

An Investigation on Foreign Direct Investment and Technology Transfer Comparative Study of Libya and Egypt

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The literature on the issue of foreign direct investment (FDI) and technology transfer (TT) has become rich many years ago, Focus is largely based on the role of foreign direct investment (FDI) to transfer of technology in host countries, the way technology is transferred and how technology transfer contributes to the economic growth. Accordingly, this research of investigation of critical success factors for foreign direct investment and technology transfer comparative study of Libya and Egypt, the first study attempted in Libya and one of few studies globally. This study has reached very important conclusions regarding an investigation on foreign direct investment (FDI) and technology transfer (TT): Comparative study of Libya and Egypt. The main conclusions are (The study found that foreign direct investment is the most important channels for transfer of technology (by the consensus of members of the sample in the two countries; the study found that there are factors that help to attract foreign direct investment to the host countries for investment and are as the presence of a good investment environment for investment; there are many investment opportunities for investors; Political stability; Legal stability; Economic stability; Geographic Location; Availability of raw materials and Tax policy encouraging; Encouraging investment law; the study found that the transfer of technology from foreign investors to the State Investment affects on each of (Location factor; Market policy; and Exchange rate; Investment law).

1. Introduction

The objective of this research is to enhance our understanding of the critical factors for the success of foreign direct investment and technology transfer, by presenting a comparative study between Libya and Egypt. Over the past few years many pieces of literature have been published on the subject of FDI and TT. Their focus has largely been on the role of technology transfer in host countries, the way technology is transferred, and how technology transfer contributes to economic growth (Hoekman; Maskus and Saggi 2005). On the other hand, foreign direct investment (FDI) and technology transfer (TT) has become a very important issue for development, especially in recent years in Arabian countries especially in Libya and Egypt (UNITED, 2001).

In addition to FDI and TT has become a very important factor for development in less developed countries (LDCs) and economies grow (Blomstrom; 1999). FDI has both direct and indirect impact on economic growth in host countries. Direct impact into host countries is seen as employment, capital, exports, and new technology, as well as improved productivity in the local firms.

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Libya is a developing Arab state; Location of Libya in North Africa, Libya is the fourth largest country in Africa With area of almost 1.8 million square kilometers. And Libya has small population (around 6 million) in the Arab countries and Africa countries as well. Libya is one of the Arabic oil exporting countries that has comparatively large surpluses income. On the other hand, the Libyan economy is still a developing economy that has been under reorganization in recent years with the attempt of the Libyan government to move towards a market economy and opening the door for foreign investments In particular, (Central Bank of Libya 2007).

The Libyan economy is still suffering from low volume of foreign investments compared to some of the set of developing economies. The flows of these investments are still fluctuating from year to year, and that the structure of these investments is still limited to a few sectors such as oil, which is the largest sector to attract foreign direct investment. Egypt is one part of the African continent that is working towards technology transfer. It has been attracting FDI even though this has not been quite as proportionate as other countries. The total share of the Africans' FDI has dropped from 203% in 2001 to 1.7% in 2002 in spite of the fact that many Middle East countries have the petrol sector. As a result, Egypt has been considered as an area of FDI. As part of the Arab nations, Egypt has a long history of colonization from the British. At the beginning of the last century it has had many revolts aimed at nationalism. As such trade and commerce were dominated to a large extent by foreigners.

Based on the above discussion of the importance of FDI and TT, the following study question was formulated:

- What are the critical success factors for foreign direct investment (FDI) and technology transfer (TT) in Libya and Egypt, and how transferable are the practices between the two countries?

2. Literature Review

2.1 Foreign Direct Investment (FDI) and Technology Transfer (TT)

2.1.1 Definition Foreign Direct Investment (FDI):

Recently China, Brazil, India and Mexico are making headlines in newspapers that they are attracting more and more Foreign Direct Investment (FDI) in the different sectors such as manufacturing, Information Communication Technology and services. Foreign Direct Investment (FDI) is the term which can be seen in different kind of journals, magazines, books and research papers.

The answer is very difficult to describe Foreign Direct Investment (FDI) in exact meanings but different scholars' takes this phenomenon in different sense such as Moosa (2002) describes that Foreign Direct Investment (FDI) is the process in which one country's corporations or individuals are buying assets or manufacturing units in the other countries for the sake of production process or controlling others activities in the

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firm. OECD (2001) takes FDI in the sense of transformation of capital, knowledge and technology from home country to the other (foreign) country.

According to the UNCTAD (1999) FDI "is an investment involving a long term relationship and reflecting a long lasting interest and control of a resident entity in one economy's in an enterprise resident in another economy". In the world of Chin and Roger (2006) "investment that brings (foreign) investors effective control and is accompanied with managerial participation". Mallampally and Sauvart (1999) describe FDI as being an investment by multinational corporations or MNCs in foreign countries for the purpose of production, acquiring assets and controlling others activities in those countries.

In the word of Moses (2003) explains that it is normally realized that FDI brings a lot of benefits for the host country in sense of capital, productive assets, entrepreneurship, skills, technology, innovation, management, organisation, export and marketing expertise. Dunning describes FDI as contributing a variety of things, e.g. capital, technology, entrepreneurship, new markets and management skills.

2.1.2 Definition Technology Transfer (TT):

Transfer of technology is another important factor which is playing key role in the economic relationships internationally from the last decades. In the past decades the transfer of Technology becomes a phenomenon in the global economy. But on the other hand technology is playing key role for the development of worldly economy system. The definition of technology is differing among different researchers. But on the other side technology transfer becomes an important factor for business and managerial concern in the developing nations.

