invested capital is in accordance with the Council of Ministers Regulation No. 7/1996, Article 6 (2), is exempted from income tax for a period of two years for pioneer activities and one year for promoted activities.

**Table 3.5** Income Tax Holidays

| Location | Type of investment activity | Tax Holiday (in years) |
|---|---|---|
| Addis Ababa, Nazereth and in locations within 15 km of the main highway connecting the two cities | Pioneer<br>Promoted | 3<br>1 |
| Underdeveloped locations: Benshangul & Gumuz, Gambella, south Omo, certain zones in Afar, Somalia and other regions determined by the Investment Board | Pioneer<br>Promoted | 5<br>3 |
| All other locations | Pioneer<br>Promoted | 4<br>2 |
| ***NB:*** *"Pioneer activities" are the top tier of activities that are agriculture-based and/or that involve irrigation. Investments requiring a large outlay or having strong linkage effects or investments that are of a strategic nature may also be considered "pioneer" activities*<br>*"Promoted activities" are of secondary priority and include rain-fed agriculture, livestock development, non-basic industries and contracting* | | |

*Source:* Ethiopian Investment Authority

**Research and Development Incentives**

An investor is entitled to deduct expenditure on research, improvement studies or training from taxable income.

**Remittance of Capital**

Any remittance made by a foreign investor from the proceeds of the sale or transfer of shares or assets upon the liquidation or winding up of an enterprise is exempted from the payment of tax.

### 3.2.5.4. Monitoring and reporting requirements

There is currently a requirement for both FDI and domestic investors, under Proclamation 37/1996, to submit progress reports to EIA on the status of projects every six months once the original investment permit has been issued. The purpose of this is for EIA to be regularly informed on progress and also to identify (as early as possible) emerging problems in order that EIA or other Government agencies can help resolve the problem or constraint. Staffs in the Project Evaluation, Follow-Up and Consultancy Service Departments of EIA also undertake (when resources and workloads allow) monitoring of major or sensitive FDI projects to assess progress against the original plan and intentions submitted to EIA to gain their permit. Should variations from the original proposals occur, the EIA seeks to understand why, and if necessary will help investors bring it back on track where the original plans have not been rendered inappropriate through external economic or market changes.

There is some concern amongst foreign investors already established in Ethiopia (on the basis of limited discussions with senior executives) that such monitoring tends to be undertaken in a

relatively mechanistic manner. Although EIA managers are adept at helping resolve inter-agency conflicts (for example, land availability), they have little understanding of business factors causing divergence from original plan intentions and no real capability to advise on how to resolve these. This is a common problem in many countries, including developed countries where FDI promotion staffs often have very limited advisory skills in business development.

However, there will normally be a local advisory capability that can be brought in to assist investors. Although it is difficult to determine whether such limitations are hampering foreign investment plans in Ethiopia, it is, nevertheless, advisable that the EIA improves its monitoring capacity. [54]

## 3.2.6. Impact of FDI on Ethiopia's economy

### 3.2.6.1. Employment creation

Foreign investors can be attracted to a particular location because of low wages, which imply higher profitability of investment. A skilled labor force may also be a magnet for foreign companies as this translates into higher productivity of investment. The combination of labor costs, skills and productivity constitutes a decisive factor for foreign investors. However, as mentioned above the majority of recent FDI flows to Africa have been concentrated in the natural resources sector. Therefore, the employment effects of such investments are unlikely to be large. Nonetheless, the government needs to be aware of the employment impact of FDI in order to focus policies on attracting investments to more labor-intensive industries.

Specifically, the number of jobs created depends on a range of factors including the following:

- The proportion of foreign workers brought in by the foreign-owned company, which determines the potential number of jobs available for local workers;
- The more capital-intensive the technology used in production, for example in the natural resource sector, the smaller the employment effects resulting from the investment;
- Higher productivity of foreign investment reduces the demand for labor; and
- The labor market conditions in terms of costs and regulations also influence the number of jobs created through foreign investment. If hiring costs are high, for example, companies generally will hire fewer employees and substitute capital for labor.

The African foreign investor survey of 2005 indicates that the average annual employment growth rate in Africa is 13 per cent for the total sample. Half of the sample has increased the number of employees by less than 3.4 per cent.

Foreign investment projects in Ethiopia created a total of 67,128 jobs from July 1992 to July 2005, representing 14.5 per cent of all jobs created during this period. In comparison, domestic and public projects generated 389,876 and 4,812 jobs, respectively. On average,

each foreign project generated 211 jobs, 118 permanent positions and 93 temporary jobs. Domestic investments resulted in fewer jobs (average 160), while public projects tended to employ more workers (219).The labor intensity (the ratio of workers to capital invested) is highest in domestic projects (25.4 workers per million birr), which also have the highest share of temporary workers, the majority of whom are unskilled. Foreign investment projects are less labor-intensive than domestic investment, though more so than public projects.

Over the period 1998/1999-2004/2005, FDI in Ethiopia created the most jobs (temporary and permanent) in the cash crops sector (79,338 jobs), followed by real estate development (37,397 jobs). Both these sectors are labor-intensive and largely employ unskilled workers.

Therefore, these figures indicate that, in general, foreign investments in Ethiopia are an important vehicle for employment creation and may also contribute to decreasing inequality through increased relative demand for unskilled workers. However, domestic investment remains more labor intensive and therefore has a larger impact on employment in terms of quantity, though not necessarily in terms of decent jobs.

**Table 3.6** Employment creation of domestic, foreign and public companies

| | Domestic | Foreign | | Public | Grand total |
|---|---|---|---|---|---|
| | | ***Wholly Foreign*** | ***Joint with Domestic*** | | |
| Total no. of projects | 2,444 | 272 | 46 | 22 | 2,784 |
| Capital(millions of Birr) | 6.28 | 28.41 | 34.74 | 21.1 | 90.53 |
| Total employment (no. of workers per projects) | 160 | 223 | 139 | 219 | 166 |
| Permanent workers (no. of workers per projects) | 37 | 120 | 104 | 192 | 48 |
| Temporary workers (no. of workers per projects) | 123 | 104 | 35 | 27 | 119 |
| Share of temporary workers | 76.7 | 46.3 | 24.8 | 12.1 | 71.3 |

***Source:*** Ethiopian Investment Authority (EIA)

### 3.2.6.2. FDI Import Substitution and International Trade

Import substitution industrialization is a trade and economic policy that advocates replacing imports with domestic production. It is based on the premise that a country should attempt to reduce its foreign product dependency through the local production of industrialized products. The term primarily refers to 20th century development economics policies, though it was advocated since the 18th century.

It has been applied to many countries in Latin America, where it was implemented with the intention of helping countries to become more self-sufficient and less vulnerable by creating jobs and relying less on other nations.

Import substitution industrialization is based primarily on the internal market and it works by having the state lead economic development through nationalization, subsidization of vital industries (including agriculture, power generation, etc.), increased taxation to fund the above, and highly protectionist trade policy.

In the past import substitution activity and government policy which support this activity is very weak. The Ethiopian government sets its strategic plan for the next five more years and in this plan trade and foreign direct investment are emphasized but less reliance is placed on FDI inflows than in the past and as much emphasis appears to be placed on import substitution as on export expansion to reduce the trade deficit. As in the previous plan, agricultural production is the main basis for economic development, with a projected doubling of basic agricultural output over the plan period to meet domestic food requirements, to provide the raw material for industrial development. The sectoral focus of the plan is on sectors that are labor intensive, use agricultural products as inputs, help achieve technology transfer and are either export oriented with significant export potential or import-substituting: leather and leather products; sugar and sugar products; cement; metal and metal works; chemical products; pharmaceuticals; and agro processing. The plan also emphasizes support for small and medium-sized enterprises in general.

#### 3.2.6.3. Domestic effects

The flows of foreign direct investment to rapidly growing foreign markets generate fears that such investment displaces domestic employment, capital investment, and tax revenue. An alternative perspective suggests that growing foreign investment may instead increase levels of domestic activity by improving the profitability and competitiveness of domestic operations as firms expand globally. Very little empirical evidence is currently available with which to distinguish these views. Foreign investment that is triggered by foreign economic growth is associated with growing domestic capital accumulation, employment compensation, R&D, and exports to related parties. [55]

In Ethiopia this effect is seen by many local firms as a negative effect but it's clearly shown that the foreign firms are important in the employment creation, R&D activity even if it's low, and export related activity.

### 3.2.7. Current and future challenges of FDI in Ethiopia

In evaluating the effectiveness of Ethiopia's investment promotion activities and the challenges ahead, it is important to briefly consider the domestic and global economic and business environment in which EIA and associated ministries and agencies must operate. It will be especially important to see Ethiopia's investment challenges and potential through the perceptions, expectations and knowledge of foreign investors from, particularly those outside the region. This section addresses the internal and external investment challenges facing Ethiopia.

**Internal economic challenges**

Among the specific economic challenges and constraints that were identified by UNCTAD report, the following five are highlighted:

- The comparatively poor infrastructure in many parts of the country, especially in relation to transportation, power and telecommunications;
- The perceived over-regulation of the economy which diverts scarce management resources from more productive activities; and a continuing ethos of state sector bureaucracy;
- The perpetuation of State control over important aspects of international business operations (e.g. imports of equipment and fuels), together with a myriad of regulatory procedures and approval processes associated with business activities;
- A shortage of modern management skills and culture in the local private and public sectors, making it difficult to benefit from existing and potential international investment; although this is again an area where local business executives see a rapid pace of improvement;
- The absence of an experienced business development framework that can assist local SMEs to improve competitiveness as suppliers to incoming TNCs. There is also lack of provision of efficiently serviced sites to host new FDI facilities and gaps in other essential economic development services to both local and international investors.

In addition to these five issues, there is the continuing challenge posed by instability in the region.

The Government must not underestimate the importance of an active public relations exercise in influencing the external perception of a country. As noted above, the perception of local FDI executives (both expatriate and Ethiopian) is also an important determinant of future inward investment flows. As negative images spread rapidly within corporate networks, they tend (unless actively combated) to persist long after the events have declined or disappeared.

**External economic challenges**

The prospective global FDI environment which is currently facing major structural and qualitative changes will also have impact on both the level and location of capital flows. There is little Ethiopia can do to influence such shifts, but awareness of them will enable future investment promotion activity to be carefully targeted to appropriate areas of opportunity and potential.

New technologies, in particular information and telecommunications technologies, are enabling future services driven FDI to be operated from virtually anywhere on the globe provided skilled people are available. The competition between national and regional Governments throughout the world to pursue, attract and secure mobile international investment is now so strong that it has become a "buyers market" where MNCs obtain levels of financial and other support beyond what was seen as possible only a decade ago.

The most important structural FDI trends likely to dominant the next decade are: [56]

- Increasing concentration of corporate organizations through mergers and acquisitions(now including multi-nation mergers) resulting in globalization of corporate structures and activities and a consequent rationalization and contraction of production and support facilities into big units serving wide regions;
- The parallel move by global corporations into single sourcing of materials, components and the supply of manufacturing services, thus making it difficult for local suppliers to benefit from FDI purchasing linkages which, in turn, can encourage FDI enclaves though, generally, this is less important in the agriculture and raw material sectors;
- Globalization of manufacturing production and the lowering of costs of transport will open up opportunities for emerging nations to effectively bid for the next generation of manufacturing and production plants through lower labor costs, as TNCs close old vintage plants and replace them with vintage units in cost competitive countries;
- The trend toward a post-manufacturing international economy also means proportionately fewer mobile large-scale industrial plants to bring technology and skilled employment benefits to host nations.

In the next decade, Ethiopia will be competing not only with countries in the African region but also countries in Latin America and South Asia to attract FDI from the major industrial nations in Europe, North America and the Far East. This will require an investment promotion strategy that identifies potential sources of international investment through a careful targeting approach that gives appropriate promotional priority to these areas.

## 3.3. Technology Transfer in Ethiopia through FDI

The idea of modern science and technology in most African countries was introduced in the beginning of the 20th century. Even in the case of Ethiopia, it is believed that the first half of the 20th century is considered as the beginning of application of modern science and technology along with the establishment of higher learning institution although its role to bring about sustainable socioeconomic development of the country has not been to the desirable level. [57]

It was during Menelik II era that modern technologies are started and introduced to Ethiopia from the westerns technological advancement. He was fascinated by modernity and had a keen ambition to introduce Western technological and administrative advances into Ethiopia. [58] The notable tries had been performed technology transfer in Ethiopia during Emperor Menelik. It was Emperor Menelik who brought, through foreign engineer, some of the technologies and instruments that we use today. Tap water (1894), electric power and telephone (1897), gramaphone (1897), mills (1901), bicycles (1901), automobile (1908), bullet factory (1911) are a few among others. Due to wars and various attitude of religious closed door policies that existed even after the reign of Emperor Menelik, must have limited the country's external political and economic relations. This made the technological transfer very slow. [59]

The main obstacle for these innovations was the resistance from the community which held that they were "the work of the Devil" – a resistance that stretched all the way from the common people to the priests around the Emperor who refused to drink tap water. The method that the Emperor used to curb such resistance was by testing the technologies first by himself, his family and his executives. For instance, he himself was the first chauffer, the first to use the grinding mill, the first photographer and the first movie spectator. Then technologies like the airplane and radio were introduced in 1929 and 1936 respectively. [59]

A number of technologies were introduced by Emperor Haile Selassie in and around Addis Ababa. These include the establishment of schools and universities as well as roads, the airline and TV transmissions. It is to be recalled that technological transfer was better particularly during the last days of the Emperor.

When the Derg came to power in 1974, the country's diplomatic ties were diverted to the Eastern bloc. And as such, lots of technologies and communications were brought to the country from North Korea, East Germany and the USSR. As the policy discouraged private participation and innovation, and as the economy was under government control, the country was almost alien to new innovations. [60]

However, during the past twenty and so years, Ethiopia, like many other countries, is experiencing the challenges as well benefiting from the fast changing science and technology

of our world. Quality and standard, globalization, establishment of the European Union and introducing common units of money (Euro), dismantling of the Berlin Wall, the Internet and mobile services are in the list of events and innovations believed to have changed the world beyond imagination.

No doubt Ethiopia has become a beneficiary of all these sectors. The changes brought by the use of the computer, the internet, and cell phone services in the country cannot be undermined. This is a new hope for tomorrows Ethiopia. Particularly, the introduction into the country of the mobile and computer technologies has immense contribution for the development of the country.

However, technological transfer in Ethiopia is said to be very slow. Cement, sugar factories, automotive and locomotive technologies still stand where they had been many years ago. If we look at our rail transport, we could not add even one new railway in a 100 years time. On the other hand, we do not even handle the existing old and outmoded train technology properly. Our horse cart transportation has still not improved from what it had been many years ago.

Hence, development in Ethiopia prolongs to be an elusive goal. It is a goal which has been easier proclaimed than understood and much less realized, as Ethiopia experience of many decades has shown. One of the main reasons is that the development policy of Ethiopia is not technology focus. There can be no development without a sustained process of technological change. Technological change plays a most decisive role in development because of its influence on all significant aspects of economic and social life.

In short, the market and transfer of technology is now the order of the day in Ethiopia. But when we see old and present day Ethiopia, we see that we are still limited to purchasing technology. The only chance that we have to catch up with the pace of technological change is through fast technological transfer and become competitive in the ever-changing global market.

# Chapter Four

# The role of Foreign Direct Investment for technology transfer experiences of newly industrializing countries

## 4.1. Introduction

The review of the socioeconomic development paths of the newly industrialized countries (Mainly East Asian countries) reveals that their initial conditions in early 1960s were not better than that of many of the African countries. Their economic structure was dominated by agriculture and country like South Korea is in fact very poor in terms of agricultural and other natural resources. However, their rapid and successful transformation into industrialized economies has amazed. A striking feature of the early development of the newly industrialized countries is that they largely sought to benefit from available technological knowledge from abroad.

The experience of the benchmarking countries (China, Singapore, Malaysia and South Africa) on the role of FDI for technology transfer is summarized based up on the following specific points:

- Policy and framework
- Contribution of FDI in the development process
- FDI impact on Technology Transfer

## 4.2. Chinese Perspective

Initially, under the Chinese Communist Party (CCP), the central government acted as the only source of investment funding for local industries. Foreign investor's were not allowed to take part in local economic development. During that time, China's economy suffered from a low development pace and a low growth rate.

The policy on technology transfer has undergone a number of changes since the People's Republic of China was established.[61][62] At first, turnkey project investments supplied by the former Soviet Union and Eastern European countries were the most important form of technology transfer. These investments typically established whole industrial enterprises mainly in heavy industries such as steel, machinery and vehicle manufacture. After the deterioration of relations with the USSR, followed by the 'Cultural Revolution', China turned inwards and tried to develop its own technological capability. During this period there was limited technology transfer from Western countries and Japan, mainly key facilities and equipment for scientific research. During the 1970s the bulk of technology imports were still in the form of complete sets of equipment or turnkey plants. [63]

Investments during this time occurred mainly in the technologically backward sectors of petrochemicals, steel, electricity generation equipment and mining machinery industries, with the objective of developing technological capability in these sectors based on the more modern technology of the capitalist economies.

