FOREIGN DIRECT INVESTMENT AND TECHNOLOGY TRANSFER IN DEVELOPING COUNTRIES

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ABSTRACT

The study of foreign direct investment (FDI) and transfer of technology have been a great interest area for academics, policy maker, and industries in both developed and developing countries. There is an increased level of link between foreign direct investment and technology transfer made by Multinational Corporation in developing countries and it widely believed that FDI help to transfer technology to the benefit of the domestic industries. But the findings of the paper shows that this benefit does not automatically accrue but rather technology is transferred to local industries with strong absorptive capability via spill over's rather than via direct effect. It further shows that there is lack of link between diffusion and rooting of technology in developing countries and this major constraint hampered the recipient country's ability to assimilate, transform and develop the technology. Based on these findings, the following recommendations were made: That comity of nations under the auspices of the United Nation should establish an international organization for collecting and distributing technological information as well as of the need to create effective international bodies for education and training. Also developing countries should encourage Greenfield's ventures and acquisition and placed less emphasis on other entry mode like joint venture, franchising, licensing.

INTRODUCTION

Foreign direct investment (FDI) flows to developing nations have risen to an unprecedented level in the 1990's. The growth of foreign direct investment during the past years has been phenomenal. Aitken and Harrison (1999) note that is 1997 FDI represented about 40% of all public and private capital flows to developing countries. Worldwide FDI as of 2001 topped $6.8trillion. This stunning growth in FDI and its acceleration in the 1990s reflect the globalization of the world's economy. As you might expect, most FDI comes from developed countries. Surprisingly, must FDI also goes to developed countries. There is widely held view that there is increased level of link between foreign direct investment and technology transfer made by multinational corporation engagement in the developing countries. It is widely held that multinational activity by more efficient foreign multinationals promotes technology transfer to the benefit of domestic companies.

Technology transfer is clearly maximized by such direct linkages with domestic suppliers which occur when incoming multinationals work closely with domestic suppliers to raise the standard of inputs. Technology transfer may also bring with it some positive indirect "demonstration effects' as less efficient local producers seeks to imitate the superior processes and organizational advantages of foreign multinationals.

REVIEW OF RELATED LITERATURE

According to Aswathappa (2006) foreign direct investment is defined as any ownership of long- term assets as well as certain short- term assets in one country by individuals or organizations of another nation.

Griffin & pasty (2005) defined foreign direct investment as the acquisition of foreign assets for the purpose of controlling them. The United States government statisticians define foreign direct investment as "ownership or control of 10 percent or more of an enterprise voting securities or the equivalent interest in an unincorporated business". Foreign direct investment may take many forms, including purchase of existing assets in a foreign country, new investment in property, plant, and equipment, and participation in a joint venture with a level partner.

According to Rugman & Hodgetts (2003) FDI is defined as an equity funds invested in other nations. They further stressed that FDI is undertake by MNEs who exercise control of their foreign affiliates. Like exports and imports, FDI is a driver of international business and many companies use FDI to establish footholds in the world market place by setting up operations in foreign markets or by acquiring business there. FDI occurs in two ways. First there is the "Greenfield" investment, which involves the construction of new production facilities in a country either through brand new subsidiaries or expansion of existing subsidiaries. Secondly, FDI occurs through the acquisition of existing firm in less developed countries. In considering the extent of FDI, three dimensions are important in taking decision. These are the company's international strengths and weakness, (i.e. the company's capabilities), the attractiveness of location and the perceived risk. When examined from an overall perspective, FDI data show that industrialized countries have invested very large amounts of money in other industrialization nations as well as smaller amounts in less developed countries (LDCS) such as those in eastern Europe or newly industrialization countries (NICS) such as Korea and Singapore. However, most of the world's FDI is Invested both by and within the three major groups we identified earlier the US, Western Europe, and Japan. The US is an excellent example of a country that is major target of investment as well as a major investor in other countries.

By 1999, the US had become such a major investment target that foreign holdings were almost $1 trillion. At the same time, American companies have substantial FDI in other countries and these total more than $1.1 trillion.