Haming (2000) says that technology "can be broadly defined as the process of acquisition, adaptation, integration and use of technological knowledge by a nation other than the one that develops the technology and has different political, economic, social, and cultural contexts". Technology is defined by many researchers; each of them has his own point of view. That is base on different factors.

According to the Saad, Cicmil and Greenwood (2002) technology is the knowledge including hardware and software that are related to the specific sector, industry and belong to the national causes. It is very difficult to define the technology because of that this definition is depending upon the group who is investigating technology. Transfer of technology can be defined as transfer of technology from university to the other organizations or from one country to another country.

Albert (1984) says that high technology can be observed from different factors such as human capital input, research and development, production sophistication and etc. Dunning (1994) states that technology is "a resource which comprises knowledge applied to improving the efficiency of the production and marketing of existing goods and services and of the creation of new goods and services".

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According to the Lan`s (1996) point of view is that the technology is the creative activity (research and development) which is using to create new product by using the technical and scientific knowledge. At the same time he suggests that technology can be structured such as knowledge as a whole (that knowledge depends on four parts like applied science, engineering, invention and sub invention). This structure is known as knowledge form structure or phase structure of technology development as well.

2.1.3 Technology Transfer Mechanism

Mechanisms in technology transfer are the means of transmitting the technology from the seller to the buyer. Ramanathan (1995) divided technology transfer mechanisms into those which were either market or non-market oriented. the major mechanisms of technology transfer are: (Purchasing of equipment and products, Foreign direct investment, Joint ventures, Technical collaboration, Licensing, Technical services agreements, Subcontracting, Turnkey contracts, Sharing production, Joint research, Management contracts, Product in hand contracts, Expert services, Clean development mechanism, Construction and engineering agreements, Trade in goods and services and Cross-border movement of personnel) as well as Non- market oriented mechanisms:(Technical information services, Industrial trade fairs and exhibitions, Conferences, seminars and workshops, Training, Sales literature, Books and academic journals and Informal personal contacts).

2.1.4 The Major Condition for Successful Technology Transfer (TT) Through Foreign Direct Investment (FDI)

Foreign direct investment (FDI) can be instrumental in technological development, more so if the FDI is a joint venture. In order for the FDI to be effective, the government should intervene in an appropriate manner to guide the FDI inflows through the development lanes of the host country. Moreover, favorable macroeconomic conditions and ideal regulatory environments should be created by the host government, and there should be appropriate investment which will enhance the absorptive capacities of the country.

Mainly, technological content and the impact that the FDI has is determined by the macroeconomic environment, regulatory environment and the capacity to absorb technology in addition to the provision of investment incentives. Foreign direct investment (FDI) is one of the means of technology transfer. Other means include:

- 1- Importing of machinery or trade in general,
- 2- International movement of labour for example the brain drain and consultants that move internationally and “arms length” transactions and the licensing of technology
- 3- Government policy such as providing education and investment in technology projects
- 4- The manufacturing of products in developing countries for the markets of developed countries
- 5- Guided tours of factories as part of apprenticeships
- 6- Illegitimate way of obtaining technology such as industrial espionage (Michael, 1998, p 45).

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According to Robinson, (1988), Group technology, or components, and can be transferred either through foreign direct investment or through a variety of contractual arrangements, and that, from these devices are:

- 1- Export of equipment
- 2- License
- 3- Technical assistance contract
- 4- Manufacturing contracts with the provision of technical assistance
- 5- Management contract
- 6- Marketing agreement
- 7- Training contract
- 8- Research and development contract (R&D)
- 9- To oversee the construction contracts
- 10- Construction contracts
- 11-Turnkey contract
- 12-Turnkey contract plus