Following the end of the Cultural Revolution the decision was taken to begin some limited market reforms and to open up parts of the economy to more foreign trade and investment. A government review of technology transfer policy soon afterwards found previous approaches, which relied on turnkey projects and purchase of equipment, deficient in a number of respects. The turnkey projects were expensive and provided limited scope for developing local technological capability. This conclusion is consistent with experience elsewhere, that developing capability beyond simply the ability to use technology requires time to learning and often necessitates long-term collaboration with the technology supplier. [63]

China's national government has opened the economy to investment from outside the country as a joint venture since 1978. Thus, the investment system has been transformed and a series of supportive policies have been proposed to encourage diversification of investment and competition. [64]

The State Council also awarded rights of autonomy in foreign trade to Guangdong and Fujian Provinces and, in 1980, set up four special economic zones in three cities in Guangdong Province (Shenzhen, Zhuhai, Shantou), and one city in Fujian Province (Xiamen). Since 1984, China also has moved to further openness to FDI. In 1984, the concept of special economic zones was extended to another fourteen coastal regions. [65] Later, in 1986 the Chinese authorities announced the "Provisions of the State Council of the People's Republic of China for the Encouragement of Foreign Investment" to encourage the transfer of technology through foreign investment into what the government considered to be more productive' areas of the economy. Under these provisions, foreign joint ventures were granted a number of privileges including preferential taxation, simpler licensing procedures, freedom to import inputs of materials and equipment, more autonomy from bureaucratic interference, interest free loans, and the right to retain and swap foreign exchange with each other. Foreign investment enterprises that employed advanced technology and were export oriented also enjoyed additional tax benefits. [65]

These improved incentives and a growing awareness of the potential of the Chinese economy stimulated a dramatic increase in foreign investment into China in the early1990s. However, much of the foreign investment was in relatively low technology, labor intensive, operations that took advantage of China's low wage costs and policies to attract investment into the Special Economic Zones[3][65][62]. Many such investments were in subcontracting operations,

[3] Special Economic Zones are development zones established by People's Republic of China in the 1980's to encourage foreign investment in China.

with higher-level functions such as design and marketing often remaining in the home country. Also, with many operations only involving assembly work of components supplied from outside (in 'screwdriver factories'), opportunities for local parts suppliers to upgrade their capabilities and grow their businesses were also limited.

As a consequence of this situation there has been some tightening of regulations and concessions affecting foreign investments. In 1994 the State Council announced a number of policies to promote foreign investment in specified key sectors including communications, energy and raw material sectors. There was also a tightening of procedures for the approval of contracts and the registration of foreign enterprises. These included stricter penalties if agreements were not fulfilled, new rules requiring foreign companies to invest capital within a prescribed period so as to reduce the gap between pledged and utilized investment, and new rules on the sharing of investment risks between Chinese and foreign investors to remove the need for investment guarantees. [63]

In 1995 further guidelines were published detailing the foreign investments the government now wished to encourage, along with those that were to be restricted, prohibited or just permitted. These guidelines encouraged investment in high technology sectors (chemical fibers, micro-electronics, precision machinery, civilian aircraft, biotechnology and energy development) as well as infrastructure and agricultural developments. Investment in the priority sectors would continue to benefit from tax preferences and foreign invested companies in these sectors would be permitted to sell up to 100% of their output in the domestic market. Elsewhere, tax preferences were mainly to be phased out, although the authorities subsequently relaxed their stance when a number of high profile foreign companies made moves to reduce or withdraw their activities in China. [63]

In 1998 the State Planning Commission identified eighteen industries, mostly in high technology sectors, where China wished to promote further foreign investment. These sectors would be granted a restoration of duty free status on capital equipment imports[4]. These newly promoted sectors were high-technology industries, new technologies, transport and telecommunications equipment, electric power generation, aviation, oil and petrochemicals, machinery, electronics, pharmaceuticals, medical equipment, textiles, metals and metallurgy, light industry, the service sector, and agriculture. At the same time the State Planning Commission also reaffirmed broad limits to foreign ownership in businesses in areas considered to be key sectors of the economy - such as nuclear power plants, satellites and aviation.

[4]**Note**: Foreign funded companies could import capital equipment duty free but this concession was not available to local enterprises, therefore the government was trying to phase it out as a way of restoring a level playing field.

Also in 1998 the government announced that the tax systems for foreign and domestic companies were to be merged by the year 2000, a change that would more than double the tax burden on some foreign-invested enterprises. However, favorable treatment was retained for sectors and areas where China remains keen to attract foreign. This removal of some tax incentives for foreign investors signals a more discriminatory approach to foreign investment and is part of the Chinese government's attempt to redirect growth from basic industries (e.g. shoes and toys) in favour of higher- technology sectors. In effect, the foreign investment regime is now more closely linked with domestic industrial policy priorities and wider economic and social objectives. [63][62]

China's supportive policies toward FDI increased the inflow of FDI in the late 1980sand it became even more frequent in the early 1990s. Since 1992, when China's central authority decided to expand the scale and geographical scope of foreign investment, an increase in the foreign direct investment in China emerged. In the years between 1982 and 1991 the average foreign direct investment in China was US$ 2.5 billion. This average increased by seven times to become US$ 37.5 billion during 1995. Subsequently, after China's entry to the WTO in 2001, China's investment system entered an expanded internationalization stage and the country has now become the top recipient of FDI among developing countries. [66]

Since 1994, the proportion of foreign investment enterprises in the total amount of Chinese imports and exports rose year after year, and this number was 35.69% in 1994, 57.74% in 2007, and 59.8% in 2008, which fully indicated that the foreign investment enterprises have occupied very important status in Chinese trade at present. [65][67]

## 4.3. Singaporean experience

Singapore achieved self government from the British in 1959 and later became a part of Malaysia. However after a few years, Malaysia and Singapore agreed to become separate countries and Singapore was a poor developing country at its independence and the country accepted as a new member of United Nations in 1965. During British colonial rule, Singapore thrived as an entre port trade and depended on the British mainly for its technical knowhow and the regional hinterland for its economic well-being. Upon the British withdrawal and as an independent country, it had to build its economy without the benefits of hinterland and natural resources. The United Nations Report for the economic future of Singapore recommended industrialization as its survival path to meet with the 15% unemployment rate of the era. [68][69]

Singapore's industrialization journey was successful till the late 1970s with an annualized growth of 8% during this period, bringing its per capita GDP to $6000 in 1980. Its industrial base was built upon the investments of the then 'Multinationals' who provided jobs in mass assembly in the factories and the numbers of multinational companies increased. [68] They provide sources of technology transfer to upgrade the technology level of Singapore, in many

industries including heavy metalworking and electronics. The companies obtain substantial funding from the government to develop required technology and automation systems. Training centers and technology showrooms were established.

In the 1980s, Japan was emerging as a successful model of industrialization. It was recognized that the quality, productivity and technological models of Japan should be a model for many developing countries. In 1979, Singapore approached the Japanese government for aid in providing training in the industrial technologies of plastic injection, tool and die, mold making, industrial electronics. This aid resulted in the establishment of the 'Japan Singapore Training Centre (JSTC)', which was one of the first instances of a foreign technology aid to Singapore. Upon completion of the JSTC, the Japanese government generously provided aid to Singapore in its second phase in 1983, resulting in the establishment of the Japan Singapore Technical Institute (JSTI) [68]. Moreover, other training institutes are established by joint interaction of the Singaporean government and other foreign countries, these include the German Singapore Institute (GSI), French Singapore Institute (FSI) and Philips Singapore Institute (PSI), in which the most up-to-date equipment are donated by suppliers and used for demonstration, training and development purposes. [70]

A notable structural characteristic of the Singaporean economy is its high degree of economic openness and internationalization. The Singaporean government has always been an unequivocal champion of unimpeded cross-border flows of goods and services, capital and labor. The remarkable transformation of Singapore is a powerful testament to the potential benefits of globalization. Quite simply, the city-state could not have achieved its economic miracle without extensive economic interaction with the rest of the world. In particular, Singapore is heavily dependent on foreign trade and the relative share of foreign trade in national output is consistently among the highest in the world. Due to its limited population and talent pool, the city-state also relies on foreign human resources to relieve shortages in a wide spectrum of skills, from domestic maids to biotech scientists.

In addition to foreign trade and foreign labor, Singapore is exceptionally open to foreign capital as well. Foreign capital in the form of foreign direct investment has played a pivotal role in the economic development and growth of Singapore. The rapid growth of an export-oriented manufacturing sector which laid the foundation for the city-state's transformation was powered largely by foreign MNCs. While the Singaporean economy is a powerful testament to the benefits of globalization, it is an even more powerful testament to the benefits of FDI. Perhaps to a larger extent than any other country in the world, Singapore has relied on foreign MNCs to drive its own industrialization and growth. What is beyond doubt is that Singapore's unique ability to attract and retain FDI has undoubtedly been a key ingredient of its economic success. [69]

Along with the government or public sector, foreign multinational corporations are one of the two main pillars of the economy. The United States embassy uses the following rule of thumb

in estimating the sources of production in Singapore; 60% of goods and services are produced by the public sector, 25% by foreign MNCs, and only 15% by the Singaporean private sector. That is, foreign MNCs, which are especially prominent in the manufacturing sector, account for around a quarter of Singapore's national output. In fact, it would be accurate to say that MNCs play a bigger role in Singapore than in almost any other economy in the world. The massive amount of FDI brought in by the MNCs has served as an engine of growth ever since the country's independence. [68]

Although both developed and developing economies compete fiercely for FDI these days, Singapore adopted a liberal open-door policy toward foreign investors long before it was fashionable to do so. The combination of a strongly pro-FDI government and generally favorable environment meant that Singapore has been and continues to be a highly attractive location for foreign capital.

Since Singapore's population in 2004 was 4.3 million, of which 3.5 million were citizens and permanent residents, per capita FDI inflows were over US$3,700 and almost US$4,600 if we exclude foreign residents. Singapore has consistently had one of the world's highest per capita FDI inflows for the last three decades. Relative to the rest of the world, investment by foreign companies has played a relatively larger role in the total investment of Singapore.

The reason to follow the strategy of FDI is that Singapore is a small city-state with a limited captive domestic market so that nurturing infant industries and companies with an active industrial policy was not a sensible strategy for economic development and growth. That is, a Japan- or Korea type model of promoting specific industries such as automobiles or steel and national champions such as Toyota or Samsung with the aid of trade protectionism, directed credit and fiscal benefits could not work in Singapore due to the small size of its domestic market. This meant that there were no opportunities for learning-by-doing by producing first for a protected domestic market before becoming internationally competitive and subsequently exporting to external markets. Industrialization had to be necessarily export-oriented from the outset for a small city-state like Singapore.

The overwhelming consensus is that FDI has been highly beneficial for the Singaporean economy and indeed the country's remarkable leap from the Third World to the First World would not have been possible without FDI. More specifically, FDI has accelerated the development of an export-oriented manufacturing sector, which has served as the primary engine of engine growth, before the economy diversified into financial services and other services. FDI made major contributions to exports, employment, skill creation, creation of local companies and business opportunities through dynamic linkage effects, and economic growth. [68][69]

## 4.4. Malaysian experience

Malaysia inherited, from its colonial past, a liberal economic system with a well functioning bureaucracy, stable macroeconomic policies, good infrastructure, trade oriented economy with foreign investment playing a large role in the productive sector, and a natural resource based sector that provided most of its export earnings However, industries in Malaysia before 1960 were meant to supply processed raw material, mainly tin, rubber, and palm oil, to industries in developed economies. After independence, Malaysia set out to diversify and restructure its industry.

In the first phase industrial policy (1960-1985), Malaysia employed both import substitution and export promotion policies, rather than free market trade policy. Its export promotion policy attracted foreign transnational's to invest in processing industries for export. So while import-substituting industries were given protection, generous incentives were devised in the area of export promotion. [71]

However, despite the protection from import competition, locally owned light and primary processing industries were not able to develop their competitive status. They remained technologically backward as they were not linked to MNCs led technologically better advanced export industries. A further set back was the government's political agenda which linked the industrialization program with the improvement of the ethnic Malay's economic status.

Failure to develop the indigenous industries prompted the government to establish state owned large firms, very much in line with the Korean approach. However, such state owned giant industries suffered large losses in the early years of their operation. In addition, many of the other smaller state-owned enterprises also performed poorly

As indicated above, Malaysia was successful in its FDI program. A generous fiscal incentive, disciplined and literate labor force, good infrastructure, low wages, efficient administration, favorable regional location, and favorable investment climate helped Malaysia to attract MNCs and launch a successful high-tech export path. [71]

Government moved into the second phase of industrial policy (in the mid 1980s) with a fresh drive to attract MNCs, privatizing some public enterprises and adopting a pragmatic strategy towards ethnic balance. The new industrial policy in this second phase shifted to more selective strategy, i.e. providing critical factors for industrial development (skills and training, technical support, finance, quality improvement, and the like). The government moved to strengthening science and technology institutions and stimulating private R&D enterprises. Industrial restructuring programs were devised to provide cheap finance for the textile and engineering industries. Infant industry protection continued but has been governed by dynamic notions of comparative advantage, promoting the development of industrial sub-

sectors that are intended to replace light manufacturing activity as the main exporters. The restructured public sectors retained a role in industries (such as automotive, petrochemical, iron and steel, etc) where the required investments were large and long gestation periods involved.

Fresh and more generous incentives were designed to attract FDI. Policy reforms, including the introduction of the Investment Incentives Act 1968, the establishment of free trade zones in the early 1970s, and the provision of export incentives alongside the acceleration of open policy in the 1980s, led to a surge of FDI in the late 1980s. To attract a larger inflow of FDI, the government introduced more liberal incentives including allowing a larger percentage of foreign equity ownership in enterprise under the Promotion of Investment Act (PIA), 1986.

This effort resulted in a large inflow of FDI after 1987(the inflow of FDI grew at an annual average rate of 38.7 percent between 1986 and 1996).Apart from these policy factors, it is generally believed that sound macroeconomic management, sustained economic growth, and the presence of a well functioning financial system have made Malaysia an attractive prospect for FDI. The government moved to more selective policies on export oriented MNCs. It started to use incentives to guide FDI into higher value-added activities and more technology-intensive processes. [72]

This time, the newly industrializing countries, led by Taiwan and Hong Kong, showed much interest in investing in Malaysia.

## 4.5. South African experience

South Africa's emergence from isolation in the 1990s has faced its democratic government with an enormous challenge in creating the structures; policies and processes to attract investors. Since 1994, both domestic and foreign investment has remained at relatively low levels in South Africa. The Department of Trade and Industry noted that "Investment rates have been generally low in manufacturing. Moreover they have shown a tendency to decline and manufacturing investment has grown more slowly than for most other sectors".

Disregarding a few discrete business transactions, FDI has remained fairly static between 1994 and 2001. In 1997and 1999, inflows were boosted by the privatization of state assets, namely, Telkom and South African Airways. While the dramatic upswing in 2001was related to a restructuring of the corporate relationship between Anglo American Corporation and the De Beers mining company. If these deals are discounted, the level of inward FDI has been more or less flat. Moreover, in general, South Africa has received very little 'Greenfield' FDI with the majority of non-privatization FDI being driven by merger and acquisition. [73]

It is in the context of not only low FDI but also fairly static domestic investment trends that the Government of South Africa has formulated its approach to investment policy in general

and FDI in particular. The fact that South Africa's supply-side policy environment is still very much in the process of being created, with most schemes having been operational for no more than three or four years, should be kept in mind when reviewing the performance requirements to which companies are required to adhere.

In implementing its FDI policies the South African Government has followed the basic principle of national treatment. Thus, all performance requirements, whether mandatory or arising out of the accessing of an advantage, apply equally to domestic and foreign investors, with one exception – the Foreign Investment Grant. Foreign and domestic investors have access to identical services and incentives from the State and have to fulfill equal obligations in adhering to national legislation and policy. Despite this principle of national treatment, existing performance requirements have implications for both the levels of FDI received and its developmental impact.

In South Africa, technology transfer requirements have been applied only as a condition for receiving a form of advantage. Commonly recognized as one of the central benefits of FDI, the Government has sought to maximize technology transfers by providing incentives to foreign investors to bring in new machinery and equipment used for local production. The Foreign Investment Grant, which was established in September 2000, covers the associated costs (freight, travelling, installations etc.), up to a maximum of R3 million, of bringing such assets to South Africa. The Grant may also subsidize travel costs for key personnel associated with the introduction of the new technology and to facilitate the installation of new machinery. While the Grant is not focused on a specific industry or technology the Government reserves the right to reject applications in areas where strong domestic capabilities already exist or where the market is saturated.

The payment of the Grant is subject to two conditions:

- The equipment must be inspected by consulting engineers to certify that it is new and will add to the productive base of South African manufacture; and
- The company must prove that they have earned at least 25per cent of their projected revenue before the grant is paid.

These two provisos have been introduced to ensure that the developmental objective of technology transfer is attained, by verifying that the technology brought into the country is not redundant and would add value to South Africa's manufacturing base, and that companies actually start to manufacture in the country.