FOREIGN DIRECT INVESTMENT IN THE UNITED STATES

Country/ region	**Millions of US$**	**% of all country**
All countries	986,668	100.0
Canada	79,716	8.1
Europe	685,845	69.5
France	77,622	7.9
Germany	111,138	11.3

Luxembourg	54,894	5.6
Netherlands	130,703	13.2
Switzerlands	55,280	5.6
United Kingdom	183,145	18.6
Others	73,063	7.4
Latin America and other western Hemisphere	44,591	4.5
Bermuda	13,054	1.3
Mexico	3,612	0.4
Panama	5,896	0.6
United Kingdom Islands- Caribbean	13,883	1.4
Other	8,146	0.8
Africa	1,545	0.2
Middle East	7,087	0.7
Asia and Pacific	167,884	17.0
Australia	10,818	1.1
Japan	148,947	15.1
Other	8,119	0.8

Sources: US Department of Commerce; Survey of current Business, March 2001 and US Bureau of Economic analysis

FOREIGN INVESTMENT BY THE UNITED STATES, 1999

Country/ region	**Millions of US$**	**% of all country**
All countries	1,132,622	100.0
Canada	111,707	9.9
Europe	581,791	51.4
France	39,984	3.4
Germany	49,617	4.4
Netherlands	106,436	9.4
Switzerland	51,227	4.5
United Kingdom	213,070	18.8
Others	121,457	10.7
Latin America and other western Hemisphere	223,182	19.7
Bermuda	45,959	4.1
Brazil	35,003	3.1
Mexico	34,265	3.0
Panama	33,429	3.0
Other	74,526	6.6
Africa	15,062	1.3
Middle East	11,137	1.0
Asia and Pacific	185,912	16.4
Australia	33,662	3.0
Japan	47,786	4.2
Other	104,464	9.2
International	3,832	0.3

Sources: US Department of Commerce; Survey of current Business, March 2001 and US Bureau of Economic analysis

FDI THEORIES

FDI theories according to Ricky & Michael (2005) include the ownership Advantages theory, internalization theory, Dunning Electric theory on one hand and according to Aswathappa (2006) include the product life cycle theory and market power theory on the other hand.

a. **Ownership Advantages theory**: - More powerful explanations for FDI focus on the role of the firm. Initially researchers explored how firm ownership of competitive advantages affects FDI. The ownership advantage theory suggests that a firm owning a valuable asset that creates a competitive advantage domestically can use that advantage to penetrate foreign markets through FDI. The assets could be, for example, a superior technology, a well known brand name, or economies of scale.
b. **Internalization theory**: - Internalization theory relies heavily on the concepts of transaction costs. Transaction costs are the costs of entering into a transaction, that is those connected to negotiating, monitoring, and enforcing a contract. A firm must decide whether it is better to own and operate its own factory overseas or to contract with a foreign firm to do this through a franchise, licensing, or supply agreement. Internalization theory suggests that FDI is more likely to occur that is international production will be internalized within the firm when the costs of negotiating, monitoring, and enforcing contracts with a second firm are high.
c. **Dunning's Eclectic theory**: This theory recognizes that FDI reflects both international business activity and business activity internal to the firm. According to Dunning, FDI will occur when three conditions are satisfied:

i. **Ownership advantage**:- The firm must own some unique competitive advantage that overcomes the disadvantages of competing with foreign firms on their home turfs. This advantage may be a brand name, ownership of proprietary technology, the benefits of economies of scale, and so on.
ii. **Location advantage**:- Undertaking the business activity must be more profitable in a foreign location than undertaking it in a domestic location especially when trying to exploit lower labour costs and avoid high tariff walls on exported goods.
iii. **Internalization advantage:-** The firm must benefit more from controlling the foreign business activity than from hiring an independents local company to provide the service. Control is advantageous, for example, when monitoring and enforcing the contractual performance of the local company is expensive, when the local company may misappropriate technology, or when the firm's reputation and brand name could be jeopardize by poor behaviour by the local company.

d. **The product lifecycle theory:** According to Aswathappa (2006) product lifecycle theory was considered earlier to explain the flow of trade between countries. But the theory has implications for FDI too. It is widely held that some firms that pioneer products in their home markets undertake to produce a product for consumption in foreign markets.

Vernon's view is that firms undertake FDI at particular stages in the lifecycle of a product they have pioneered. They invest in other advanced countries when local

demand in those countries grows large enough to support local production. They subsequently shift production to developing countries when product standardization and market saturation give rise to price competition and cost pressures. Investment in developing countries where labour costs are lower are seen as the best way to reduce costs

e. **Market power theory**: The market power theory assumes that an international business seeks to establish a dominant market presence in an industry through FDI. The benefit of such a presence is clear; the firm is in a better position to dictate the cost of its inputs and /or price of its output.