2.1.4 How do technological transfers (TT) from foreign direct investment (FDI) take place?

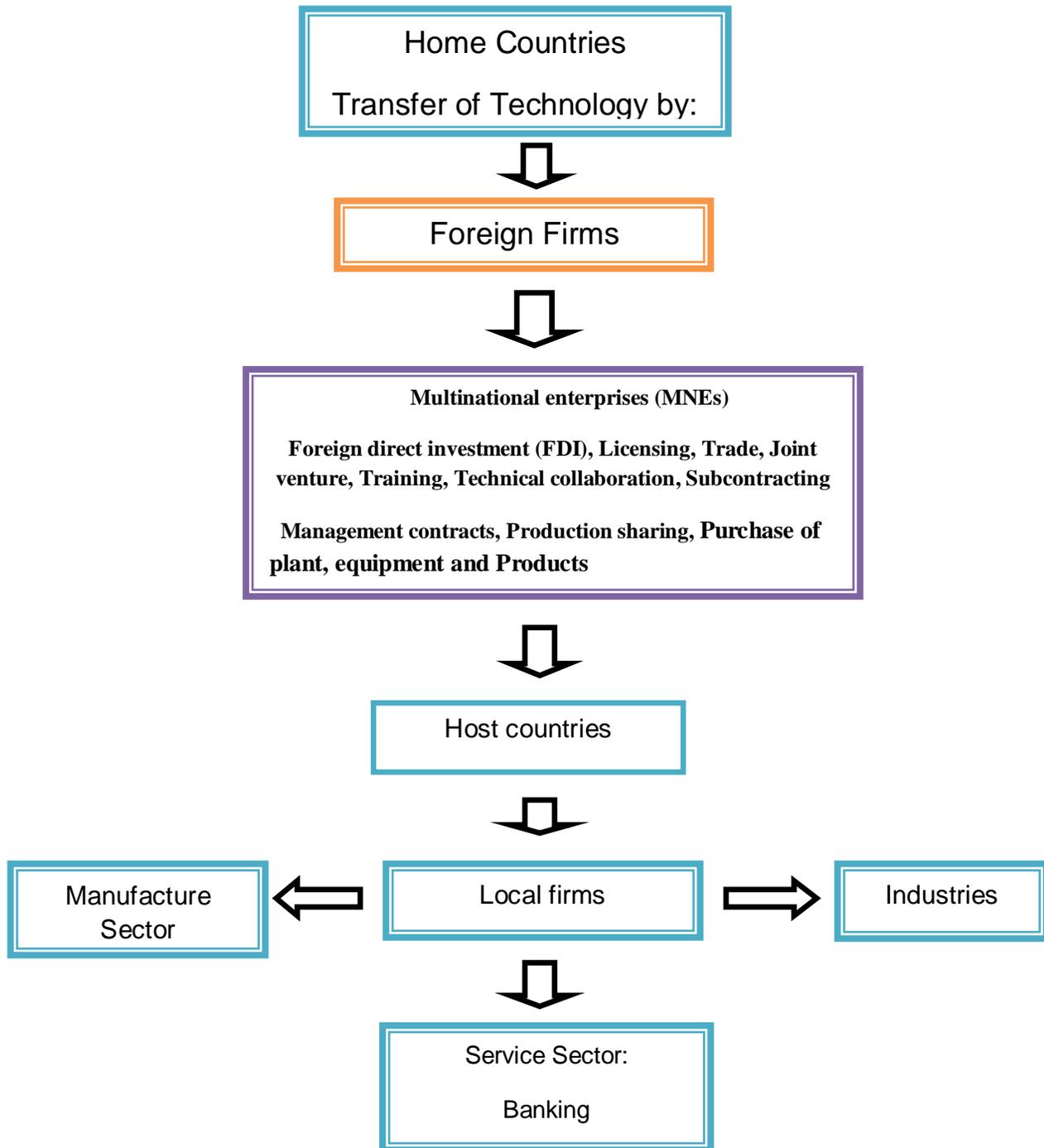
Foreign direct investment (FDI) promotes economic development in host countries through a number of various channels but the impact it has largely depends on the receiving countries and their industries (Cantwell, 1995). While the trade theory approach is concerned with the direct effects, for example factor prices, the industrial-organization approach is more concerned with the indirect effects such as spillovers.

In consideration of spillovers, it should be considered that their benefits usually materialise within several years from when a technology is introduced to a country. However, there has not been substantial analysis of these technological spillovers because such analysis requires large amounts of data. Literature related to FDI does contain some empirical evidence pertaining to spillovers, which includes the linkages between foreign and local companies, training of the local workforce, and demonstration effects (Blomstrom and Kokko, 1997).

Demonstration effects of FDI are the technological advantages that local companies can gain from FDI by expanding the technology that is available locally, combined with the competitive prowess of foreign firms (Pack and Saggi, 1997). Technology transfer can take place through FDI from home countries to host countries, as shown in the figure 2.1 below.

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Figure 2.1 shows general channels of Technology Transfer from home to host country

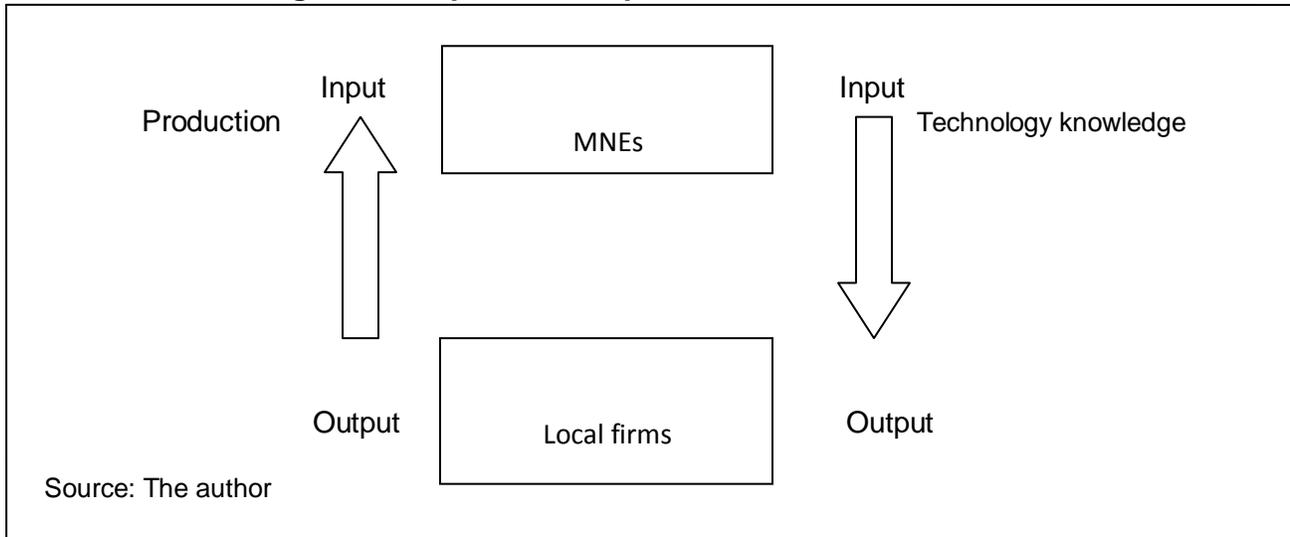


Source: The author

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In the other words, according to Shih-Fen (2005), MNEs are play very important role to technology transfer (TT) to local firms, also he said MNEs can simply provide technological knowledge to local manufacturer without licensing contract for example, as well as MNEs transfer of technology knowledge to local firms, than MNEs buy back the production (output) of the local firms through the external market without licensing, in other words (output from MNEs is input to local firms on the one hand, output from local firms is input to MNEs on the other hand) as shown in figure 2.2 below.