## 4.6. Summary of Country benchmarking

After intensive data collection and analysis about countries experience in technology transfer small description of the countries are presented in tabular form. From the reviewed countries the following experience can be summarized:

**Table 4.1** summary of policy and framework

| | **Policy and framework** |
|---|---|
| **China** | The policy on technology transfer has undergone a number of changes since the People's Republic of China was established.<br>• In 1970s turnkey project investments are allowed to the former Soviet Union, Eastern European countries and Japan but the technology transfer to the local companies are limited.<br>• In 1978s the government review of technology transfer policy soon afterwards and the government has opened the economy to investment from outside as a joint venture. To encourage the transfer of technology foreign joint ventures were granted a number of privileges including preferential taxation, simpler licensing procedures, freedom to import inputs of materials and equipment, more autonomy from bureaucratic interference, interest free loans, and the right to retain and swap foreign exchange with each other. Foreign investment enterprises that employed advanced technology and were export oriented also enjoyed additional tax benefits.<br>• These improved incentives and a growing awareness of the potential of the Chinese economy stimulated a dramatic increase in foreign investment into China in the early 1990s.<br>• In 1994 the State Council announced a number of policies to promote foreign investment in specified key sectors including communications, energy and raw material sectors.<br>• In 1995 further guidelines were published detailing the foreign investments these guidelines encouraged investment in high technology sectors (chemical fibers, micro-electronics, precision machinery, civilian aircraft, biotechnology and energy development) as well as infrastructure and agricultural developments.<br>• In 1998 the government announced that the tax systems for foreign and domestic companies were to be merged, a change that would more than double the tax burden on some foreign-invested enterprises. In effect, the foreign investment regime is now more closely linked with domestic industrial policy priorities and wider economic and social objectives. |
| **Singapore** | • A notable structural characteristic of the Singaporean economy is its high degree of economic openness and internationalization. |
| **Malaysia** | • In the first phase industrial policy (1960-1985), Malaysia employed both import substitution and export promotion policies, rather than free market trade policy. Its export promotion policy attracted foreign transnational's to invest in processing industries for export. So while import-substituting industries were given protection, generous incentives were devised in the area of export promotion.<br>• The policy is failed to develop the indigenous industries prompted the government to establish state owned large firms, very much in line with the Korean approach. |

| | |
|---|---|
| | • The second phase of industrial policy (in the mid 1980s) with a fresh drive to attract MNCs, privatizing some public enterprises and adopting a pragmatic strategy towards ethnic balance. The new industrial policy in this second phase shifted to more selective strategy, i.e. providing critical factors for industrial development (skills and training, technical support, finance, quality improvement, and the like).<br>• Fresh and more generous incentives were designed to attract FDI. This time, the newly industrializing countries, led by Taiwan and Hong Kong, showed much interest in investing in Malaysia. Japanese MNCs continued to relocate their assembly operation in Malaysia, and induced many of their suppliers to invest along with them. |
| **South Africa** | • Foreign and domestic investors have access to identical services and incentives from the State and have to fulfill equal obligations in adhering to national legislation and policy. |
| **Ethiopia** | • FDI is now, in principle, welcome in most sectors but still there are sectors closed to foreign participation include a number of services, small-scale manufacturing and sectors considered to be of national interest.<br>• Regulatory policy framework governing FDI in Ethiopia is based on a series of Investment Proclamations issued between 1996 and 1998, principally Proclamations 7/1996, 37/1996, 35/1998, 36/1998 and 116/1998. In combination, these establish the economic sectors open to FDI; the financial limits and requirements for FDIs; the monitoring and reporting requirements; and the financial incentives that are available. |

**Table 4.2** summary of FDI contribution in the development process

| | **Contribution of FDI in the Development process** |
|---|---|
| **China** | • In the years between 1982 and 1991 the average foreign direct investment in China was US$ 2.5 billion. This average increased by seven times to become US$ 37.5 billion during 1995. China's investment system entered an expanded internationalization stage and the country has now become the top recipient of FDI.<br>• Since 1994, the proportion of foreign investment enterprises in the total amount of Chinese imports and exports rose year after year, and this number was 35.69% in 1994, 57.74% in 2007, and 59.8% in 2008, which fully indicated that the foreign investment enterprises have occupied very important status in Chinese trade at present |
| **Singapore** | • Singapore's industrialization journey was successful till the late 1970s with an annualized growth of 8% during this period, bringing its per capita GDP to $6000 in 1980. Its industrial base was built upon the investments of the then 'Multinationals' who provided jobs in mass assembly in the factories and the numbers of multinational companies increased. |

| | |
|---|---|
| | • FDI provide sources of technology transfer to upgrade the technology level of Singapore, in many industries including heavy metalworking and electronics.<br>• The sources of production in Singapore; 60% of goods and services are produced by the public sector, 25% by foreign MNCs, and only 15% by the Singaporean private sector. |
| **Malaysia** | • Foreign direct investment (FDI) has been seen as a key driver underlying the strong growth performance experienced by the Malaysian economy.<br>• The inflow of FDI grew at an annual average rate of 38.7 percent between 1986 and 1996 and the economy of the country grew by between 7 to 10% per annum. |
| **South Africa** | - |
| **Ethiopia** | • Foreign investment projects in Ethiopia created a total of 67,128 jobs from 1992 to 2005, representing 14.5 per cent of all jobs created during this period.<br>• Capital inflow into Ethiopia have increased continuously from 135 million US$ in 2000 up to 545 million US$ in 2004 since then the total FDI inflows remain quite constant after 2005. |

**Table 4.3** Summary of FDI impact on technology transfer

| | **FDI impact on technology transfer** |
|---|---|
| **China** | • In the early 1990s much of the foreign investment was in relatively low technology, labor intensive, operations that took advantage of china's low wage costs.<br>• In 1998 by changing some investment policies eighteen foreign industries which are engaged in high technology sectors are identified. |
| **Singapore** | • Foreign companies provide sources of technology transfer to upgrade the technology level of Singapore, in many industries including heavy metalworking and electronics.<br>• Training institutes are established by joint interaction of the Singaporean government and other foreign countries in which the most up-to-date equipment are donated by suppliers and used for demonstration, training and development purposes. |
| **Malaysia** | • The Foreign Company's strengthen the science and technology institutions and stimulating private R&D enterprises.<br>• Industrial restructuring programs were devised to provide cheap finance for the textile and engineering industries. The restructured sectors retained a role in industries (such as automotive, petrochemical, iron and steel, |

| | |
|---|---|
| | etc) where the required investments were large and long gestation periods involved. |
| **South Africa** | - |
| **Ethiopia** | • Technological transfer in Ethiopia is said to be very slow. Cement, sugar factories, automotive and locomotive technologies still stand where they had been many years ago. One of the main reasons is that the development policy of Ethiopia is not technology focus.<br>• Most of foreign investors are engaged in the resource oriented and labor intensive operations due to this the technology and knowhow transfer is very weak/slow. |

## 4.7. Gap observed

The review of the newly industrialized countries illustrates the policy and the FDI effects on technology transfer and the gap between the newly industrialized countries and Ethiopia is identified and demonstrated.

From the experience of china, it can be seen that the government encourages and opened the economy to investment from foreign investors as a joint venture and to encourage the transfer of technology through foreign joint ventures the government granted a number of privileges including preferential taxation, simpler licensing procedures, freedom to import inputs of materials and equipment, more autonomy from bureaucratic interference, interest free loans, and the right to retain and swap foreign exchange with each other. Foreign investment enterprises that employed advanced technology and were export oriented also enjoyed additional tax benefits. Guidelines were published detailing the foreign investments. These guidelines encouraged investment in high technology sectors (chemical fibers, micro-electronics, precision machinery, civilian aircraft, biotechnology and energy development) as well as infrastructure and agricultural developments.

Malaysian experience demonstrated that the government employed import substitution and export promotion policies, rather than free market trade policy. Its export promotion policy attracted foreign transnational's to invest in processing industries for export. So while import-substituting industries were given protection, generous incentives were devised in the area of export promotion. But the policy failed to develop the indigenous industries technological capability. Due to this the government changes the industrial policy with a fresh drive to attract MNCs, privatizing some public enterprises and adopting a pragmatic strategy towards ethnic balance. The new industrial policy shifted to more selective strategy, i.e. providing critical factors for industrial development (skills and training, technical support, finance, quality improvement, and the like).

In Singapore training institutes are established by joint interaction of the Singaporean government and other foreign countries firms in which the most up-to-date equipment are donated by suppliers and used for demonstration, training and development purposes. Foreign companies provide sources of technology transfer to upgrade the technology level of Singapore, in many industries including heavy metalworking and electronics.

In Ethiopia the government's policy on FDI mainly concentrate on the financial flow to the country. Due to this local industries are unable to increase their technological capability and most of foreign investors are engaged in the resource oriented and labor intensive operations resulting in very weak/slow technology and knowhow transfer. The Ethiopian private sector plays a much smaller role in FDI promotion than in many similar emerging economies. There are thus few effective private sector links into the international corporate community.

# Chapter Five

# Data Collection and Analysis

## 5.1. Overview of Basic Metal and Engineering Industries

The Basic Metal and Engineering (BME) is a sub-sector within Manufacturing Sector. Basic Metals Industries are concerned with the refining and production of raw metal products from mineral ores, while Engineering Industries are industries which use these metal products as an input and fabricate them into various engineering products. Products of basic metals industries fall under two categories ferrous (Iron and Steel) and non-ferrous (all other metals but most importantly, aluminum, copper, tin, bronze and brass).

The sub-sector is further divided into:

- **Basic Metal Industries:** are industries that deal with production of metal from ore, scrap and conversion of billet, slabs etc. into primary metal products such as metal sheet, tubes, bars, wires, cables and nails. This major group includes establishments engaged in processing ferrous and nonferrous metals from ore, pig, or scrap and those engaged in rolling, drawing, and alloy metals and castings of primary products.
- **Engineering Industries:** convert primary metal products into secondary products such as metallic structures, windows and doorframes, tanks, pressure vessels, machine parts, machineries, transport equipments, electrical and electronic equipments, measuring and control instruments and etc.

The basic metal and engineering industry is crucial to the development of any modern economy and is considered to be the backbone of human civilization. It is for this reason that the level of per capita consumption of steel is treated as an important index of the level of socioeconomic development in any country. It is a product of a large and technologically complex industry having strong forward and backward linkages in terms of material flows and income generation. All major industrial economies are characterized by the existence of a strong steel industry and the growth of many of these economies has been largely shaped by the strength of their steel industries in their initial stages of development. The Ethiopian condition on basic metal sectors reveals that basic metal industries lack the crucial component of producing basic metals from iron ore or other process route.

Engineering industries in Ethiopia is still in its infancy over the years even if expansion of this industry is making a very substantial increment and is not likely to make a very potential contribution to the National Economy. However, it is evident that engineering industries can play an important role in serving other industries by providing experienced technical manpower at large and also a significant role by incubating small-scale industries.

**Performance of the industry in Ethiopia**

The manufacturing sector as a whole and the basic metal and engineering industrial sub-sector performance is very low in Ethiopia. This is illustrated by the low valued added and the low share of manufacturing industries in the country's GDP which is only about 8.5 %. On average, metal industries was about 12.6 % of the manufacturing sector. With regard to gross value of production the basic metal industries constitute 0.56% to 7% of the manufacturing sector in the period 2002-2004. If we consider the performance of the basic metal industries in the year 2004, its contribution to the GDP is to the magnitude of 1%. Fixed capital asset of the sub-sector had increased in the years 1991-1996. However the share of fixed capital investment compared to other section was low which about 7.47%.

Basic metal products that amount about Birr 2.76 billion and Engineering products amounting Birr 10.86 billion were imported in 2005 total import of basic metal products and engineering products has reached USD 1.48 billion. During this period, total import reached USD 4.38 million. The highest expenditure was on metal and engineering products (metal products, machinery and vehicles), which was 33.7 % of the total of import.

Currently, the major consumer of the outputs of the basic metal industries is the construction sector. With the current growth of the construction sector, however, it has not been possible to meet the demand with the existing basic metal industries because of which the country is forced to import the balance. The volume of import is immense and characterizes the dependence of our economy on this important material. The engineering industries mainly require mild steel for welding fabrication, and alloyed steels for engineering components and parts. However, because of the low level of development their material requirement is limited which doesn't go along with the production capacities of the basic metal industries in general and hot rolling facilities in particular. As a result, the material demand for the engineering industries is fully met through import and for some time to come the engineering industries can't be a market base for the basic metal industries.

There are few plants, which can be considered as engineering factory. The manufacture of machinery and equipment is almost non-existent with the exception of the former pump factory, truck, bus and tractor assembly plant and trailer manufacturing plant and the abandoned light aircraft assembly plant of Ethiopian Airlines.

Different survey and researches indicate that most of the metal and engineering industries operate under their capacity. The reason for under capacity utilization is named as lack of market, high product price and lack of raw materials. Furthermore, the reasons given for low productivity of the enterprise are: Scarcity of finance, Scarcity of raw materials and obsolete machinery in operation. It is surprising that engineering design skill, manufacturing skill, management skill and economy of scale were rated as minor contributors to productivity.

Due to their low productivity and Competitiveness of the metal sector, only about 10 % of the enterprises have exported their products. Most companies believe that price, customer service and quality are instruments for gaining competitive advantage. However, 47 % of the enterprise believes that their product prices are cheaper than imported ones. Their reason behind is high raw material costs, low manufacturing quality and high manufacturing costs. Causes for high raw materials cost were given as purchase from retailers and low order quantity. As a result, they buy at higher unit price. Scarcity of working capital is also the major bottleneck for timely order of raw materials.

Ethiopia, which is total importer of various machinery and equipment, has to devise strategies to develop the engineering industry in order to improve its foreign trade deficit in the long range. Overall, it can be inferred that the contribution of the basic metal industries to the overall economy is minimal which indicates that there is much to be desired from this industry if it has to position itself to a level where it can be a real contributor to the economy. However, the overall trend of the industry is very much encouraging if it continues to grow, especially in a better enabling environment. Therefore, improvement in this sector can help to cut import figures by increasing locally produced primary products and equipment.

## 5.2. Data presentation and analysis

This chapter presents analyze and interpret the data obtained from the primary source. The primary data was obtained from the questionnaire which is designed to collect the necessary data to answer the research questions. This chapter is organized in the same way the measurement questions in the questionnaire are organized which prepared for both domestic and foreign metal and engineering firms.

The questionnaire is grouped in to different headings to show the level of technology transfer from foreign based companies. The headings are the level of collaboration between foreign firms and local company's(industry-industry relation), the effect of FDI in local the presence of foreign investors and the response of the local companies, diffusion of technology to local companies and policies to encourage technology absorption from FDI are analyzed and the findings are discussed here.

The researcher presents the data in terms of graphical and statistical way which is developed by using SPSS software.

## 5.3. Content of Data Analysis

The analysis is done in five categories with which the survey has been conducted targeting on the research aims and objectives. Under each category major problems and achievements are discussed based on the findings from the interviews and questionnaires.

***i. Level of local technological capability***

Different writers and researcher argued that shifting of production by multinational companies to a developing country can reduce technology adoption costs for indigenous local firms. The degree to which imitation costs are lowered by FDI might be higher for process than for product technologies. For product technologies, reverse engineering may be the main way that imitation costs are reduced. Since better process technologies tend to be difficult to deduce from inspection of the final good, firsthand experience with the technology may be required.

In this regard, the opinion of industry mangers, senior engineers, technicians, and experts at different local and foreign engineering industries is assessed by using questionnaires. The questionnaire tries to assess the following points:

- The ability of local companies to make effective use of imported technologies by foreign companies.
- The flexibility of local companies to adopt to the changing nature of product and services in the global market.

***ii. Industry-industry relation(engineering industries)***

In this section the collaboration of foreign and local companies is assessed by using the following points:

- The training and consultancy from foreign based companies for technical assistance to local companies.
- The exchanges of staffs from foreign based companies to local companies in the intention of transferring know-how.

***iii. The effect of FDI in local companies in their effort to grow and become globally competitive***

- The effect of foreign investors in the local companies in the overall ability to compete in the market, business opportunities, demand for the product, cost of skilled labor, availability of raw material, access of finance and export market.
- The competition of foreign and local companies.
- The importance of foreign based companies for similar or complementary industries to local companies serving as a source of technological knowhow.

*iv.* ***Diffusion of technology to local firms(Engineering industries)***

- The level of collaboration between foreign and local companies in sharing technological software and hardware for mutual benefit.

*v.* ***Policies to encourage technology absorption from FDI***

- The government effort in assuring the participation of local engineers and technicians during the implementation of technological intensive projects in association with foreign firms.
- The technical and economic incentives available to foreign investors engaged in high tech industries that have a potential to make critical and major contribution to technology transfer to the country.

## 5.4. Findings from Questionnaire Analysis

***Profile of the respondents:*** from the total number of questionnaire distributed 96% of the respondents are high level employees with engineering and technical background, 80% have greater than 4 years of experience in the company and 92% are first level university degree holders.

### 5.4.1. Findings from Local companies

Using the collected information analysis of the responses has been done. This analysis is shown below categorized into 5 main headings mentioned earlier.

**a. Level of Local Technological Capability**

The technological capability of a firm is the capacity to deploy resources, usually in combination, using organizational processes, to achieve a desired end. For most least-developed countries, technological progress is mainly a process of adoption and adaptation of technologies from abroad rather than the creation of new technologies. Therefore, the transfer and diffusion of technology are crucial to build domestic technological capabilities; and the role of Governments in supporting this process, as well as in building on it to develop and enhance national innovations systems, is fundamental. Different researchers argued that even if the number and technological capability of the foreign industries are high; the local company should have technological capability to adopt and diffuse technology from these firms.

In this regard the local company capability is assessed by using different points that can imply the capability of the local technology.