FACTORS INFLUENCING FOREIGN DIRECT INVESTMENT

There is a widely held view that because of the complexity of the global economy and the numerous business opportunities abound in different countries, it is not surprising that several factors may influence a firm's decision to undertake FDI. According to Rugman and Hodgetts (1998) these factors may include:

a. **To increase profit and sales:-** when a company develops and markets a new products, it initially promotes the product in a local market. Eventually, the company's focus will turn to the export opportunities. These new markets often help to sustain sales growth while generating increased profits. In fact, global markets frequently offer more lucrative opportunities than do domestic markets. This helps to explain why Mitsubishi, BMW, and Mercedes for example, are now pushing hard to increase their share of the profitable U.S automobile market, while ford motors and Chrysler are striking hard in Europe. Similarly, Coca-cola is earning more sales and profits overseas than in the United States, and Pepsi co. has become Mexico's largest products company. Obviously, FDI is paying off handsomely for many companies selling their products in overseas market.

b. **To enter rapidly growing markets:** some international markets are growing much faster than others, and FDI provides MNEs with the chance to take advantage of these opportunities. For example, when the laptop computer market is Japan in the early 1990s was booming; more than 40 percent of are personal computers sold there were laptops. As a result IBM introduced its new laptop in Japan. Many MNEs also use FDI to gain footholds in emerging markets, where large number of companies are acquiring firms or setting up joint ventures and gaining greater international prominence especially in developing countries.

c. **To reduce cost**: An MNE can sometime achieve substantially lower costs by going abroad than by producing at home. If labour expenses are high and represent a significant portion of overall costs, an MNE may be well advised look to other geographical area where the goods can be produced at a much lower labour price. In recent years for example, some Canadian manufacturers have been moving operations across the border to take advantage of lower US labour units costs. A second important cost factor is material. If materials are in short supply or must be conveyed a long distance, it may be less expensive to move production close to the source of supply than to import the materials. A third critical cost factors is energy. If the domestic cost of energy for making the product is high, the company may be forced to set up operations overseas. If the cost of transporting raw materials is high than domestic production, It is more efficient to establish a subsidiary. FDI

in developing countries assist in reducing costs thereby increasing profit margin for an MNC.

d. **Another reason for FDI is to protect one's domestic market:** Many MNEs are now entering an international market in order to attack potential competitors and thus prevent them from expanding their operations overseas. These multinationals reasons that a competitor is less likely to enter a foreign market when it is busy defending its home market position. Similarly, sometimes an MNE will enter a foreign market in order to bring pressure on a company that has already challenged its own home market. For example, 10 days after Fuji began building its first manufacturing facility in the US; Kodak announced its decision to open a manufacturing plant in Japan.
   Sometimes the decision to go international also helps a firm to its position with current clients who are going international. For example, when Honda Motors set up operations Indiana, Nippodenso, a producer of automobile radiators and heaters, established a plant nearby.
e. **Protect Foreign Markets:** Sometimes MNE will use FDI in order to protect their foreign markets. In the US, for example, from 1981 to 1991 the total number of service stations had declined by over 50 percent. British petroleum (BP), which had a substantial investment in this market, realized that in order to protect its investment it would be necessary to make a substantial investment in order to upgrade its stations and increase its market share. The company refines and markets petroleum products and realized that if it could attract a growing number of customers to its service stations, it could profit handsomely by moving its products directly downstream to the final consumer. The company also merged with Amoco, thus assuring itself of a solid market share and, in the process, protecting its investment in this foreign market. Had it not done this, local competitors would inevitably have eroded the firm's position.
f. **Acquire Technological and managerial Know-how**: Still another for FDI is to acquire technological and managerial expertise. One way of doing this is to set up operations near those of leading competitors. This is why some US firms have moved some of their research and development facilities to Japan. With this strategy, they find it is easier to monitor the competition and to recruit scientists from local universities and competitive laboratories. Kodak is an excellent example. The company made the decision to build an 180,000-square foot research center and it started cultivating leading scientists to help with recruiting.
g. **To Gain a foothold in economic blocs:** As we have noted on a number of occasions thus far, these are three major international economic blocs. MNEs that acquire a company in one of these blocs or that enter into an alliance to do business in one of these economic strongholds can obtain a number of benefits including the right to sell their output without having to be burdened by import duties or other restrictions. In the case of NAFTA, for example, the United State – Canada Free Trade Agreement of 1989 was the initial step in fashioning a giant North American market. In January 1994 this agreement was expanded to include Mexico, and in the future Chile will become the fourth member. International MNEs wanting to do business in North America are finding that it is important to gain a foothold in this region through FDI.