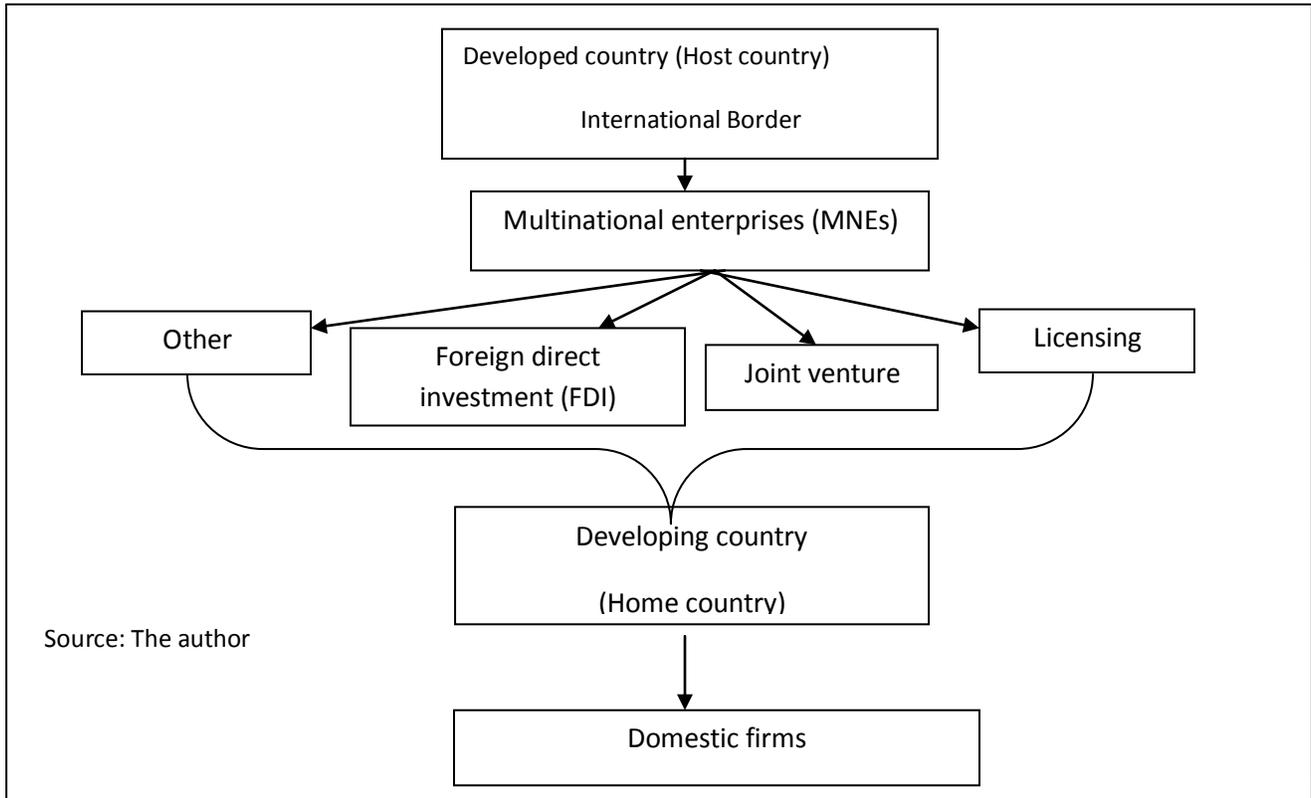
Figure 2.2 Input and output from MNEs to Local firms



In addition, there are indirect and technology transfer, which occurs when the client does not receive foreign technology through the public media, such as technical publications, or come to the source of technology, and the researcher or student to the university. So can show in figure 2.3, how technology transfer and knowledge by Multinational enterprise.

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Figure 2.3 Transfer of technology and knowledge by Multinational enterprises (MNEs): Direct and Indirect types



The researcher thinks that this is most viable and cheapest way of transfer technology by using the direct and indirect methods (as shown below in figure 2.4 and 2.5) and the third way is International trade, alliances and joint ventures, subcontracting and goods imports and exports, and mobility of personnel developments and assistance.

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Figure 2.4 Direct of technology transfer