**Table 5.1** Technological capability of local firms

| | Totally unable | Slightly capable | Capable | Highly capable | Extremely capable | Mean | Sta. Deviation |
|---|---|---|---|---|---|---|---|
| Ability of the company to make effective use of imported technology | 5(20)* | 12(48) | 7(28) | 1(4) | 0(0) | 2.16 | 0.8 |
| Flexibility of the company to adopt the changing nature of product and service | 1(4) | 16(64) | 6(24) | 2(8) | 0(0) | 2.36 | 0.7 |
| Local technological capability to absorb, improve and emit the transferred technology | 11(44) | 10(40) | 4(16) | 0(0) | 0(0) | 1.72 | 0.73 |

*Show frequency and percentage

The result show that local companies capability to make effective use of imported technology *(Mean=2.16, St.deviation=0.8)* as measured above is totally unable (20%), slightly capable (48%), capable (28%) and highly capable (4%). The flexibility of the local firms to adoptthe changing nature of product and service (*Mean=2.36, St.deviation=0.7*) is totally unable (4%), slightly capable (64%), capable (24%) and highly capable (8%). The technological capability to absorb, improve and emit the transferred technology (*Mean=1.72, St.deviation=0.73*) is totally unable (44%), slightly capable (40%) and capable (16%).

The result shows that the local companies have slightly capable to make effective use of imported technology with some flexibility. On the other hand, the capability to absorb, improve and emit a given technology is weak. The result indicates that local companies have the capability to use imported technology but the improvement and adoption of the technology is weak and to transfer a given technology local firms must adopt, absorb and improve technologies from abroad which fills the technological gap between foreign and local companies.

**Industry-industry relation**

Foreign firms can diffuse technology and skills to domestic firms, suppliers, customers and entities with which they have direct and indirect relation. In particular, backward linkages between foreign firms and domestic firms are important for enhancing technology dissemination. To ensure that local inputs meet their stringent technical requirements, foreign firms often provide the local suppliers not just with specifications but sometimes also with assistance in raising their technological capabilities. Such assistance tends to be more

prominent in developing countries, and knowledge transfer has a positive impact on the suppliers' competitiveness.

Industry-industry relation was assessed by considering the following indicator factors:

***i. The collaboration of foreign firms with local companies in sharing technological software and hardware for mutual benefit***

The result shows that 48, 32, and 16% of respondents responded saying limited, extremely poor and fair collaboration respectively and the remaining 4% respond the collaboration is very good. In general, the level of collaboration between foreign and local firms in sharing technological software and hardware is limited (*Mean=1.92, St.deviation=0.812*) and from the respondent most of the reasons for these are:

- Lack of trust between companies
- Cultural difference between foreign and local investors

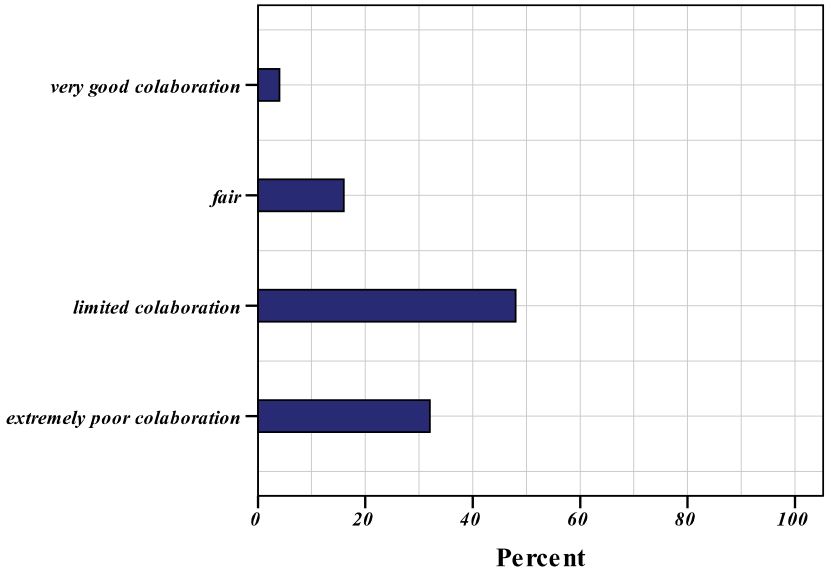


**Figure 5.1** collaboration of foreign firm with local companies

***ii. Training or consultancy from foreign based companies to local companies***

FDI enhances internal human capital through training and on-the-job learning. There is evidence that foreign companies tend to provide more of this training and learning than domestic enterprises, OECD (2002). From the experience of developed countries training and consultancy is the easy way of acquiring knowledge and new technologies from other high-tech foreign firms to local companies.

In this regard the training and/or consultancy from foreign based companies to the local firms has been assessed and 40% confirmed that they had training from foreign companies and while the rest 60% did not. This is illustrated in the pie-chart below.

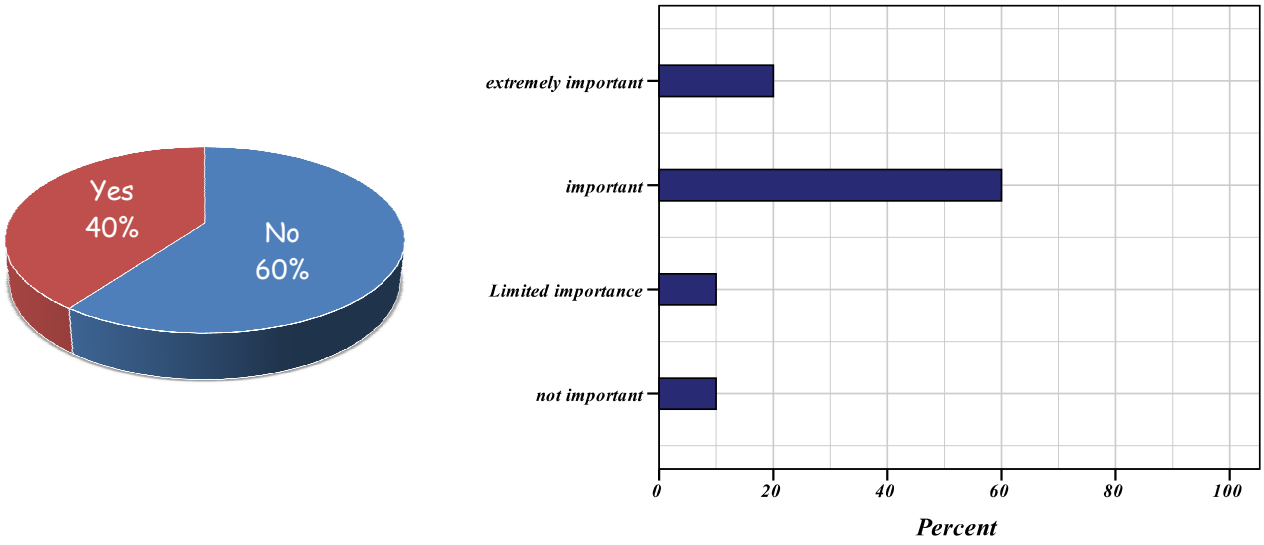


**Figure 5.2** (a) Training and consultancy (b) The importance of foreign firms as a source of technology

The respondents argue that the training and consultancy is important for exercising new production system and managerial skill from foreign to local companies. However, the result shows that the training and consultancy is limited because of the interaction between the firms.

Out of the 40% who took training and consultancy from foreign companies, 80 %( *Mean=3, St.deviation=0.876*) argue that foreign firms are important as a means to transfer foreign technology and know-how to Ethiopia.

### *iii. Transfer of staffs from foreign to local companies*

Knowledge and technology spillovers can take place through mobility of labor in which local researchers and engineers leave foreign-invested firms and switch to local firms or established their own companies.

The survey indicated that around 76% of respondents replied that transfer of staffs from foreign to local companies is very low. Most of the respondents argue that the reason for limited transfer of staff is due to difference in wages between foreign and local firms.

### *iv. The role of government in assuring the participation of local engineers/technicians during implementation of technology intensive projects in association with foreign firms*

The government is an important actor in transfer of technology to local companies. In this regard the government's effort in assuring participation of local engineers and technicians during implementation of technology intensive projects and industries in association with

foreign firms has been assessed. Respondent respond the participation of the government is low (44%), somewhat participant (32%) and participant (24%). This shows that participation level of the government in inclusion of local engineers and technicians in technicians in technology intensive projects is low (*Mean=1.8, St.deviation=0.816*).The respondent also argue that the government does not provide information about the implemented projects to local companies, universities and other institutions and also after awarding an investment the government does not follow the implementation process.

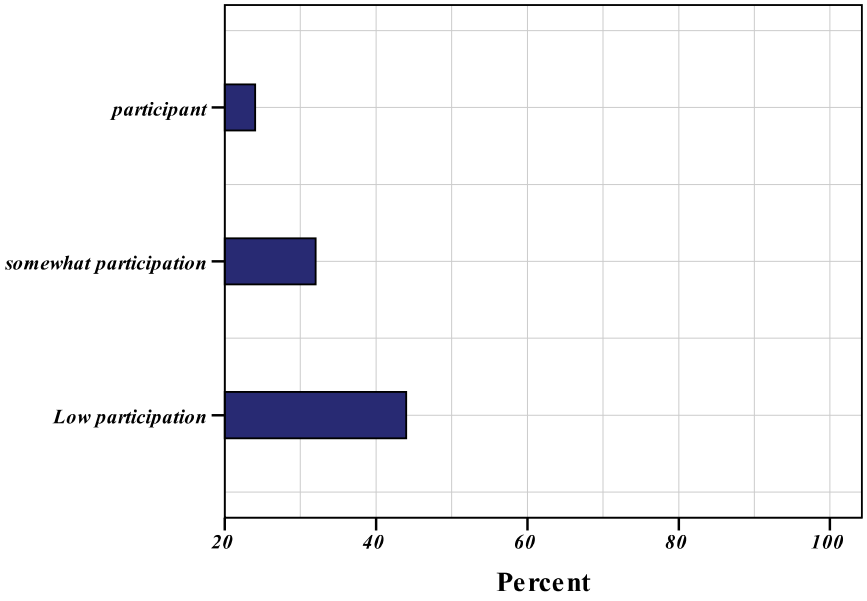


**Figure 5.3** Government participation

To boast the level of participation, most respondents suggested:

- Relevant government office should plan and act on such activities
- Government should follow every stages of the investment of foreign investors
- Policy must be formulated if there already exists one, it should be effectively implemented
- Different associations should be formed in a way they can participate and add values

***v. The effect of foreign investors in local companies***

Foreign investors have a positive and negative effect on the economy of a given country. The respondent argued that foreign investors have positive impact on access to export market and availability of raw materials or inputs; and a negative impact on cost of skilled manpower, demand for company's product and ability to compete in the local/domestic market; and the foreign firms are no effect in access to finance and business opportunity.

**Table 5.2** Statistics for the effect of foreign investors in local companies

| | strongly negative | slightly negative | No effect | Slightly positive | Strongly positive | Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|
| Overall ability to compete in the market | 3(12)* | 9(36) | 9(36) | 2(8) | 2(8) | 2.64 | 1.075 |
| Business opportunity | 2(8) | 5(20) | 14(56) | 3(12) | 1(4) | 2.84 | 0.898 |
| Demand for companies product | 5(20) | 9(36) | 7(28) | 3(12) | 1(4) | 2.44 | 1.083 |
| Cost of skilled labor | 4(16) | 11(44) | 8(32) | 2(8) | 2(8) | 2.32 | 0.852 |
| Availability of raw material and inputs | 0(0) | 3(12) | 9(36) | 11(44) | 2(8) | 3.48 | 0.823 |
| Access to finance | 0(0) | 2(8) | 19(76) | 4(16) | 0(0) | 3.08 | 0.493 |
| Access to export market | 2(8) | 5(20) | 5(20) | 9(36) | 4(16) | 3.32 | 1.215 |

*Show frequency and percentage

From the result foreign firms can open the way for local companies to enter into the global market this is because foreign investors have access to enter into the global market. However, due to the capability, product quality and differentiation foreign firms have an opportunity to dominate in the domestic market and cost of skilled manpower is increased due to the existence of foreign firms this is because of the difference in salary in foreign and local firms.

### *vi. The response of local company to the presence of foreign investors*

Presence of foreign firms has some negative effect in the local firms and local firms should make every effort to maintain their market share. In this regard from the survey identified that most local companies try to maintain their market by adopting similar market strategy *(52%)* and adopting similar production technology *(56%)* to that of foreign investors. 80% of the local firms work in the way they do previously without considering the market competition coming from foreign investors.

The competitive environment is important for local companies; the tension in the environment could affect positive linkages between foreign and local companies, cutting off technology transfer and other benefits. The technological capability of local firms can be improved by adopting similar production technology, recruiting technical employees from foreign firms and producing similar product which help local firms to improve their production process.

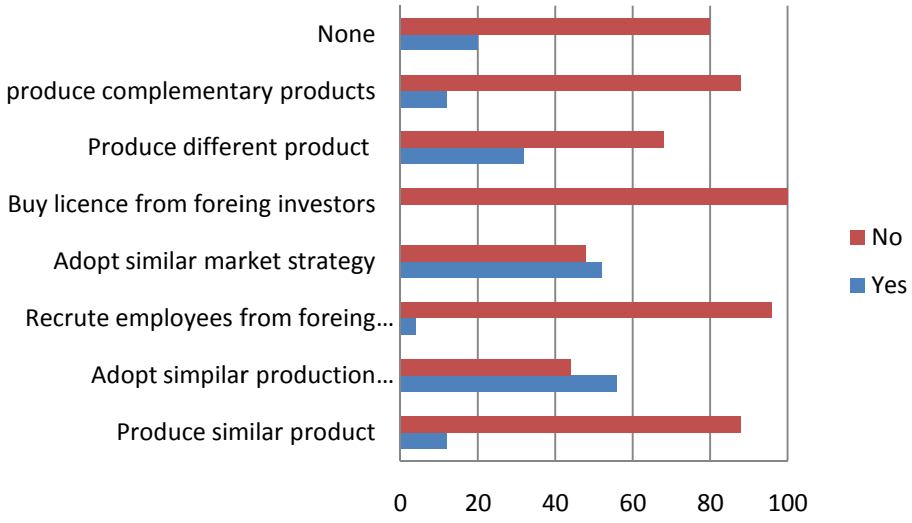


**Figure 5.4** The response of local companies

**b. The effect of FDI in local companies in their effort to grow and become globally competitive**

***i. Main competitors for product sold in the domestic market***

32% of local firms respond that their main competitors comes from only foreign based companies that are found in the country, 20% respond their competitors are local while and 48% comes from both foreign and local companies.

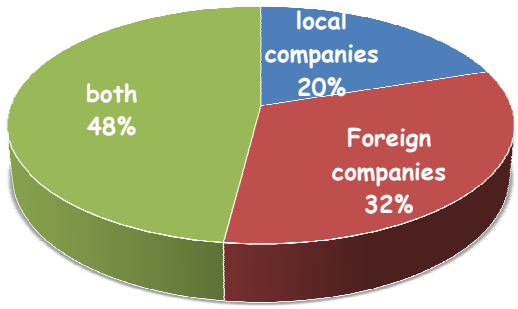


**Figure 5.5** The main competitors for the surveyed firms

Reason for local companies' inability to compete locally consists:

- Unable to access latest technology and capability to produce competitive products
- Lack of skilled manpower
- High cost of production to produce competitive product
- Frequency of being out of stock
- Financial constraint to bring latest production technology
- Absent of incentives by the government for internal capacity building

### ii. *The importance of foreign based companies presence*

The importance of foreign based companies for similar or complementary industries serving as a hub or as a source of technological knows how far from the direct contribution of their product and services has been assessed. Almost 95% of the respondent argued that the presence of foreign firms is valuable (*Mean=3.24, St.deviation=1.05*) as a source of technology and knowhow.

Foreign firms can bring modern machinery and equipment's this would definitely drive the local firms to obtain the same machinery and equipment's in order to perform competitively. These help local companies to build their technological capability to produce a competitive product.

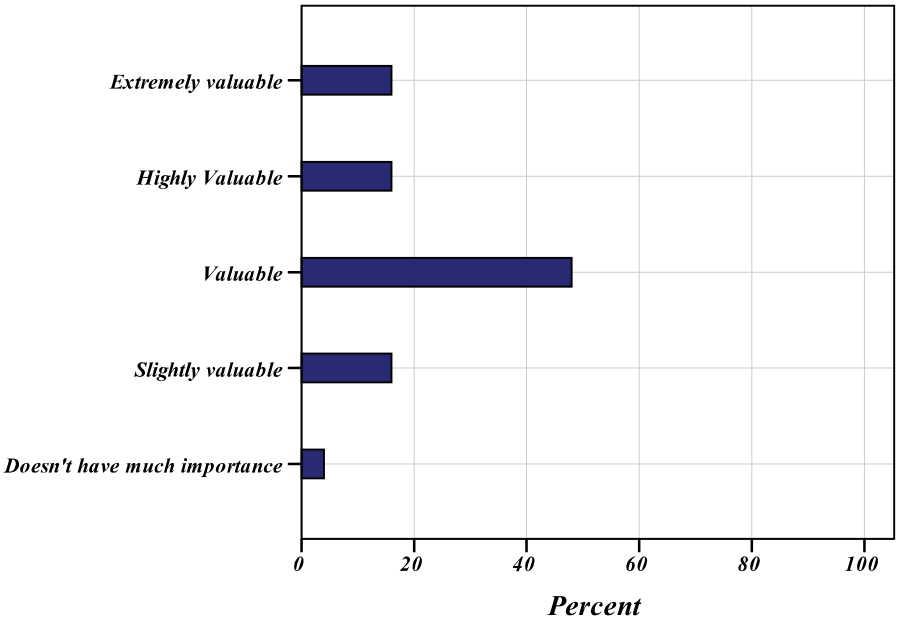


**Figure 5.6** the importance of foreign companies

### iii. *The technological contribution to local companies*

From the experience of the developing countries as discussed in the previous chapter foreign investors have a great contribution to the growth and transformation of a given country.