Similarly, according to Ricky & Michael (2005) these factors may be classified into three (3) namely; supply factors demand factors and political factors.

a. SUPPLY FACTORS

i. **Production cost:** Firms often undertake FDI to lower production costs. Foreign locations may be more attractive than domestic sites because of lower land prices, tax rates, and commercial real estate rents or because of better availability and lower cost of skilled or unskilled labor. For example, Novolabs, a small German software company, has shifted much of its programming to Novosibirsk, Russia. Novolabs was able to hire high quality imaginative programmers in that Siberian city at one- third the salaries it was paying at its headquarters in Dusseldorf.

ii. **Logistics:-** If transportation cost are significant, a firm may choose to produce in the foreign market rather than export from domestic factories. For example, Heineken has utilized FDI extensively as part of its internalization strategy because its products primarily water. Brewing its beverages close to where its foreign consumers live is cheaper for Heineken than transportation the beverages long distances from the company's Dutch breweries. International businesses also often make host- country investment to reduce distribution costs. For example, Citrovita, a Brazilian producer of orange juice concentrate, operates a storage and distribution terminal at the port of Antwerp rather than ship to European grocery chain directly from Brazil. Citrovita can take advantage of low ocean- shipping rates to transport its goods in bulk from Brazil to the Belgian port. The company then uses the Antwerp facility to repackage and distribute concentrate to its customers in France, Germany, and the Benelux countries.

iii. **Availability of natural Resources:** Firms may utilize FDI to access natural resources that are critical to their operations. For instance, because of the decrease in oil production in the united stats, many U.S based oil companies have been forced to make significant investments world wide to obtain new oil reserves. Often international businesses negotiate with host governments to obtain access to raw materials in return for FDI. For example, Manila's Ayala Corporation built tuna canaries on the northern Indonesia Island of Sulawesi; this was part of a deal with the Indonesian government to allow Philippine tuna boats based in the southern Philippine Island of Mindanao to fish in Indonesia's territorial waters. This deal has benefited both countries; more than 8,000 people in the Philippines and Indonesia are now employed in nine canneries and 600 fishing vessels, part of an operation that annually exports $34million worth of tuna to North American and European Consumers.

iv. **Access to key Technology:** Another motive for FDI is to gain access to technology. Firms may find it more advantageous to acquire ownership interests in an existing firm than to assemble an in-house group of research scientists to develop or reproduces and emerging technology. For instance, many Swiss pharmaceutical manufacturers have invested in small U.S biogenetics companies as an in expensive means of obtaining cutting- edge biotechnology. Similarly, Taiwan's Acer Inc., a manufacturer of personal computers and work stations, paid $100million in the 1990s for a pair of Silicon Valley computer companies in the hope of leveraging their technology and existing distribution networks to boost Acer's share of the U.S personal computer market.

b. **DEMAND FACTORS**

Firms also may engage in FDI to expand the market for their products. The demand factors that encourage FDI include customer access, marketing advantages, exploitation of competitive advantages, and customer mobility.

a. **Customer Access:-** Many types of international business requires firms to have a physical presence in the market. For example fast food restaurants and retailers must provide convenient access to their outlets for competition reasons. KFC cannot provide its freshly prepared fried Chicken to Japanese customers from its restaurants in the United States; it must locate outlets in Japan to do so. Similarly, IKEA'a success in broadening its customer's base beyond its home marker in Sweden is due its opening a number of new stores worldwide.

b. **Marketing Advantages**:- FDI may generate several types of marketing advantages. The physical presence of a factory may enhance the visibility of a foreign firm's products in the host market. The foreign firm also gains from "buy local" attitudes of host country customers. For example, through ads in such magazines as Time and sports illustrated, Toyota has publicized the beneficial impact of its U.S factories and input purchases on the U.S economy.