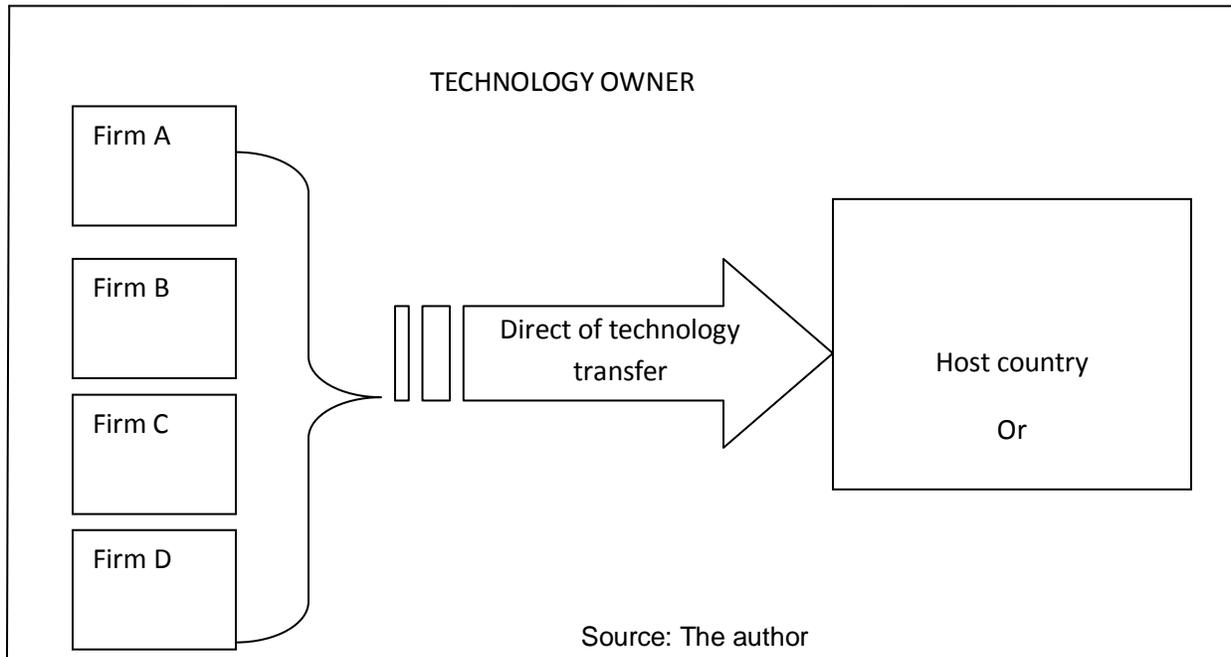
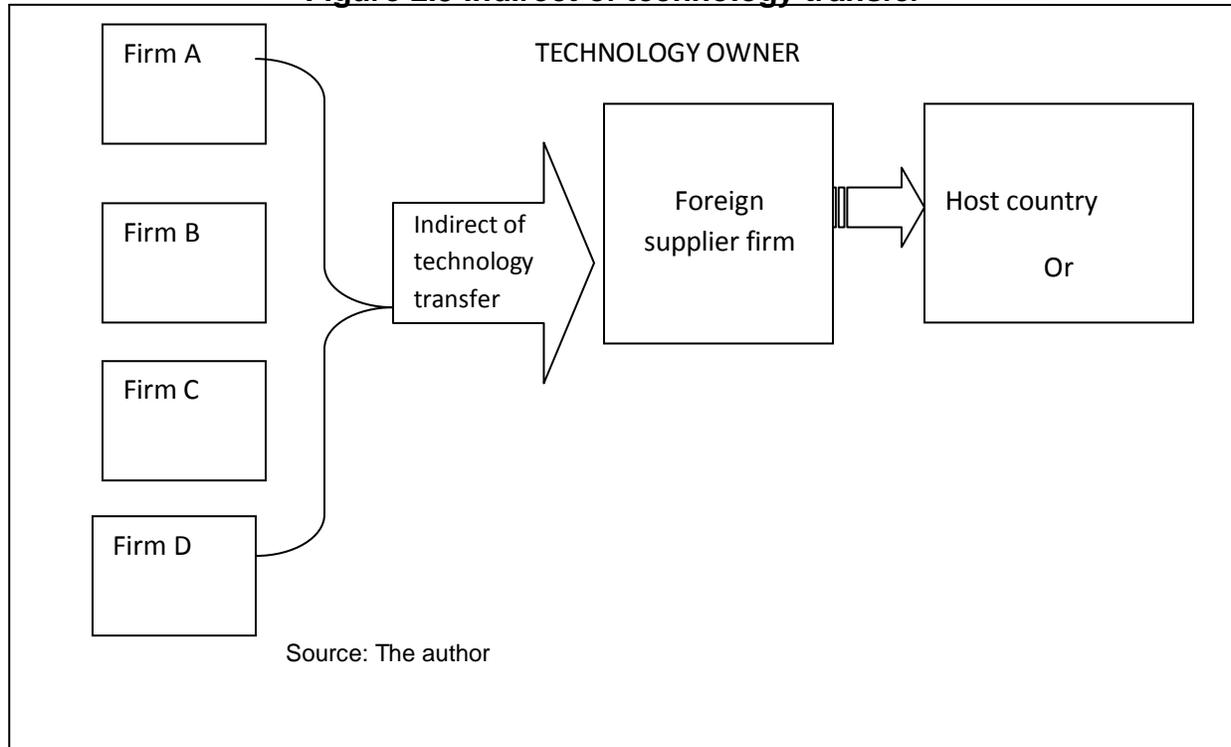


Figure 2.5 Indirect of technology transfer



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3. Methodology

The research approach to be adopted is to identify Libya and Egypt as specific case studies for the investigation on foreign direct investment (FDI) and technology transfer (TT) and to enable a point of comparison as well as this study used questionnaire to collected data, because this study is qualitative study, there are many reasons associated with the choice of Egypt for this comparative study. Firstly, Egypt and Libya are geographically close in proximity. Secondly, the Egyptian economy is more diversified and developed than the Libyan economy. Thirdly, Egypt has long-term experience of foreign direct investment (FDI) having emerged as the leading FDI recipient in Africa. Moreover, this study used a questionnaire for the collection of important data, and distributed 220 questionnaires in the Libyan target environment and 220 questionnaires in the Egyptian target environment, order to adequately cover different sectors within industry, of different sizes, with different nationalities participating. The questionnaire survey contained four parts with (37) a question in total, the questionnaire was addressed to the company's Director of Information Technology (Department of Transportation), and the Director of Research and Development of the company. In addition, for this study the T. Test for the analysis of data with software was applied. The use of the T. Test to establish the difference between two mediums was considered as one of the famous static barometric measurements, used for testing the guidance difference between two groups in one or more of the contrasts.