From the survey the local companies respond some of the contributions done by foreign investors as:

- Import new technology and know how
- Adopting new management and production system
- Increase competitive advantage
- Improving the working culture
- Import of different software's and hardware's used for resource management

**c. Policies to encourage technology absorption from FDI**

The technical and economic incentives available in particular to industries that have the potential to make critical and major contributions to technology transfer to the country has been assessed. 44% of the respondent argued that the technical and economic incentives are not encouraging; 40% respond the incentive is slightly encouraging; 12 and 4% respond that the incentives are encouraging and highly encouraging, respectively.

The result shows that the incentives are not that much encouraging for local as well as foreign firms to make critical and major contributions to transfer technology to the country. Most of the respondents argue that the government should focus and give incentives for engineering industries and high technology investments rather than less technological intensive sectors like agriculture and food processing industries.

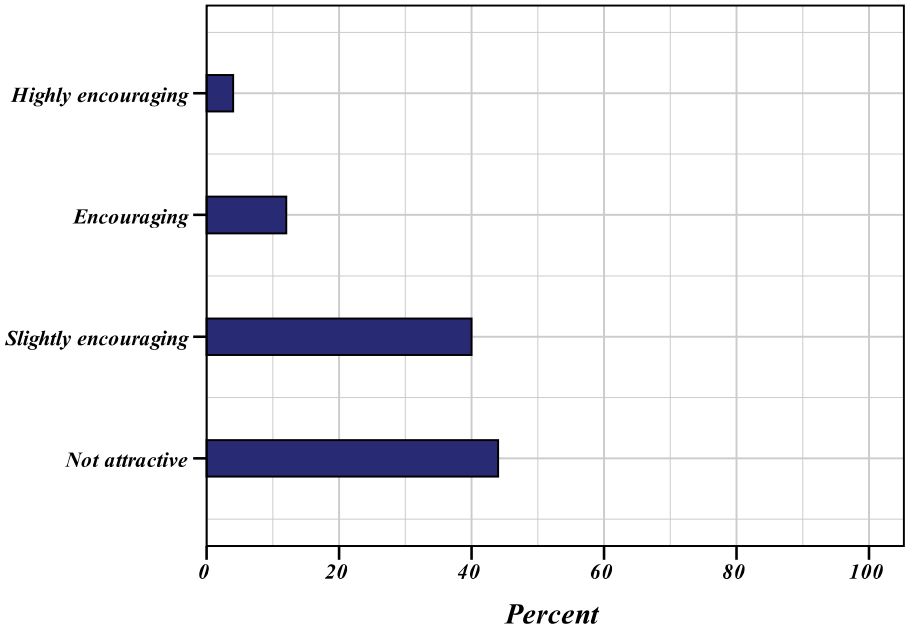


**Figure 5.7** Technical and economic incentives

### 5.4.2. Findings from Foreign based companies

**a. Motives for investment**

Theoretically, FDI can benefit both the home country and host country in many ways. But, FDI decision to go into invest in a country will be determined by a number of factors. They will be motivated when the business environment in the host country is conducive and their investment is secured. The main objective of the foreign investors is to go abroad and gain profit. Although, countries do offer financial incentives and various concessions to attract such investment, they are thought to be relevant to foreign investor's decision making only if

the general business environment is conducive for making profit. So, the decision of foreign investors to invest in a host country depends on these motives as well as their firm-level advantages and country-level advantages as well.

From the survey on foreign firms the determinants for investment (70-80%) are access natural resources (*Mean=3.8, St.deviation=0.834*), lower production cost (*Mean=3.2, St.deviation=0.696*), access new market (*Mean=3.55, St.deviation=0.759*) and diversify the product portfolio (*Mean=3.05, St.deviation=0.605*).

To join specific partner (*Mean=1.8, St.deviation=0.834*), Export back to home country (*Mean=1.95, St.deviation=0.875*), to benefit from trade agreement (*Mean=2.15, St.deviation=0.875*) and to build a base in Eastern Africa (*Mean=1.65, St.deviation=0.87*) are not such important to motivate the foreign firms.

**Table 5.3** Motives for investment

| | **Not important** | **slightly important** | **important** | **Very important** | **Crucial** | **Mean** | **Std. Deviation** |
|---|---|---|---|---|---|---|---|
| To access new market | 0(0)* | 0(0) | 12(60) | 5(25) | 3(15) | 3.55 | 0.759 |
| To lower the production cost | 0(0) | 2(10) | 13(65) | 4(20) | 1(5) | 3.2 | 0.696 |
| Access natural resource | 0(0) | 2(10) | 3(15) | 12(60) | 3(15) | 3.8 | 0.834 |
| To join a specific partner | 9(45) | 6(30) | 5(25) | 0(0) | 0(0) | 1.8 | 0.834 |
| Export back to home country | 5(25) | 12(60) | 2(10) | 1(5) | 0(0) | 1.95 | 0.875 |
| To benefit from trade agreement | 4(20) | 11(55) | 3(15) | 2(10) | 0(0) | 2.15 | 0.875 |
| To build a base in Eastern Africa | 11(55) | 6(30) | 2(10) | 1(5) | 0(0) | 1.65 | 0.875 |
| Diversify the existing product portfolio | 0(0) | 3(15) | 13(65) | 4(20) | 0(0) | 3.05 | 0.605 |

*Show frequency and percentage

### b. Investment incentives

Incentives can be described as policies used to attract internationally mobile investors. Most countries offer incentives to attract foreign investment in the form of tax holidays, exemptions on export and import duties, subsidized infrastructures, and limits on workers' rights. According to different literatures and opinions about importance of incentives vary significantly. Governments consider them as means to obtain FDI whereas transnational corporations perceive them as providers of favorable investment sites.

As per the survey tax exemption (*Mean=4.3, St.deviation=0.571*), infrastructure (*Mean=4.6, St.deviation=0.598*), and availability of investment guarantees (*Mean=4.25, St.deviation=0.639*), are the important incentives for the investors.

**Table 5.4** Investment incentives

| | Not important | Slightly important | Important | Very important | Crucial | Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|
| Availability of investment guaranty | 0(0) | 0(0) | 2(10) | 11(55) | 7(35) | 4.25 | 0.639 |
| Capital grant | 0(0) | 3(15) | 10(50) | 0(0) | 7(35) | 3.2 | 0.696 |
| Infrastructure | 0(0) | 0(0) | 1(5) | 6(30) | 13(65) | 4.6 | 0.598 |
| Tax exemption | 0(0) | 0(0) | 1(5) | 12(60) | 7(35) | 4.3 | 0.571 |
| Existence of double taxation treaty | 0(0) | 8(40) | 9(45) | 3(15) | 0(0) | 2.75 | 0.716 |
| Training | 10(50) | 4(20) | 4(20) | 2(10) | 0(0) | 1.9 | 1.07 |

**c. FDI policy**

FDI policies play a major role in the economic growth of developing countries around the world. Attracting FDI inflows with conductive policies has therefore become a key battleground in the emerging markets. Developed countries also seek to bring in more FDI and use various policies and incentives to attract overseas investors, particularly for capital-intensive industries and advanced technology.

The primary aim of these policies is to create a friendly business environment where foreign investors feel comfortable with the legal and financial framework of the country, and have the potential to reap profits from economically viable businesses. The prospect of new growth opportunities and outsized profits encourages large capital inflows across a range of industry and opportunity types.

Policies which are effective in attracting FDI are assessed in terms of entry policies, promotion and facilitation, and policies to enhance the investment environment. In entry phase; restriction on sectors is somewhat important policy, compulsory joint venture, export requirement, import restriction and local content requirement is an important policies in the entry phase. In promotion and facilitation; promotion (*Mean=4.35, Std.Deviation=0.671*) and investment incentives (*Mean=4.3, Std. Deviation=0.657)* are very important policies and in the third phase political stability (*Mean=4.8, Std.Deviation=0.41*) is a crucial thing in the investment environment, property right (*Mean=4.3, Std.Deviation=0.47*) and macroeconomic stability (*Mean=4.25, Std.Deviation=0.786*) are very important policies.

Most of the respondents argue that it's good to open sectors in which FDI can be made to increase the flow of FDI to the country. Compulsory joint venture, export requirement and

local content requirement are important for local industries in improving the technological and know-how capability. The second and third phases of the investment policies are important in which foreign investors can invest in the country; because all the policies are crucial in the existence of a given investment process.

**Table 5.5** FDI policy

| | | Not important | Slightly important | important | Very important | Crucial | Mean | Std. deviation |
|---|---|---|---|---|---|---|---|---|
| ***I*** | Restrictions on sectors FDI can be made | 5(25) | 8(40) | 6(30) | 1(5) | 0(0) | 2.2 | 0.801 |
| | Compulsory joint ventures with local firms | 3(15) | 6(30) | 11(55) | 0(0) | 0(0) | 2.4 | 0.754 |
| | Export requirement | 0(0) | 3(15) | 15(75) | 2(10) | 0(0) | 2.95 | 0.51 |
| | Import restriction | 3(15) | 1(5) | 13(65) | 3(15) | 0(0) | 2.8 | 0.894 |
| | Local content requirement | 0(0) | 1(5) | 16(80) | 3(15) | 0(0) | 3.1 | 0.447 |
| ***II*** | Promotion | 0(0) | 0(0) | 2(10) | 9(45) | 9(45) | 4.35 | 0.671 |
| | Investment incentives | 0(0) | 0(0) | 2(10) | 10(50) | 8(40) | 4.3 | 0.657 |
| ***III*** | Political stability | 0(0) | 0(0) | 0(0) | 4(20) | 16(80) | 4.8 | 0.41 |
| | Property right | 0(0) | 0(0) | 0(0) | 14(70) | 6(30) | 4.3 | 0.47 |
| | Macroeconomic stability | 0(0) | 0(0) | 4(20) | 7(35) | 9(45) | 4.25 | 0.786 |

**d. Role of FDI in the transfer of technology**

To assess the role of FDI in the transfer of technology, respondents are asked to answer different indicating questions.

- 60% of respondent from the foreign based firms confirmed that the foreign firms spend lots of capital on technology upgrading by importing new technologies,
- 65% of the respondent do not arrange training program to local companies in the intention of upgrading the technological capability.
- 55% of the respondents respond that employees left their companies and joined another rival firm and they consider it as a major flow of technological knowhow.

**e. Diffusion of technology to local firms**

- 45% of respondents replied their company procure some of the production input from local suppliers, out of these 55% of the firms interact with local producers with the intention of helping them to improve their operation by transferring of technology and knowhow through design and process know how. 70% of the respondents argue that the most important factor to procure inputs from local suppliers is for tax efficient supply chain reasons.

- 85% of the respondents verified that they don't have a department for local sourcing and local supplier development this is because most of the inputs to the firms are directly imported from the foreign market.

## 5.5. Summary of Results

A detailed analysis has been presented in the previous sections that comprise different domestic and foreign organizations participation. In general, the following points can be considered as the major findings from the interview and questionnaires.

- Weak technological capability of local companies to absorb, improve or modify a given technology.
- The collaboration between foreign and local companies in sharing technological software and hardware as well the training and consultancy is limited.
- There is a low mobility/transfer of staffs from foreign to local companies.
- The government role in assuring the participation of local technicians during the implementation of technology intensive projects in association with foreign firms is weak.
- Foreign investors have a negative impact on the cost of skilled manpower, demand for local company's product and ability to compete in the market and a positive impact on access to the export market and availability of raw materials or inputs.
- Most local companies are not reacting for the presence of foreign firms so as to maintain their market share.
- The presence of foreign firms as a source of technological know-how is important.
- Foreign based companies are importance for similar or complementary industries serving as a hub or as a source of technological know how far from the direct contribution of their product and services.
- The technical and economic incentives available in particular to industries that have the potential to make critical and major contributions to technology transfer to the country are not encouraging.
- The main determinants for foreign investors to invest in the country are access to natural resource, lower production cost and access new market.
- Availability of investment guaranty, capital grant, infrastructure and tax exemptions are the important investment incentives to invest in the country.

## 5.6. Proposed solution and policy implication

Without a doubt, FDI has proved to be the driving force for economic growth for many countries like China, Singapore and others. Foreign capital has had two positive effects; it has improved the liquidity of the economy, and thus facilitated other investments (e.g. more business opportunities for local entrepreneurs as well as support businesses such as legal

work, construction, transportation, hospitality etc). Secondly, it has created employment, earnings and thus taxation revenue for the central and regional governments.

The main sustainable benefit of FDI lies in its ability to bring in technical know-how for a developing country. In the absence of this, FDI may serve only to exploit the cheap labor or natural resources of another country. From the experiences of the benchmarked countries the Chinese government has played a nimble game to attract FDI into China, and the country being the largest host country for FDI among the developing countries supports success of its policies.

### 5.6.1. Proposed solutions

The basic building blocks for the establishment of a conducive framework for technology transfer and dissemination in Ethiopia include the following:

***Boosting absorptive capacities of domestic enterprises***

In order to maximize technology dissemination in Ethiopia specifically to basic metal and engineering industries, it is imperative for governments to establish and implement policies that help enhance the absorptive and adaptive capacities of the firms. This involves creation of skilled workforce through the interaction of the industry (BMEI's) and institutions to promote high quality, competitive domestic industries.

Skilled labors can quickly absorb the new knowledge and modern techniques. Labor does not mean only the number of workers, but also the quality of human capital, which necessitates adequately of education and skills. Better human capital can assimilate technology better, and give more productivity. With equivalent in educated and skilled labor and technology level, local firms might easily assimilate the advanced technology of FDI. At the same time, domestic firm's could rapidly catch up the know-how and managerial skills transferred from FDI.

***Joint venture and equity ownership requirements***

Joint venture ownership requirements have been used for a number of reasons. In natural-resource-rich countries, for example, restrictions on foreign ownership have been applied to secure economic rents from exploitation of various resources. In other cases, equity requirements have been employed by host governments to enhance the chances of technology and knowledge controlled by foreign affiliates being diffused to the domestic enterprise sector in the host country.

The government must identify and give priority or incentives for joint venture and high technology investments to strengthening the BMEI's. In joint ventures, there is a commitment

of resources by both partners to achieve pre-set goals. A major contribution of local partners to the venture is usually knowledge of local market conditions and the workings of bureaucracy and foreign partner contribute latest production technology, managerial skill and know-how.

***Attracting foreign investors in specific sectors***

Governments need to target the promotion of specific technologies relevant to basic metals and engineering industries in their development strategies. Governments can seek to attract foreign investors into these industries, by using fiscal or financial incentives. Targeting foreign companies that are already present in country can also be part of this strategy, for instance by offering incentives to move into more complex technologies and to increase or upgrade the technological R&D undertaken locally.

This may involve both improving all factor inputs that foreign investors need (infrastructure, skills, information and so on) and giving targeted incentives to launch new functions by existing affiliates or to attract technology intensive sequential investment. Finally, governments can collect, organize and disseminate information to foreign investors about the technical, research and training facilities in the host country and improve technology access for local enterprises, by providing information on foreign and local sources of technology. The Ethiopian Investment agency can play a central role in targeting foreign investors that are technology leaders in the area of metals and engineering industries and in providing after-care.

***Promoting technology dissemination through linkages***

Technology alliances and linkages between foreign and domestic metal and engineering firms are among the key modes of transmission of know-how and technology. Whether domestic companies acquire technology from foreign companies, to what degree and at what speed, depends on the type, scale and quality of the interface that exists between them. The type of interface may involve joint venture partners, competitors, suppliers or public-private partnerships.

Backward linkage programs between foreign firms and domestic suppliers could involve intensive consultation, training and technology transfer between foreign firms and potential domestic suppliers through design specifications and process improvement. Linkages could be promoted by offering fiscal benefits for R&D or the exploitation of its results, or by offering other incentives, such as inexpensive infrastructure.

***Local Supplier Upgrading***

Efforts to link locally owned supplier firms with foreign "mentor" multinational corporations can be an effective way of improving levels of technology, particularly in local firms. The Ethiopian government should facilitate to implement the *Local Industry Upgrading Program* and enter into contractual relationships with foreign metal and engineering firms to transfer experienced technical and managerial employees to local firms. As a result of this initiative, local suppliers can able to transition out of low-wage, labour-intensive industry into more capital- and knowledge-intensive industries.

***Provide technical and economic incentives***

The government should provide technical and economic incentives, in particular to metal and engineering industries that have the potential to make critical and major contributions to technology transfer to the country. Some local engineering companies try to make improvement in the production process by improving the production equipment and machinery so the government must give incentives for this kind of firms.

***Engage domestic Engineers in technology intensive projects***

Participating domestic engineers and technicians in high technology intensive projects is important to adopting new technologies and know-how in the sector.

***Conduct investment promotion activities***

Investment promotion must be done by the government at national level that can show the market potential, location, and other favorable conditions. Moreover, the promotion must target a specific sector and technology that can enable the technological level of the country. Investment promotion covers a range of activities, including investment generation (e.g. image-building, general marketing, investor targeting), investment facilitation, aftercare services and policy advocacy to enhance the competitiveness of a location.