c. **Exploitation of Competitive Advantages**:- FDI may be a firm best means to exploit a competitive advantage that it already enjoys. An owner of a valuable trademark, brand name, or technology may choose to operates in foreign countries rather than export to them. Often this decision depends on the product's nature. For instance, pari mutuel Urbain (PMU) operates 7,000 off- track betting facilities in Europe. It developed an ingenious network of computers, on-site terminals and satellite communications to make it France's seventh- largest service company with annual revenues of $6billion. PMUs success in harnessing modern communications technology to meet the needs of horse-racing fans has boosted its French business by 25 percent and enables it to expand its off track betting operations into Switzerland and Monaco.

d. **Customer Mobility:-** A firm FDI also may be motivated by FDI of its customers or clients. If one of a firm existing customer builds a foreign factory, the firm may decide to locate a new facility of its own nearby, thus enabling it to continue to supply its customers promptly and attentively. Equally important, establishing a new facility reduces the possibility that a competitor in the host country will step in and steal the customer. For example, Japanese parts suppliers to the major Japanese automakers have responded to the construction of Japanese owned automobile assembly plants in the United States, by building their own U.S factories ware houses, and research facilities. Their need to locate facilities in the United States is magnified by the auto makers' use of just-in-time (JIT) inventory management techniques.

c. **POLITICAL FACTORS**

Political factors may also enter into a firm's decision to undertake FDI. Firms may invest in a foreign country to avoid trade barriers by the host or to take

advantage of economic development incentives offered by the host government.

i. **Avoidance of Trade Barriers**:- Firms often build foreign facilities to avoid trade barriers. In the late 1990s, for example, the Fuji photo film company invested $200million in its Greenwood, South Carolina, factory complex to begin manufacturing film for sale in the United State. Previously, the company supplied film to its U.S customers from its factories in the Netherlands and Japan. By producing in the United states rather than exporting to it, Fuji avoided a 3.7 percent tariff on film imposed by the United states and deflected claims by Kodak that Fuji was unfairly "dumping" Japanese- made film in the US market.

ii. **Economic Development Incentives**:- Most democratically elected governments- local, state and national- are vitally concerned with promoting the economic welfare of their citizens, many of whom are, of course, voters, many governments offer incentives to invest to induce them to locate new facilities in the governments' jurisdictions. Governmental incentives that can be an important catalyst for FDI include reduce Utility rates, employee training programs, and infrastructure additions (such as new roads and rail road spurs) and tax reductions or tax holidays. Often MNCs benefit from bidding wars among communities eager to attract the companies and the jobs they bring. For instance, Alabama agreed to provide Hyundai motor $118.5million in incentives to capture the firms first U.S plant, which is expected to employ 2,000 workers once it becomes operational in 2005.

THE NATURE OF TECHNOLOGY TRANSFER

A major reason for the inequality between developed nations and poor (Underdeveloped or developing) nations is simply the gap in technology. Technology largely determines a nation wealth. Nations, people, and organization increasingly depend on technology for prosperity and quality of life. The competitive edge of an individual firm vastly depends on technology. One of the means of acquiring technology is through its transfer.

"Broadly speaking, technology is how people modify the natural word to suit their own purpose, from word techne, meaning art or artifice or craft, technology literally means the act of making or crafting, but more generally it refers to the diverse collection of processes and knowledge that people use to extend human abilities and to satisfy human needs and wants" (NOACSC, 2007). Technology could be viewed as the technique used by human and machine to support daily activities. This technology could be used at work place or at home. Technology could be seen as the ensemble of theoretical and practical knowledge and skill that are used by firms to develop and produce its goods and services (P.K.De, 2004). Technology facilitates information sharing there by making it possible for tacit knowledge to be transferred. The MNC through FDI is the only legitimates channel through which technology can be transferred.

According to Aswathappa (2006) technology transfer is a process that permits the flows of technology from a source to a receiver. The source is the owner or holder of the knowledge and it can be individual, a company, or a country. The receiver is the beneficiary of the transferred technology. In the opinion of YU (1990) Technology transfer

is the systematic transfer of knowledge for the manufacture of a products or provision of services. Yu view technology transfer as the simple movement of knowledge of product and services from one company to another.

Technology transfer covers various activities, including the internal transfer of technology from the R&D or engineering department to the manufacturing department of a firm based in a country. It also includes the some transfer of technology from a laboratory or operations of a MNC's in one country to its laboratory or operations in another country. Finally, it includes the transfer of technology from a research consortium supported by many firms to one of its members (Szokanyi, 1999).