4. Results Analysis

Table (4.1) shows the distribution of foreign direct investment in different economic sectors in Libya during the period from 2000 to 2008. These investments are investments amounted to 13496 million dollars in 154 projects investments. The volume of work in these projects 21595 workers, including the 4092 foreign workers and the rest of local employment.

Table (4.1) Evolution of the volume of foreign direct investment received by some economic sectors in Libya, during Period (2000 – 2008) Million dollars

Sector	Quantity	Sharing Ratio (%)	Foreign direct investment in millions of dollars	Local Employment	Foreign Employment	Total of Employment
Industry	67	44	3073.29153	6524	745	7269
Health	13	2.4	151.90377	957	285	1242
Tourism	46	26.9	1858.53	6896	325	7221
Agriculture	2	0.1	6611.25	91	34	125
Services	23	6.6	457.32138	1595	391	1986
Real Estate Investment	3	19.5	1344.27069	1440	2312	3752
total	154	100.0	13496.56737	17503	4092	21595

Source: - Central Bank of Libya - Economic Bulletin - , the reports of various years

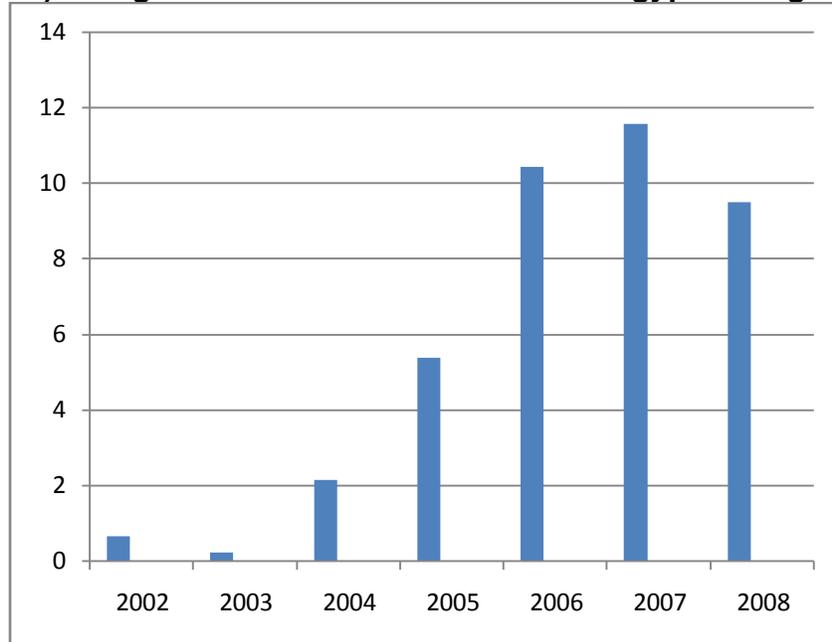
Table (4.2) Net foreign direct investment inflows to Egypt during 2002-2008

2002	2003	2004	2005	2006	2007	2008
647	237	2.157	5.376	10.043	11.578	9.495

Sources: Ministry of Investment, repot 2008, p.232

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Figure (4.1) foreign direct investment inflows to Egypt during 2002-2008



This study is a comparative study between two countries (Libya and Egypt) because Libya and Egypt are at different stages of development within their foreign direct investment (FDI) industries, as they have great differences in which they have contact with issues regarding technology transfer. Moreover, on a comparative basis, Egypt is more advanced in foreign direct investment and has been one of the first Arab countries along with African countries to attract foreign direct investment (FDI) and technology transfer (TT), which provides an opportunity to consider its development as a possible analogue for what may occur in the Libyan economy.

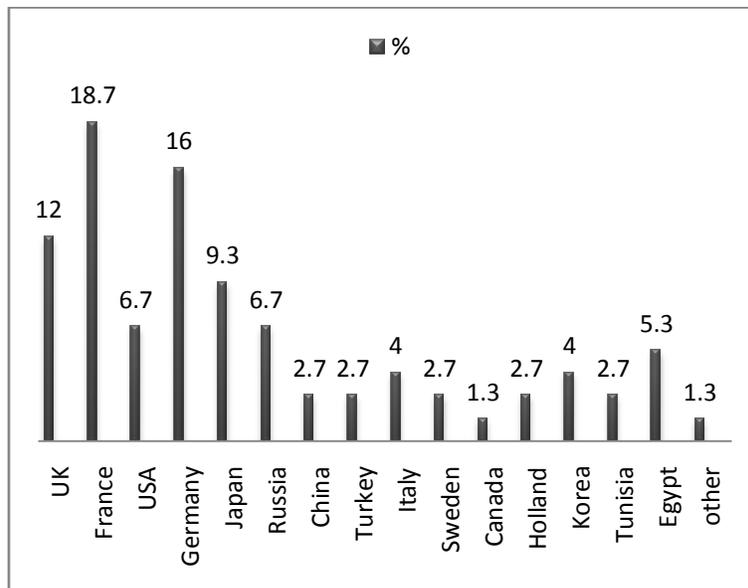
Moreover, table (4.3) gives a clear picture about nationality of investors companies which are shared in this study. It investigates the nationality of the foreign investor which is very important in order to be aware of the sources of foreign investment and technology. On the hand, if the majority of investment came to Libya or Egypt from countries such as Tunisia, there will be a difference if for example, the majority of investment came from Japan or USA in terms of values of investment and levels of technology. For this reason, it is important to investigate the nationality of the foreign investor. The results will help to conduct analysis and make a judgment about the investment situations in Libya and Egypt.