### 5.6.2. Policy implication

As it is known, Ethiopia lacks the needed financial and technological capability to undertake major industrialization activities by domestic investors. As a result, the participation of foreign firms on technology and capital intensive activities becomes undisputable means of industrialization. The effect of FDI could be primarily viewed in expanding domestic output, capital accumulation, creating job opportunities, expanding export activities, etc. However, the most appreciative importance of FDI is its indirect benefits through technology transfer and diffusion, skill upgrading and the development of local auxiliary industries through the creation of backward linkages.

Ethiopia has opened its doors to foreign direct investment to improve the livelihood of the nationals in the short term and to benefit from technology spill over as a long term goal. However, foreign investors are highly interested on the utilization of cheap manpower and natural resources of the country as found from the survey. To be specific, the leather, textile, and the agricultural sectors are the main ones partly because of the country's policy interest towards these sectors. As a result, the number of investments conducted on high tech industries is so limited and our ambition to benefit from the technology spill over via these carriers is still blurred. In this regard, how to attract more high-tech FDI investments and how to exploit their potential to the domestic companies is by far challenging and needs a thorough analysis as the primary intention of foreign companies is all about making money and it should be the government hidden objective to unlock the knowledge they carry.

To change the situation in to a win –win situation, the government are supposed to focus on the following policies:

- **Priority for Technology Intensive FD Investments**: FDI could serve as a technology transfer channel on condition that, the type of investments are technology intensive in comparison with those found in the local market. In this account, the government should focus on basic metal and engineering industries from the less technological intensive sectors e.g. agriculture, textile, and the food processing industry. In doing so, the government could place great incentives to attract foreign investors as the spillover is usually much higher in comparison with the direct benefits which this industry could bring in.
- **The Placement of Local Content Requirement:** In this case, the government should place a time frame for foreign firms to go to subcontracting arrangement or local supplier development activity with the objective to diffuse their technological knowhow to the locals. From the experience of the Chinese auto industry, the placement of such agreements will enable FDI's to manufacture some components within the locals otherwise to get heavy taxes and even a fine for that. For example, it is common to see auto assemblers in Ethiopia which are making profit only from cheap labor available while the technology spill over they contributed is insignificant.
- **Participation of local personnel's**: Besides the presence of local content requirement for foreign firms, there should also be an agreements placed in order to assure the presence and the participation of the local employees at key position of the foreign firm. In doing that, it will be possible to speed up the spillover of technical knowledge from the foreign firm to the local industries. The assurance of local participation must not be limited to FDI only; the government should assure the local participation during the implementation of large scale project by foreign contractors.

## 5.7. The Proposed Framework of Technology Transfer in Ethiopia

In order to make effective flow of technology from FDI there must be a clear framework that shows the interaction between different actors in the process. From the experience of the newly industrialized countries which is discussed above the government is an important actor to lead the country to current better economic and technological development; local and foreign firms as well.

The conceptual framework for technology transfer is developed by combining the experience of benchmarked countries so that the Ethiopia metal and engineering industries would benefit to the maximum possible extent. The implementation of the framework will enhance the technology transfer nationwide by facilitating the interaction between the government, foreign investors and local industries which are the most important parts in the process of technology transfer through FDI.

The following figure shows the conceptual framework to make an effective transfer of technology through FDI.

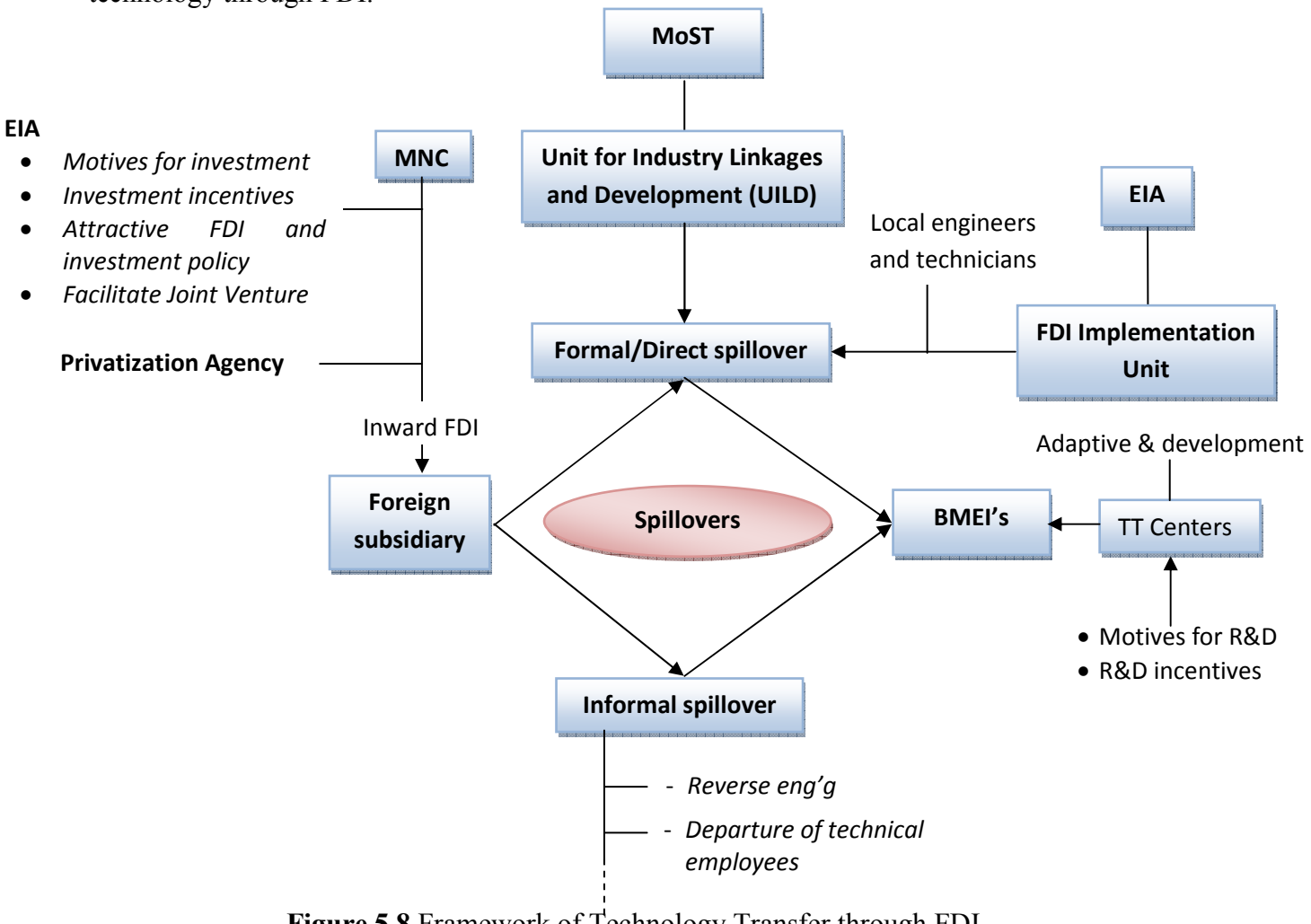


**Figure 5.8** Framework of Technology Transfer through FDI

**Ethiopian Investment Agency**

The Ethiopian Investment Agency (EIA) is the government organ responsible for promoting, coordinating and facilitating foreign investment in the country. It is a one stop-shop for all investors in Ethiopia, and has already established itself as the focus for national FDI initiatives. The EIA will facilitate quick translation of FDI approvals into implementations, provide a pro-active one stop after care service to foreign investors by helping them and meet with various government agencies to find solutions to problems and maximizing opportunities through a partnership.

The EIA shall take steps to:

- Promoting the country's investment opportunities and conditions in metal and engineering sector to foreign investors;
- Issuing investment permits and work permits for;
- Negotiating and, upon government approval, signing bilateral investment promotion and protection treaties with other countries;
- Advising the government on policy measures needed to create an attractive investment climate for investors;
- Assisting investors in the acquisition of land, utilities, etc., and providing pre- and post-approval services to investors; and
- Fostering partnership between investors and government agencies concerned.

**Foreign metal and engineering industries**

FDI has played an important role in overall development process in several countries. Impacts of FDI have been different, especially when it comes to capability-building at the national level. It is also obvious that levels of technology and quality of human resources of the country are the important factors in attracting FDI and thereby in development in general and in industrial and technological changes in particular.

Foreign metal and engineering industries are pivotal in introducing new technologies for local industries in the countries. These technologies can be transferred in the form of product and/or process technology (either embedded in products or machinery, or in the form of blue-prints), in the form of management practices and expertise, in the form of intensified competition, and finally as information about and access to foreign markets provided by the foreign parent company.

Foreign metal and engineering industries should upgrade the technology by importing new technologies and also through R&D activity to transfer new technology to local industries by working together with the government and local industries. With this linkage the foreign firms

can provide technical assistance to their local firms and customers, and train workers and managers who are later employed by local firms.

**Ministry of Science and Technology (MoST)**

Ministry of Science and Technology is a governmental institution that established for the first time in December 1975 by proclamation No. 62/1975 as a commission. Following the Commission was re-established in 1994 by Proclamation No. 91/94. The commission went into its 3rd phase of re-institution on the 24th of 1995 by Proclamation No.7/1995, following the commission established as an Agency. Later on, in 2008 the government upgraded the Agency as one of the Cabinet ministries accountable to the prime minister and the council of ministers by the proclamation No. 604/2008 and re-established recently too in October 2010.

The MoST shall take steps to:

- Coordinate science and technology development activities and prioritize sectors that are effective in the development of the country.
- Motivate R&D activities in local industries this activity can be done by unite for industry linkage and development.
- In cooperation with the local and foreign industries it should establish a system for technology need assessment, identification, acquisition, packaging utilization and disposal, and follow up the implementation.
- Establish, coordinate and support councils that facilitate the coordination of research activities.

**Unit for Industry Linkages and Development (UILD)**

The UILD is the main actor in the transfer of technology through direct integration of industries; it facilitates linkages between foreign and local industries. This unit can be under the ministry of science and technology. The role and function of the unit is:

- To establish partnership with foreign investors and to collaborate them to local industries.
- To assist local industries to build the technological capability.
- Identify and attract R&D-related FDI and arrange a means for local companies to become part of the knowledge networks.
- To establish, coordination and support councils that facilitate the coordination of research activities.

**Privatization Agency**

The privatization agency should transfer state owned enterprises to investors and it must give priority for foreign investors if the sectors require latest technology and know-how.

**FDI Implementation Unit**

FDI Implementation Unit is under the EIA and will facilitate quick translation of FDI approvals into implementations, provide a pro-active one stop after care service to foreign investors by helping them obtain necessary approvals, sort out operational problems and meet with various Government Agencies and institutions and local industries to find solutions to problems and maximizing opportunities through a partnership approach.

The role and functions of the FDI implementation authority is to:

- Understand and address concerns of investors;
- Understand and address concerns of approving authorities;
- Facilitate the participation of local industries and institutions;
- Initiate multi agency consultations; and
- Refer matters not resolved at the FIIA level to high levels on a quarterly basis, including cases of projects slippage on account of implementation bottlenecks.

**Local Metal and Engineering Industries**

To transfer a given technology to the host country the local companies should have the technological capability to adopt the given technology. In the survey most of Ethiopian engineering industries are low in technological capability as measured in terms of R&D activity, flexibility, upgrading of their equipment's and machineries and competition in the market place. This means the local firms have nothing to learn from foreign firms, or that local technological capability is so weak that the foreign technologies cannot be used in local firms.

The main weakness of local industry is they are tied up with profit maximization not technological or knowledge upgrading in the industry. As a result the research and development activities in the industry are far from reality. Industries with R&D activities are untraceable. For example, a metal industry engaged on sheet metal fabrication will fabricate these sheet metals for the past 20 yrs and will continue the same business probably in the future as well. In this regard, they don't seem bothered how to change their business trend into more technological way.

Local industries should improve the technological capability giving focus to R&D activities in the industries. Foreign metal and engineering industries in the country can be the main source of new and improved technology and through R&D local companies can adopt this technology. Besides the R&D activities which the industry should carry out, the industry should have to understood their moral and national obligation to assist the research and development activities all over the country. In order to improve the capability of local industries and to make effective, the local industries and universities should negotiate, and the same time, the government should intervene so as to improve the technological capability of the sector this can be done by establishing technology transfer centers in the industry, both in foreign and local industries. The government should give incentives for local industries engaged in R&D activities this help other industries to focus on their R&D activities.

# Chapter Six

# Conclusion and Recommendation

## 6.1. Conclusion

FDI can generate spillover effects and it can take the form of horizontal and vertical linkages. Some scholars argue that FDI can also facilitate technology transfer to host countries through upstream and downstream industries (i.e., through vertical linkages). In other words, vertical linkages are also important mechanizes of FDI spillovers. It is well known that the magnitude of spillover effects depends on absorptive capacity of the host industries. In other words, the size of effective spillovers depends on the extent to which domestic firms respond positively to factors such as technology gap and human capital.

In this thesis an attempt has been made to obtain information from government agencies and industries via direct contact and distributing questionnaires. The findings are have been discussed and analyzed in the previous chapters.

This paper considered the impact of FDI generated technology transfers on local metals and engineering industries. From the experience of the leading developing countries, their current development comes from applying different FDI strategies and policies in selected sectors. In effect it develops the local technological capability. From the survey the technological capabilities of local metal and engineering industries is weak to transfer technology horizontally or vertically from foreign firms. This is because most of the foreign companies are engaged in labor intensive low technology production system and also the collaboration of foreign and local companies are weak in the intention to transfer technological knowhow.

The result also supports that technology transfer and spillover is dependent on the absorptive capacity of the firms. This absorptive capacity mainly depends on the R&D activity and expenditure in local firms and the result shows the spending on R&D by Ethiopian firms is very low. Although, it is seen that the more competitive the industry, the greater extent of technology spillover. It's also observed in this study that local industries failed to compete with foreign firms. In addition, the government has an important enabling role in determining technology transfer to local firms. The present policies encourage enterprises to introduce more foreign capital, products and brands, but few advanced technologies are introduced till now and not much attention is paid to digest and absorb the introduced technology for the domestic industries.

From the analysis the researcher propose a solutions and policy options and develop a frame-work for effective transfer of technology through FDI.

## 6.2. Recommendation

Based on the overall analysis, the following recommendation has been made for the improvement technology transfer form foreign direct investment:-

- Adjust the policies for FDI, to optimize the structure of foreign capital.

  Foreign investors who bring higher content technology or are willing to make cooperative R&D with domestic enterprises, the government should give them some preferential treatment. The government should encourage the domestic enterprises; especially the state-owned enterprises add collaborative R&D provision when they sign joint venture agreement with foreign enterprises.

- Provide good environment to attract R&D institutions of multinational companies to inhabit down in Ethiopia.

  Innovation does not mean "innovation by ourselves." Technology innovation is in an environment open to the world, so Ethiopian firms should integrate with global technology resources for innovation. The domestic enterprise should use this opportunity to share their innovation and technology resources in order to enhance its own innovation capability.

  Currently, internationalization of foreign multinational R&D is a new trend, many multinational enterprises set up R&D institutions abroad in order to encourage the localization. Through the introduction of multinational R&D institutions, the host country should incorporate multinational R&D resources effectively into national innovation system, make full use of their superior technology resources and spillover effect, and encourage cooperation in R&D. This would effectively help the domestic enterprises to enhance indigenous technology innovation capability. But this needs the government to create a fair competition environment for the three types of enterprises: foreign multinationals, state-owned enterprises and domestic private enterprises.

- The government should make effective negotiations with foreign investors to bring latest technologies and to collaborate with local industries engaged in the same sector.

- The government should provide more support for domestic enterprise's technology innovation.

  In many western developed countries, more than 50% R&D input of high-tech enterprises comes from government support such as financial subsidies, tax incentives and so on. The government should give financial subsidies and tax incentives for local firms; this are of great significance for small and medium enterprises particularly and

greatly enhanced their enthusiasm for technology innovation, since these enterprises are seriously constrained by the shortage of R&D input.

- Change the policy for attracting FDI to transfer its aim from absorbing funds and brands to import and capacitate technological development, particularly the core technology.

  Through the introduction of core technology, the country could narrow the technology gap with developed countries. At the same time, we should also pay special attention to the cooperation in R&D, and to achieve a win-win pattern for both sides.

- The evaluation criteria of the government to assess the performance of foreign firms should be changed to emphasize FDI's having latest technology instead of low technology users.

  The government should emphasis to access what kind of FDI is brought, FDI project's technology content, land resources and energy consumption, as well as the project's impact on the local firms, local environment, etc.

- Phase out non-national treatment for foreign investors, give domestic enterprise the same treatment with foreign investors, and promote domestic enterprise' enthusiasm for technology innovation.

## Bibliography

[1] United Nations Conference on Trade and Development,"*Investment and technology policies for competitiveness: Review of successful country experience",*New York, United Nations, 2003.

[2] Bernadette A.et al., "*Technology transfer to china: A theoretical approach",*China, University of Limerick, 1998, Vol. 3, pp. 277-308.

[3] Kumar Nagesh,"*Intellectual Property Rights, Technology and Economic Development:Experiences of Asian Countries",*India, Commission on Intellectual Property Rights, 2003.