WHAT IS IT THAT IS TRANSFERRED IN THE NAME OF TECHNOLOGY?

Technology is transferred through published material (such as journals, book); purchase and sale of machinery, equipment and intermediate goods, transfer of data and personnel; and inter- personal communication.

According to Andrzej (1999) technology transfer exists in the following main forms;

- Sales / Purchase of result of the R & D work
- Turnover of licenses, patents, Utility models know- how
- Sales /Purchase of production technology, means of automation
- Technology advisory/ consulting
- Technical staff training
- Exchange of technological information.

Andrzej went further to simplify technology transfer into;

- Embodied technology transfer (i.e. the flow of knowledge embodied in new products, materials, tools, machines and similar equipment) and
- Disembodied technology transfers (i.e other forms of flow of technical knowledge)

Asawathappa (2006) Identify six categories of technology transfer which comprises:

- International Technology Transfer:- In which the transfer is across national boundaries. Generally, such transfers take place between developed and developing countries.
- Regional Technology Transfer:- In which technology is transferred from one region of a country to another.
- Cross- Industry or cross- sector Technology Transfer:- In which technology is transferred from one industrial sector to another. An example is the transfer of technology from the space programme to commercial applications.
- Inter- Firm Technology Transfer:- In which technology is transferred from one company to another. An example is the transfer of computer aided design (CAD) expertise and computer aided manufacturing (CAM) machines from a machine tool manufacturing firm to a furniture making firm.
- Intra- Firm Technology Transfer:- In which technology is transferred within a firm, from one location to another. Intra firm transfers can also be made from one department to another within the same facility (Agman & Glinow, 1991)
- Pirating or Reverse- Engineering:- Whereby access to technology is obtained at the expense of the proprietary rights of the owners of technology.

TYPES OF TECHNOLOGY TRANSFER

According to Wall and Rees (2004) technology transfer usually occurs in one of two ways:

- Internalized transfer:- This takes the form of direct investment by a parent company in its foreign affiliate. Such intra firm technology transfer may be difficult to measure.
- Externalized transfer:- This can take a variety of forms: Licenses, franchises, Minority joint ventures, sub contracting, technical assistance, purchase of advanced equipment (embodied technical progress), and so on.

THE NATURE OF TECHNOLOGY BEING TRANSFERRED TO DEVELOPING COUNTRIES

According to kojima (1971) industrialized countries export to developing countries manufactured goods of Capital- intensive industries or those employing advanced technology, while importing from them products of labor-intensive industries, and through this a harmonious international division of labor can be established and an effective global distribution of resources realized.

As it came to be more widely understood that the rooting of transferred technologies in developing countries is hampered not merely by imperfections in the technology marker but also by inadequate capacity to assimilate them, the question of the "appropriateness' of the technologies to be introduced also came to the fore. In other words, it became clear that technologies not suited to the economic, social and/ or culture conditions of the developing countries concerned could not hope to take root in their soil. As it is now generally understood, the appropriateness of a technology should be determined through consideration of various factors such as the level of economic development, productive factors endowment, and even ecological, cultural and social factors. Obviously, then determination of what technology is 'appropriate' to a given society is no easy matter.

HOW MUCH DEVELOPING COUNTRIES PAY FOR THE SUPPLY OF TECHNOLOGY

According to Aswathappa (2006) the cost of technology transfer is a very serious issue for developing countries. Much of the cost of imported technology is concealed because import of technology often takes place as part of a package as in embodies form, which is, embodied in machinery and equipment. Though actual figures are difficult to come by, the estimates made by UNCTAD suggest that the annual payments by developing countries alone towards import of technology amount to $10billions. Such high cost of technology defeat the very spirit of modern science and technology which are expected to be "the common property of mankind", and subject to proper protection and payments to the investor and are freely available. But, unfortunately 90 percent of the modern technology transferred to developing countries is controlled by MNCs who are essentially interested in getting highest returns from their inventions.

Another contentious issue related to technology transfer here are royalties and profits. The distinction between royalties and profits is often ill defined but the possibility of varying methods of securing the reforms is a valuable weapon in ensuring satisfactory profit repatriation. The alternative is payment in kind, either no the form of raw materials (if, for example, the technology is being applied to developing natural resources), or by a share of the manufactured products, which can be sold by the international enterprise

either in its domestic market or any where else it can secure payment in an acceptable currency.