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Table (4.3) Nationality of investors companies which investment In Libya

Countries	Number	%
UK	9	12
France	14	18.7
USA	5	6.7
Germany	12	16.0
Japan	7	9.3
Russia	5	6.7
China	2	2.7
Turkey	2	2.7
Italy	3	4.0
Sweden	2	2.7
Canada	1	1.3
Holland	2	2.7
Korea	3	4.0
Tunisia	2	2.7
Egypt	4	5.3
other	1	1.3

Figure 4.2 Nationality of investors companies which investment in Libya



The Egypt situation, however, is different if compared with the Libyan case study, because the Egyptian government has a good relationship with all the countries (Arab countries; Africa countries; Europe countries and USA) from many years ago. The USA came in first place among countries investing in Egypt and came with a rate of 20% which is higher than any other country as shown in table (4.4), because Egypt has a very good relationship with the USA as shown in the table (4.5). The alternative is, that the Egyptian government encourages attracting investment which is working to develop the Egyptian economy and at the same time bringing with them high technology, as Egypt depends on foreign investment more than any other factor, because it is not a

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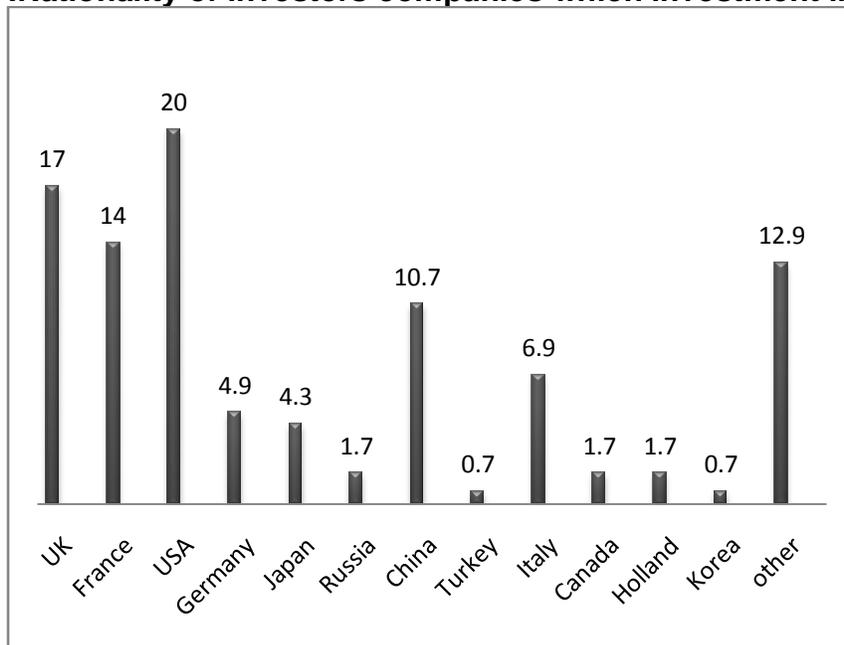
rich country and it has the biggest population within the Arab countries. Consequently, for this reason, the Egyptian government relies heavily on foreign investment as a great source of income.

According to the Ministry of Investment, (2008), from 2003-2008 the USA has contributed to the largest investment in Egyptian economy with around 6 billion dollars. Egypt is the largest market in the world for wheat for the United States and a large importer of other agricultural commodities, machinery, and equipment. European investment to Egypt was around 5 billion dollars, and the UK investors ranked first among the countries investing in Egypt other than European investments. This includes investments in oil and the gas sector as well as consumer goods, automobile production, and financial services.

Table (4.4) Nationality of investors companies which investment in Egypt

Countries	Number	%
UK	15	17
France	13	14
USA	17	20
Germany	6	4.9
Japan	4	4.3
Russia	2	1.7
China	9	10.7
Turkey	1	.7
Italy	6	6.9
Canada	2	1.7
Holland	2	1.7
Korea	1	.7
other	12	12.9

Figure 4.3 .Nationality of investors companies which investment in Egypt (%)



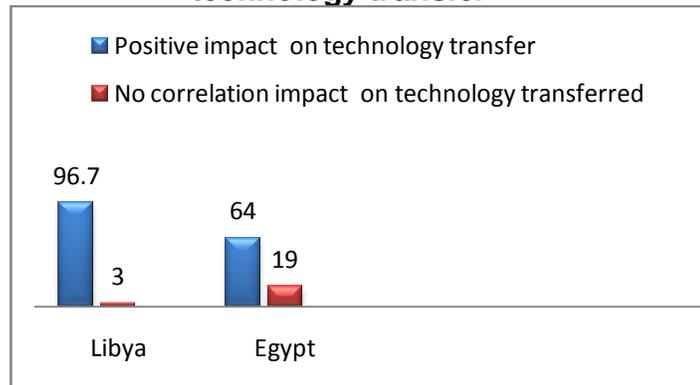
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Through the table (4.5), show most of the sample in two countries (Libya and Egypt) see that their investments have positive impact on technology transfer.