[4] Amri Ahmed, "*Technology Transfer Through Industrial Capacity Expansion Projects: Developing Countries Case",*Iran, Massachuset Institute of technology, 1995.

[5] Kadah Mohamed Mansour,*"FDI and International Technology Transfer to Egypt",* Cairo Egypt, Economic Research Forum , 2008.

[6] MaskusE. et al., "*Encouraging International Technology Transfer",*Colorado, UNCTAD/ICTSD capacity building project, 2003.

[7] Speser L. et al.,"*The Art and Science of Technology Transfer",* New Jersey, Jhon Wiley and Sons, Inc., 2006.

[8] Kumar Vinay, "*Optimizing Technology Transfer",*New Delhi, Department of Scientific & Industrial Research, n.d.

[9] WorldBank,"*Economic development report"* World Bank, 1999.

[10] Evans et al., "*.Knowledge Society and the Knowledge Gap",*Germany, University of Bonn, n.d.

[11] UN Conference on Trade Development, "*Reducing the Technology gap",* United Nations Conference on Trade and Development, 2002.

[12] Kondo Masayuki,"*Networking for Technology Acquisition and Transfer",*Yokohama UNIDO, 2001.

[13] World Bank, "*World development report(WDR)",* World Bank, 1991.

[14] "*Technology Transfer Practices",* India, n.d.

[15] Donald, "*Origins of Modern Mind: Three Stages in the Evolution of Culture and Cognition"*, England, Harvard University, 1991.

[16] DimondJ.,"*Guns, Germs and Steel",*New York, Norton and Company, 1997.

[17] CameronE.H., "*Samuel Slater:Father of American Manufacturer",* Portland, The Bond Wheelright Company, 1960.

[18] Irwin H.et al,"*Technology Transfer and Communication: Lesson from Silcon Valley",*Texas, Carolina's Research Triangle, 1998.

[19] Industrial Partinership,*"Technology transfer: the history",* USA, Industrial Partinership office, 2005.

[20] Feguereido P."*Technological Learning and Competitive Performance",* Cheitenham , 2001.

[21] Sazali, A.W, et al., "*Evolution and Development of Technology Transfer Models and the Influence of Knowledge-Based View and Organizational Learning on Technology Transfer",*Malaysia, University Putra Malaysia, 2009.

[22] Al-Thawwad et al., "*Technology Transfer and Sustainability-Adapting Factors: Culture, Physical Environment, and Geographical Location",*Saudi Arabia, IAJC-IJME International Conference, 2008. ISBN 978-1-60643-379-9.

[23] IETC, International Environmental Technology Center,"*Technology Transfer: The Seven "C"s for the Successful Transfer and Uptake of Environmentally Sound Technologies",*OsakaJapan, International Environmental Technology Center, 2003.

[24] Liu, Sifeng, et al.,"*Theory of Scince and Technology Transfer and Applications",*New York, Tailor and Francis Group, 2010.

[25] Wie Thee kian,"*The major channels of International Technology Transfer to Indonesia: An assessment",*Indonesia(Jakarta), Asian Pacific Economy, May 2005, Vol. 10. 2.

[26] Hendrix, A., et al., "*Unlocking the Channels of Tacit Knowledge Transfer",*n.d.

[27] HoekmanM., et al.,"*Transfer of Technology to Developing Countries: Unilateral and Multilateral Policy Options",*USA : World bank, 2004.

[28] Dahlman, C.J., et al., "*Managing technological development lessons form the newly industrializing countries",* Ross-Larson. 1987.

[29] Kim L., "*Immitation to innovation: The Dynamics of Koreas Technological Learning",*Boston, Harvard Business School Press, 1997.

[30] Maskus E., et al., "*Encouraging International Technology Transfer"*USA, International Center For Trade and Sustainable Development(ICTSD) and United Nation Conference on Trade and Development(UNCTAD), 2004.

[31] WorldBank,"*World debt tables: External finance for developing countries"*Washington, World Bank, 1996.

[32] Genet A., et al.,"*Determinants of Foreign Direct Investment in Ethiopia: A time-series analysis"*Addis Ababa, University of Westminster , 2005.

[33] UNCTAD, "*World Investment Report 1998: Trends and Determinants",* UNCTAD, 1998.

[34] Dunning J.H.,"*Multinational Enterprises and the Global Economy",*Workingham, England, Addison-Wesley , 1993.

[35] UNCTAD,"*World Investment Report 1996: Investment, Trade and International Policy Arrangements"* UNCTAD, 1996.

[36] Joong-Wan, et al., "*Foreign Direct Investment: Determinants, Trends Inflows and Promotion Policies",*China, Investment Promotion and Enterprise Development Bulletin for Asia and the Pacific, n.d.

[37] Bjorvatn K., "*The Role of FDI in economic development"*, Norway, The research council of Norway, 2001.

[38] Luiz R.,"*Foreign Direct Investment-led growth: evidence from time series and panel data",*Oxford Economic Papers, 1997, Vol. 51.

[39] Kumar N., et al., "*Technology, Market Structure and Internationalization: Issues and Policies for Developing Countries",*New York, Routledge and UNU Press, 1997.

[40] Saggi Kamal, "*Trade Foreign Direct Investment, and International Technology Transfer: A Survey"*Geneva, World Trade, 2000.

[41] DabourNabil, "*The role of FDI in development and growth in OIC member countries",* Journal of Economic Cooperation, 2000.

[42] UNCTAD,"*Forein Direct Investment and the Challenge of Development",*Geneva, United Nation Publication, 1999.

[43] Young Stephen, et al., "*Technology Transfer to china through FDI"*London, Reginal Studies Association, 1996, Vol. 31:7, pp. 669-679.

[44] Cusumano R., et al., "*Linking international technology transfer with strategy and management",* Res policy, 1994, Vol. 23.

[45] Dunning J.H,*"Re-evaluating the benifits of FDI",* Lexington, Transnational corporation, 1994, Vol. 3.

[46] Teekasap Pard,"*Dynamics of Technology Spillover through Foreign Direct Investment in Thailand under R&D Consortia Policy",* Korea, System Dynamics society, 2010.

[47] Cincera M., et al., *"Foreign firms and technology spillovers in developing countries: the Turkish case"*,. Turkey, Science and Technology Policy Research Center, n.d.

[48] BlomstromM., et al., "*Multinational coorporations and spillovers",* Journal of Economic Survey , 1998.

[49] UNCTAD, "*World Investment Report",* UNCTAD, 2008.

[50] DegefeB., "*Explaining African Growth performance: The case of Ethiopia",*Nairobi, AERC growth research workshop, 2002.

[51] GetinetH., "*Determinants of Foreign Direct Investment in Ethiopia: a time series analysis",*Addis Ababa, University of Westminster, 2006.

[52] Weissleder Lucie,"*Foreign Direct Investment in the Agricultural Sector in Ethiopia",* Berlin, 2009.

[53] OECD,"*Regulatory environment for Foreign Direct Investment: preliminary inventory for selected African countries",*Uganda, OECD, 2005.

[54] United Nations,"*Investment and Innovation policy review",* United Nations, 2002.

[55] James R., et al., "*Domestic effect if the foreign activities of U.S Multinationals",*Michigan, Harvard university, 2008.

[56] UNCTAD,*"Investment and innovation policy review Ethiopia",* United Nations, 2002. United Nations Publication. pp. 23-46.

[57] MoST, Minstry of Science and Technology, "*National Science, Technology and Innovation Policy: Building Competitiveness through Innovation",*Addis Ababa, Minstry of Science and Technology, 2006.

[58] Gulelat G, "*Technology Transfer: the case of Japan and Ethiopia",* Addis Ababa, Addis Ababa University , 2010.

[59] Adejumobi, et al.,"*The History of Ethiopia",*USA, Greenwood Publishing Group, Inc., 2007.

[60] MarcusG., et al.,*"History of Ethiopia",* Los Angeles, University of California, 1994.

[61] Saich T.,"*Chinas Science Policy in the 80s",*Manchister, Manchister University Press, 1989.

[62] Zhu, F.D, et al.,"*Technology Transfer under Chinas economic reforms: business environment and success factors",* Technology managment, 1995, Vol. 2.

[63] United Nations,*"Management of technology",* Austria,United Nations, 2001.

[64] Zhang H., "*Encourage the pluralism of investment subjects",* China, Heilongjiang Daily, 2007.

[65] Chen Xi, "*The influence of FDI on chinas tourism industry",* Auckland university of technology , 2010.

[66] United Nations,"*World Investment Report",* United Nations, 2006.

[67] Ding Li,. "*Study on the Influence of Foreign Direct Investment in Chinese Foreign Trade",* China, Changehun University of Science and Technology, 2009, Vol. 2.

[68] Fong Aik, "*Japan Singapore technical institueainternational coorporation in Human resource development for inclusive growth",*Singapore, Nanyang Polytechnic International, 2010.

[69] Park Donghyun, "*Foreign Direct Investment and Corporate Taxation: Overview of Singaporean Experience",*Singapore, Nanyang Technological University, 2004.

[70] Kwan S.et al., "*Some aspects of technology transfer in Hong Kong",*Hong Kong, Hong Kong Productivity councel, 1991-92.

[71] Rock M.,et al., "*Technology transfer through Multinational companies",*1998.

[72] Mohammad S., et al., "*FDI and Economic Growth in Malaysia", M*alaysia, University of putra, 2009.

[73] United Nations,*"FDI and Performance Requirements: New Evidence from selected countries",* Geneva, United Nations, 2003.

[74] A.J. Buys, et al.,"*A Review of Technology Transfer Mechanisms",*Pretoria, South Africa, University of Pretoria.

[75] UNCTAD,"*World Investment Report: FDI policies for development National and International Perspectives",*New York, United Nation, 2003.

[76] OECD,"*Tax Effects on Foreign Direct Investment",*Paris, Organizaton for Economic Co-operation and Development , 2008.

[77] Lars P., et al., "*FDI and Taxation",*Center for European Economic Research , 2008.

[78] Kirkland John,"*Barriers to international technology transfer",*London, Kluwer Acadamic Publishers , 1996.

[79] Devine M.D. et al.,"*Government Support Industry-University Research Centers:Issues for Successful Technology Transfer",*1987, Vol. 12.

[80] International Economic DevelopmentGroup,"*The new EPAs: comparative advantage of their content and the challenges",* International Economic Development Group , 2008.

[81] COMESA,http://www.comesa.int/(Cited: February 21, 2011.)

# Appendix

## 1. Questionnaire: Domestic Company

### A. Profile of the Respondent

1. Your Position in the Company :_____
2. Years of experience in this company :_____
3. Please indicate the highest level of education that you have completed?

□Primary school □ University- 1st level

□High school □ University- higher level

### B. Introductory Questions

4. Among the total employees in your industry (100 %), roughly what percent of them have Technical and Engineering background at;
   1. Masters or above _____%
   2. B.Sc level _____%
   3. College Diploma and TVET level _____%
5. How do you rate your capital equipments and production processes modernity in comparison with available processes and technologies in the developed world?

□ Extremely outdated □ Outdated

□ Highly outdated □ Latest Technology & production process

If you believe that your capital equipments and production processes' are old and unsuitable, please give us some reasons why it is difficult for your company to upgrade your capital equipments and processes to the latest technologies available in the foreign market? ( e.g. lack of finance, management commitment, etc)

1._____
2._____

6. Does the production capacity of this company is underutilized under normal circumstance due to lack of necessary specialized technology? □ Yes □ No

### C. Level of Local Technological Capability

7. How do you rate the ability of the company to make effective use of imported technologies, ability to maintain, capability to design and manufacture spare parts etc, at full extent or without any technological difficulty to use.

□ Extremely capable □ Slightly capable
□ Highly capable □ Totally unable
□Capable

If there is a difficulty to use imported technology, what do you think as a cause for the problem?

1._____
2._____
3._____

8. How do you rate the flexibility and capacity of your company to adopt itself to the changing nature of products & services in the global market which in turn needs some sort of adjustment at your company shop floor ?

□ Extremely flexible □ Slightly flexible
□ Highly flexible □ Totally unable to change products and processes
□ Flexible

If your flexibility is too low, please forward the main reasons for that,

1._____
2._____

9. The local's technological capability to absorb, improve, emit and re-sell the once transferred technology is sometimes referred as the matured state of technology transfer, in this context how do you rate your capacity to re-sell or modify the once acquired technology?

□ Extremely capable □ Slightly capable
□ Highly capable □ Totally unable
□ Capable

If it is difficult for your company to re-sell or modify the once acquired technology, please give us the main obstacles to do such activities (e.g. technical difficulty, copy right issues, or others)

1._____
2._____

## D. Industry-Industry Relation

10. How do you evaluate the collaboration of foreign firms with local companies in sharing technological software and hardware for mutual benefit out of the usual rough competition?

□ Excellent level of collaboration □ Limited collaboration
□ Very good collaboration □ Extremely poor or almost no collaboration
□ Fair

If your level of collaboration is limited, what a reason could you forward as a major constraint (e.g. culture, lack of trust, etc)?

1._____
2._____

11. Does this company spent capital on technological upgrading by importing new technology.

□ Yes □ No

12. Have you ever take training or consultancy temporarily or permanently from foreign based companies in the country, just looking for a technical assistance? □ Yes □ No

If 'yes' how do you express the importance of foreign nationals as a means to transfer foreign technology to Ethiopians?

□ Extremely important □ Limited importance
□ Important □ Not important at all

13. Do you have a research and development activity in your company or industry? □ Yes □ No

13.1. If "yes", how do you rate the outcomes of these research and development activities?

□ Not relevant output □ Very relevant output
□ Somewhat relevant output □ Extremely relevant output
□ Relevant output

13.2. Roughly what percent of your revenues you spent on activities related to these? ____%

14. Have you ever hired an employee who have been working before in foreign based company with the intention to know the working knowhow of the rival firm? □ Yes □ No

15. How do you rate the effect of the presence of foreign investors in this country on this company?

| Strongly negative | Slightly negative | No effect | Slightly positive | Strongly positive |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |

16.1. Overall ability to compete in the market _____
16.2. Business opportunities _____
16.3. Demand for the companies' products _____
16.4. Cost of skilled labor _____
16.5. Availability of raw material and other inputs _____
16.6. Access to finance _____
16.7. Access to export market _____

16. What has been the response of this company to the presence of foreign investors: [multiple answers is allowed]
    - □ Produce similar product
    - □ Adopt similar production technologies
    - □ Recruit key employees from foreign based companies
    - □ Adopt similar marketing strategies and methods
    - □ Buy licenses or patents from the foreign investor
    - □ Produce different products to avoid direct competition
    - □ Produce complementary products
    - □ None
    - □ Other, please specify:_____
17. Do you know any technical and economic incentives available in particular to industries that have the potential to make critical and major contributions to technology transfer to the country?

□ Yes □ No

## E. The effect of FDI in local companies in their effort to grow and become globally competitive

18. For your main product sold in the domestic market, does your main competition comes from:
    - □ Locally-owned manufacturers
    - □ Foreign-owned companies based in this country

    If your main competitor comes from Foreign based companies, what are the main reasons that your company unable to compete locally?

    1._____
    2._____
    3._____
19. How do you see the importance of foreign based companies for similar or complementary industries serving as a hub or as a source of technological knowhow far from the direct contribution of their product and services?
    - □ Extremely Valuable
    - □ Highly Valuable
    - □ Valuable
    - □ Slightly valuable
    - □ Doesn't have much importance

    If you believe that it is important for others, please give us if there any technological contributions to your company or other companies?

    1._____
    2._____

## H. Diffusion of technology to local firms(Engineering industries)

20. How do you evaluate the collaboration of foreign firms with local companies in sharing technological software and hardware for mutual benefit out of the usual rough competition?
    - □ Excellent level of collaboration
    - □ Very good collaboration
    - □ Fair
    - □ Limited collaboration
    - □ Extremely poor or almost no collaboration

    If your level of collaboration is limited, what a reason could you forward as a major constraint (e.g. culture, lack of trust, etc)?

    1._____
    2._____

## I. Polices to encourage technology absorption from FDI

21. How do you measure the government's effort in assuring the participation of local engineers and technicians during the implementation of technology intensive projects and industries in association with foreign firms with the objective to build local technological capability?
    - □ Extremely efficient
    - □ Highly efficient
    - □ Efficient
    - □ Slightly efficient
    - □ Not efficient at all

    If the level of participation is low, what do think should be implemented to boast the level of participation?
    1. _____
    2. _____

22. How do you understand the technical and economic incentives available in particular to industries that have the potential to make critical and major contributions to technology transfer to the country ( High tech industries )?
    - □ Extremely encouraging
    - □ Highly encouraging
    - □ Encouraging
    - □ Slightly encouraging
    - □ Not attractive

26. What is your view of the national policy in association with engineering capacity building program, TVET program , etc in facilitating the desired technological capacity building process?
    - □ Extremely optimist
    - □ Highly Optimist
    - □ Optimist
    - □ Slightly optimist
    - □ Don't think as a solution

## J. Concluding Remark

27. Most technologies imported in the past with the country's limited resources are stagnant to be adopted, improved, re- engineered, and disseminated to other similar industries for one or more reasons, in your side, what do you think is the main problem of Ethiopian industries to build up their technological capability ?
    1. _____
    2. _____

## 2. Questionnaire: Foreign Company

### A. Profile of the Respondent

1. Your Position in the Company :_____
2. Years of experience in this company :_____
3. Please indicate the highest level of education that you have completed?