METHODS OF TECHNOLOGY TRANSFER

a. **Foreign Direct Investment (FDI):** FDI have been a channel for technology transfer approved by many authors because of its direct impact on economy development and low cost of transfer. But the choice of choosing what method of channel technology depends on the countries market size, market growth, the threat of imitation, and the intellectual property right (IPR). For developing countries to acquire technology through foreign direct investment there should be abundance of skilled and semi- skilled workers and also a strong IPR protection to attract investors, these will increase the level of tacit knowledge (know- how) absorption. The multinational corporation (MNC) through foreign direct investment (FDI) is media for the transfer of technology. Expatriates' are used for the transfer of technology and knowledge by the MNC. According to Dana & Snejina (2004), the greater the expatriates' ability to transfer knowledge while the more the MNC uses expatriates for long- term assignments, the greater the willingness to transfer knowledge.

   Haris (2002) argued that, expatriates' with the long-term assignment remain critical for skill transfer, management control and management developments while expatriate with temporary assignment are used mainly for skill transfer.

b. **Joint Venture:-** Joint venture typically involves less risky than strategic alliances, acquisitions or financing subsidiaries, they tend to be more common, as skills, attributes and resources are sought through mutual business objectives. (Czinkota etal, 1994). With joint ventures companies can pursue common business related purposes, use harmonizing technology or research techniques, increase capital and bargaining power, extend the risk of scale; and surmount entry barriers, achieve economies of scale, gaining market share and therefore power (Boyeth and Boyeth, 2001). The expansion of joint venture in any country leads to Multinational Corporation; therefore encourage technology and knowledge transfer. Mowery et al (1996) argued that joint venture is superior means to enhance a firm's positioning through capability learning and knowledge transfer.

c. **Licensing Agreement:-** Licensing is a contractual arrangement is which one firm grants Access to its parents, trade secrets, or technology to another for a free. A license is a contract which authorizes the use or exploitation of the subject matter of the license for a specified purpose and period of time with all other right maintained by the owner of the technology (Thomas, 1998). He also argued that companies wishing to expand into the international arena are finding the licensing or transferring their technology provides a low risk and highly profitable alternative to direct export, establishing a foreign branch, subsidiary or joint venture. These arguments by Thomas can only benefit the transferor and not the transferee at the long- run. The reason for technology transfer is to benefit both parties and at the long-run, the transferee should be independent of the technology gained. The motivation for licensing of technology and product could be for the penetration of the international market. Companies are willing to license their technology to countries where they do not have penetration through export or direct investment and also selling of their product. Countries willing to embark on technology

transfer through licensing must be sure of the credibility of the licensors and their willingness to transfer technology.

d. **Franchising:-** Franchising is a form of licensing in which one firm contract with another to operate a certain type of business under an established name according to specific rules. In recent years, firms have gone overseas with a new kind of licensing- franchising. Franchising permits the franchisee to sell products or services under a highly publicized brand name and a well- proven set of procedures with a carefully developed and controlled marketing strategy. Some franchisors are hotels (Hilton, Holiday Inn) soft drinks (coca- cola, orange rush).

BENEFITS AND CHALLENGES OF TECHNOLOGY TRANSFER

Samli (1985) Model the pattern of technology transfer into six dimensions: geography, culture, economy, business, people and government, while Andrzej (2003) broadly classified technology transfer into two viz: Vertical technology transfer- the flow of knowledge from research institution to companies and Horizontal technology transfer- the flow of knowledge among companies.

The challenges of technology and knowledge transfer have over the years been a great concern to researchers. Because of the closeness these two elements, their challenges' are almost similar. The technology transfer has being a great challenge in developing countries because of lack of infrastructure and educational development of the people. For developing countries to achieve technology transfer certain factor has to be in place, such as good investment policy, basic infrastructures, attitudes of people, good communication network etc.