Table (4.5) investment in (Libya and Egypt) has positive impact or other on technology transfer

			Do you think that the size of your investment in Libya and Egypt has:		Total
			Positive impact on technology transfer	No correlation impact on technology transferred	
Country	Libya	Count	87	3	90
		% within Country	96.7%	3.3%	100.0%
		% of Total	50.3%	1.7%	52.0%
	Egypt	Count	64	19	83
		% within Country	77.1%	22.9%	100.0%
		% of Total	37.0%	11.0%	48.0%
Total	Count	151	22	173	
	% within Country	87.3%	12.7%	100.0%	
	% of Total	87.3%	12.7%	100.0%	

Figure 4.4 investment in (Libya and Egypt) has positive impact or other on technology transfer



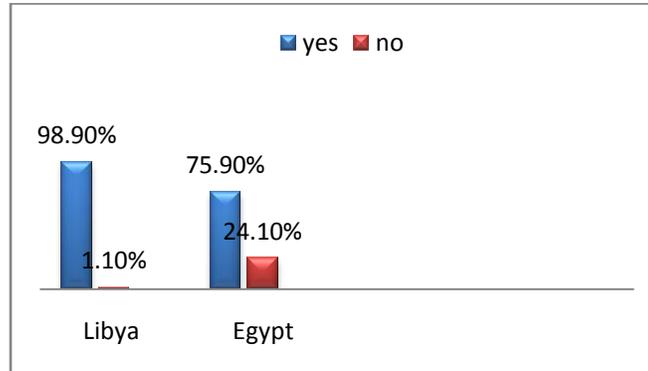
Through the table (4.6), show most of the sample around 89 % in two countries (Libya and Egypt) see that foreign direct investment is very an important way to technology transfer

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Table (4.6) foreign direct investment (FDI) is very an important way to technology transfer (Libya and Egypt)

			Do you think foreign direct investment (FDI) is very an important way to technology transfer to Libya and Egypt?		Total
			yes	no	
Country	Libya	Count	89	1	90
		% within Country	98.9%	1.1%	100.0%
		% of Total	51.4%	.6%	52.0%
	Egypt	Count	63	20	83
		% within Country	75.9%	24.1%	100.0%
		% of Total	36.4%	11.6%	48.0%
Total		Count	152	21	173
		% within Country	87.9%	12.1%	100.0%
		% of Total	87.9%	12.1%	100.0%

Figure 4.5 foreign direct investment (FDI) is very an important way to technology transfer to (Libya and Egypt)



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Table 4.7 T. Test for measuring factors Major influenced decision invest in Libya

	Mean	Std. Deviation	T		Rank
			T	Sig. (2-tailed)	
1- Political stability	4.4111	.63413	21.111	.000	1
2- Country's geographical position	4.3444	.63884	19.965	.000	2
3- Availability of natural resources	4.2333	.56190	20.823	.000	3
4- Government incentives	4.1222	.83232	12.791	.000	4
5- There are many investment opportunities	4.1000	.84866	12.296	.000	5
6- Good investment environment	3.7444	1.05534	6.692	.000	6
7- Supportive legal framework	3.6667	.76438	8.274	.000	7
8- Availability of highly skilled technical labour	3.6000	1.08927	5.226	.000	8
9- Availability of cheap unskilled labour	3.0000	1.21784	.000	1.000	9
10- Large market potential	3.4111	.93490	4.172	.000	10
11- Availability of cheap unskilled labour	3.0000	1.21784	.000	1.000	11
12- Educated consumers	2.9222	.99694	-.740	.461	12

The results shown in Table (4.7) answer the first question of the research, (*What are the critical factors for the success of foreign direct investment in the economies of Libya and Egypt?*), the results confirm that there are a large number of factors that have attracted FDI to Libya. Based on the statistical analysis has been used in this study, it emerges that for instance, there is a good environment for investment in Libya capable of promoting foreign investment. This environment is identified with a mean (3.744) based on the level of its significance (.000), which assures statistically that Libya has a good investment environment capable of attracting FDI, and that it is characterized by the stability of the political and economic environment. Libya also has an important geographical location, because it provides a link between Africa and Europe; it is nearest to the international market, so this factor (geographical location) is in second place as mentioned in Table 7.6. A good environment for investment and geographical location is linked to other elements, as mentioned in the Table.

5. Conclusion

This paper has reached very important conclusions regarding an investigation of critical success factors for foreign direct investment (FDI) and technology transfer (TT): Comparative study of Libya and Egypt. A number of objectives have been formulated to achieve this aim as mentioned below.

- 1- The study found that foreign direct investment is the most important channels for transfer of technology (by the consensus of members of the sample in the two countries)

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- 2- The study found that there are factors that help to attract foreign direct investment to the host countries for investment and are as follows:
 - The presence of a good investment environment for investment
 - There are many investment opportunities for investors
 - Political stability
 - Legal stability
 - Economic stability
 - Geographic Location
 - Availability of raw materials
 - Tax policy encouraging
 - Encouraging investment law
- 3- The study found that the transfer of technology from foreign investors to the State Investment affects on each of:
 - Location factor
 - Market policy
 - Exchange rate
 - Investment law
- 4- The study found that political conflicts cost of technology transfer (TT); international relations between developed and developing countries are most important factors on the process technology transfer (TT).
- 5- The study found that the transfer of technology from foreign investors to the State Investment affects: (Location factor, Market policy, Exchange rate and Investment law)

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