□Primary school □ University- 1st level

□High school □ University- higher level

### B. Introductory Questions

4. Among the total employees in your industry (100 %), roughly what percent of them have Technical and Engineering background at;
   1. Masters or above _____%
   2. B.Sc level _____%
   3. College Diploma and TVET level _____%
5. How do you rate your capital equipments and production processes modernity in comparison with available processes and technologies in the developed world?

□ Extremely outdated □ Outdated

□ Highly outdated □ Latest Technology and production process

If you believe that your capital equipments and production processes' are old and unsuitable , please give us some reasons why it is difficult for your company to upgrade your capital equipments and processes to the latest technologies available in the foreign market?( e.g. lack of finance, management commitment, etc)

1._____
2._____

6. Does the production capacity of this company is underutilized under normal circumstance due to lack of necessary specialized technology? □ Yes □ No

### C. Motives for investment

| | Not important | Slightly important | Important | Very important | Crucial |
|---|---|---|---|---|---|
| 7. Rate your agreement to what extent did the following factors influence the investment decision | | | | | |
| 7.1. Access new market | | | | | |
| 7.2. To lower the production cost | | | | | |
| 7.3. Access natural resources/inputs | | | | | |
| 7.4. To join a specific partner | | | | | |
| 7.5. Export back to home country | | | | | |
| 7.6. To benefit from trade agreement | | | | | |
| 7.7. To build a base for business in Eastern Africa | | | | | |
| 7.8. Diversify the existing product portfolio | | | | | |
| 7.9. Other, please specify: _____ | | | | | |

## D. Investment incentives

| | Not important | Slightly important | Important | Very important | Crucial |
|---|---|---|---|---|---|
| 8. To what extent are the following investment incentives are important in attracting FDI in Ethiopia? | | | | | |
| 8.1. Availability of investment guarantees | | | | | |
| 8.2. Capital grant | | | | | |
| 8.3. Infrastructure | | | | | |
| 8.4. Tax exemption, tax holidays | | | | | |
| 8.5. Existence of double taxation treaty | | | | | |
| 8.6. Training | | | | | |
| 8.7. Other, please specify: _____ | | | | | |

## E. FDI policy

| | Not important | Slightly important | Important | Very important | Crucial |
|---|---|---|---|---|---|
| 9. To what degree the following policies are effective in attracting FDI? | | | | | |
| 9.1. **First generation:** Liberalization of investment policies | | | | | |
| 9.1.1. Restrictions on sectors in which FDI can be made | | | | | |
| 9.1.2. Restrictions on the value of FDI | | | | | |
| 9.1.3. Restriction on the level of ownership that may be acquired | | | | | |
| 9.1.4. Compulsory joint ventures with local firms | | | | | |
| 9.1.5. Export requirement | | | | | |
| 9.1.6. Import restrictions | | | | | |
| 9.1.7. Local content requirement | | | | | |
| 9.2. **Second generation:** promotion and facilitation | | | | | |
| 9.2.1. Reducing burdensome regulation | | | | | |
| 9.2.2. Promotion | | | | | |
| 9.2.3. Investment incentives | | | | | |
| 9.3. **Third generation:** policies to enhance the investment environment | | | | | |
| 9.3.1. Political stability | | | | | |
| 9.3.2. Transparency and corruption | | | | | |
| 9.3.3. Property rights | | | | | |
| 9.3.4. Macroeconomic stability | | | | | |

## F. Role of FDI in the transfer of technologies to local companies

10. Does this company spent capital on technological upgrading by importing new technology.
□Yes □No
11. Do you arrange training programs for local companies in the intention to upgrading the technological capability of the companies? □Yes □No
12. Do you have a research and development activity in your company or industry? □Yes □No
    12.1. If "yes", how do you rate the outcomes of these research and development activities?
    □ Not relevant output □Very relevant output
    □ Some what relevant output □Extremely relevant output
    □ Relevant output
    12.2. Roughly what percent of your revenues you spent on activities related to these? ____%
13. Have you ever hired an employee who has been working on another similar industry with the intention to know the working knowhow of the rival firm? □Yes □No
14. Do you know someone who left your company and established or join a rival firm (similar) to yours which you consider as a major flow of technological knowhow from your company to others? □Yes □No
15. Do you know any technical and economic incentives available in particular to industries that have the potential to make critical and major contributions to technology transfer to the country?
□Yes □No

## G. The effect of FDI in local companies in their effort to grow and become globally competitive

16. For your main product sold in the domestic market, does your main competition comes from:
    □ Locally-owned manufacturers
    □Foreign-owned companies based in this country
    If your main competitor comes from Foreign based companies, what is the main reason that the local companies does not compete locally.
    1._____
    2._____
17. How do you rate the local's technological capability to absorb, improve, emit and re-sell the once transferred technology?
    □Extremely capable □Slightly capable
    □Highly capable □Totally un-capable
    □Capable
    If it is difficult for local companies to re-sell or modify the once acquired technology, what do you think the main obstacle for doing this activity (e.g. technical difficulty, copy right issues, or others)
    1._____
    2._____
18. How do you see the importance of your company for other similar or complementary industries in serving as a hub or as a source of technological knowhow far from the direct contribution of your products and services?
    □Extremely Valuable □ Slightly valuable
    □Highly Valuable □Doesn't have much importance
    □Valuable
    If you believe that it is important for others, please give us the technological contributions which your company made towards other companies.
    1._____
    2._____

19. Does your company arrange a means to support other local company to enter into the global market? □Yes □ No
    If yes, what do you think the best way to support local companies to become globally competitive?
    1. _____
    2. _____

## H. Diffusion of technology to local firms(Engineering industries)

20. Does the company procure its production input from local manufacturers? □Yes □ No
    If yes, Does the company interact with local suppliers with the intention of helping them to improve their operation by the transfer of technology or know-how through design and process know-how. □Yes □ No
21. Does the company contract-out work, such as manufacturing operations for local companies? □Yes □ No
22. What is the most important factor that influences the decisions for local procurement?
    - □To improve local market acceptability or local customization of the product
    - □ For tax efficient supply chain reasons
    - □ Reduced tariff cost
    - □ Local content is mandated or strongly encouraged by the ultimate customer
23. What is the most important factor that influences decisions to cancel or not enter local procurement
    - □ Product or service quality is not competitive
    - □Technical or managerial skill issue
    - □ Plant or process capacity
    - □Age, quality of plant and equipment of suppliers
24. How do you evaluate the collaboration of foreign firms with local companies in sharing technological software and hardware for mutual benefit out of the usual rough competition?
    - □ Excellent level of collaboration
    - □ Good collaboration
    - □ Very good collaboration
    - □ Extremely poor or almost no collaboration

    If your level of collaboration is limited, what a reason could you forward as a major constraint (e.g. Culture, lack of trust, etc)?
    1._____
    2._____
25. Do you have a special department for:
    1. Local sourcing? □Yes □ No
    2. Local supplier development? □Yes □ No

## I. Polices to encourage technology absorption from FDI

26. How do you measure the government's effort in assuring the participation of local engineers and technicians during the implementation of technology intensive projects and industries in association with foreign firms with the objective to build local technological capability?
    - □ Extremely efficient
    - □ Slightly efficient
    - □ Highly efficient
    - □ Not efficient at all
    - □ Efficient

    If the level of participation is low, what do think should be implemented to boast the level of participation?
    1._____
    2._____
27. How do you understand the technical and economic incentives available in particular to industries that have the potential to make critical and major contributions to technology transfer to the country (High tech industries)?
    - □ Extremely encouraging
    - □Slightly encouraging
    - □ Highly encouraging
    - □Not attractive
    - □Encouraging

28. What is your view of the national policy in association with engineering capacity building program, TVET program, etc in facilitating the desired technological capacity building process?
    - □ Extremely optimist
    - □ Highly Optimist
    - □ Optimist
    - □ Slightly optimist
    - □ Don't think as a solution

## J. Concluding Remark

29. Most technologies imported in the past with the country's limited resources are stagnant to be adopted, improved, re- engineered, and disseminated to other similar industries for one or more reasons, in your side, what do you think is the main problem of Ethiopian industries to build up their technological capability ?
    1. _____
    2. _____

## 3. Summary of the questionnaire

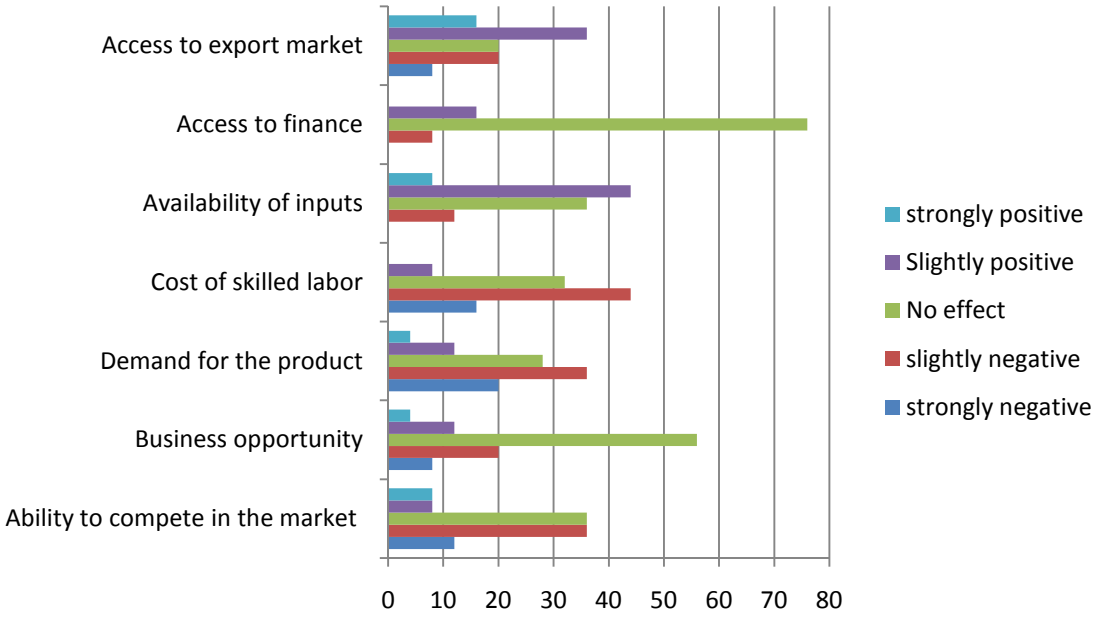


**Figure A.1** The effect of foreign investors in local companies

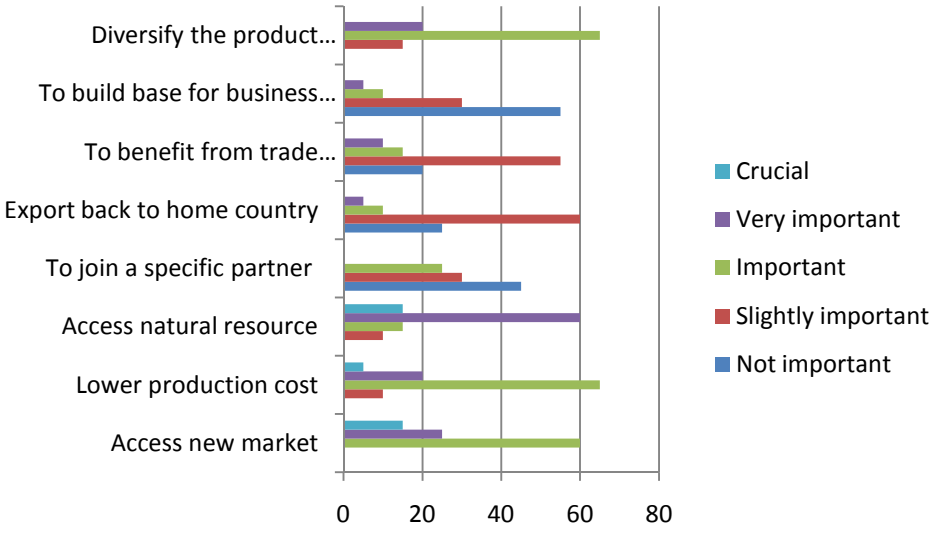


**Figure A.2** Determinant for investment

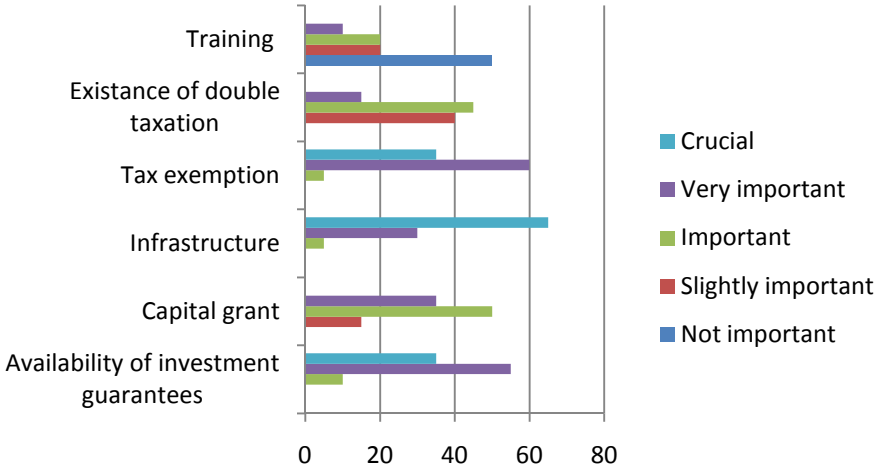


**Figure A.3** investment incentives

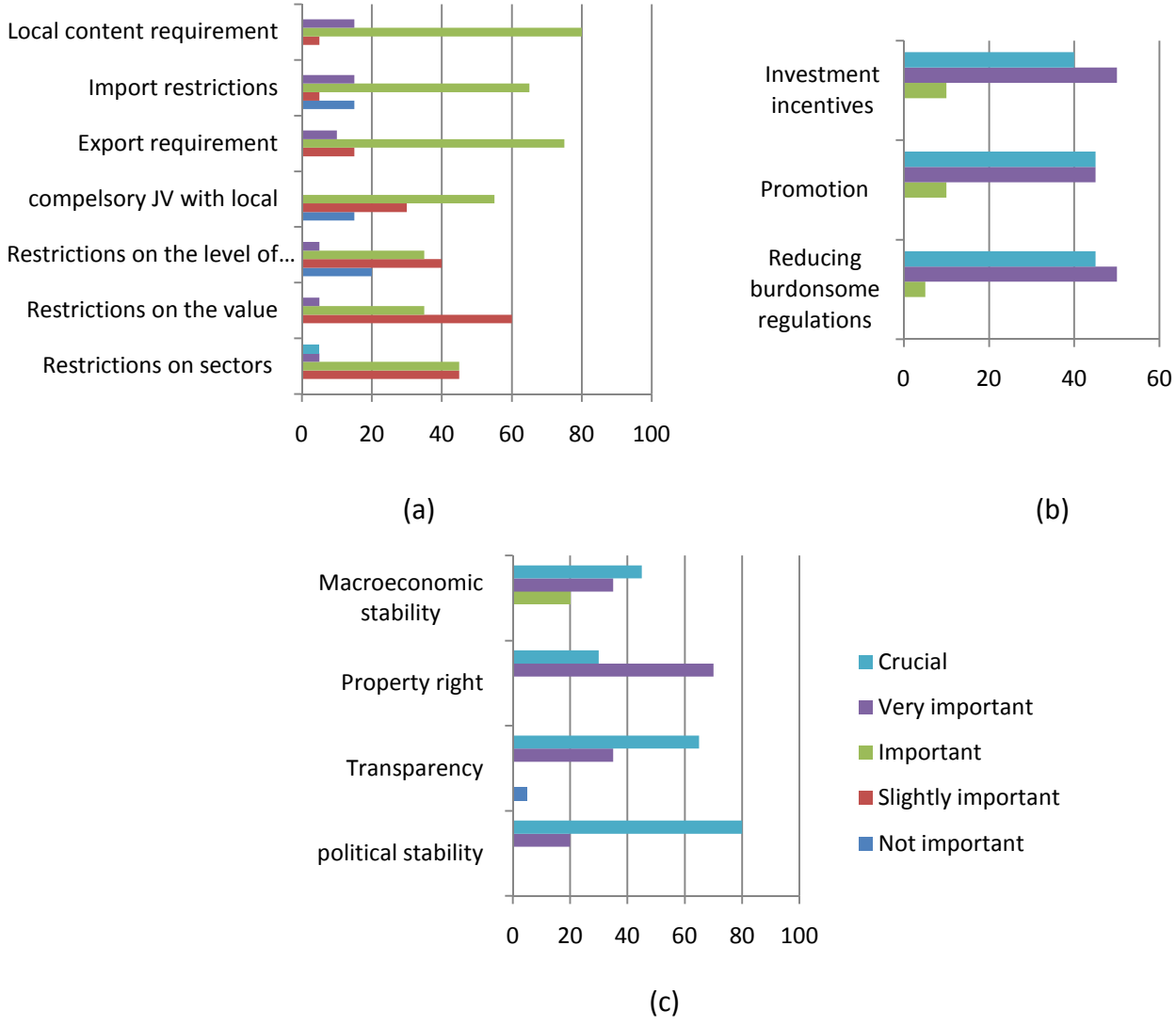


**Figure A.4** FDI policies (a) policy in entry (b) promotion policy (c) Working environment