As Healey (2004) points out there are, however, clear limitations to technology transfer. The inward FDI may, for example, reflect the multinational seeking to exploit an ownership- specific advantage over domestic companies. In such circumstances it is unlikely that the foreign multinational will willingly share the technologically based sources of its competitive advantage over local rivals. A further obstacle to technology transfer according to Healey (2004) may involve the issue of culture dissonance. For example the psychic distance between US and UK companies is relatively small. Both share a broadly common culture, a common language and they have a reasonably high level of mutual understanding. The benefits of technology transfer to the host countries through FDI do not automatically accrue. The magnitude and extent of technology transfers may be related to host industry characteristic. Especially the level of absorptive capability is needed to acquire and work with the technology, For example, technologies from MNCs may not be appropriate for local firms and industry and thus, may not enable them to compete effectively in the global market. Local firms and industries have to make a variety of investment to actually benefit from technology inflows. Therefore the host capability to absorbs foreign technology turns out to be an important determinant of the size of realized spill over's.

One of the benefits of technology transfer is globalization of industries. Technology transfer brings the world together as one large market place. When technology are properly transfer around the world from developed nation to less developed nation,

economic vibrancy will be seen and nation will draw closer to one another making the world look like a large global market place.

Internationalization of domestic market place is also a benefit to technology transfer. Product produced by domestic market could compete with large international industry if proper technology is transfer to the domestic market. This will increase production and also economic growth.

BARRIERS TO TECHNOLOGY TRANSFER

Aswathappa (2006) identified some problems encountered on the transfer of technology to developing countries.

a. Lack of a relevant quantitative framework/approach to the analysis and evaluation of technology transfer to developing countries.
b. Failure to include ergonomic aspects in technology transfer or to accord sufficient value to the human- machine interface variable of the transferred technology, or the failure to adjust the technology to the existing socio- cultural system.
c. Failure to determine if the existing national productive capacity is adequate to support the application of the transferred technology (technical and technological protection and infrastructures).
d. Restricting the feasibility study of technology transfer to financial assessments (mostly cost- benefit analysis)
e. Lack of any universally accepted perspective on relevant socio-economic as well as technological infrastructures in the process of technology transfer (commercial, legal, transportation, utilities, and communication networks)
f. Absence of any substantial effort to review and utilize the potential of technological interchange and socio- technical collaboration for technology transfer between developing countries.

CONCLUSION AND RECOMMENDATIONS

The issues of technology transfer have been a great interest area for academic policy maker, and industries in both developed and developing countries of the world. Foreign direct investment associated with the transfer of technology to developing countries has increased substantially over the years. While the potentials for technology to be transferred exist, the benefits to host countries do not automatically accrue. The technology transfer has benefited the developed countries more than the developing countries. Better still, transfer of appropriate technology to developing countries will go along way in reducing poverty, and reduce mass migration of people and increases world economy wealth.

Though there are criticisms against FDI and the transfer of technology. It is argued that transfer of technology from FDI to industries do not take place through direct effects, but spill over's and the benefit accrue to only industries with strong R&D ability to capture more technological spill over's through "learning by watching"

Similarly lack of linkages forms a major constraint in technology transfer to developing countries and has been pointed out by many scholars. For example Hayashi (1984) pointed out that diffusion and rooting of technology can hardly be effective without closer

and stronger ties among them that allow for the effective transfer of technology and increase the capacity of the part of the recipient to assimilate, transform, and develop it. He further pointed out that introduction into developing countries through FDI higher technologies, such as those connected with processing, assembling, and capital goods. Industries, rather than those connected with the more traditional type of industries. Industries based on higher technologies can function only when supported allied industries manufacturing the necessary parts and materials, and therefore they presuppose close technological linkages. Similarly, Maruyama (1984) stated that lack or insufficient development of allied technologies tends to render newly introduced technologies inefficient.

RECOMMENDATIONS

1. Developing countries should make a concerted effort in developing policies such as local content regulation and export promotion which will go along way in creating technological linkages between multinationals and local industries via FDI
2. Host countries industrial capacity absorption should be strengthen which will serve as a key factor in influencing technology transfer.
3. The comity of nations should establish an international organization for collecting and distributing technological information as well as of the need to create effective international bodies for education and training
4. There should be close partnership between government, companies, Universities and research and development project in developing countries to serve as potential strategy in developing local R &D
5. Intellectual property right (IPR) should be strengthened in the developing countries to serves as an incentive to attract investment and know-how.
6. Encouraging "Green fields" ventures and acquisitions: Governments of developing countries should encourage green field investments and acquisition or mergers, less emphasis should be placed on the forms of international engagements like joint venture, licensing, Franchising, import, and portfolio investment. Technology brought in via Green field ventures and acquisitions are easier to control.
7. Counter trading:- If the prices to pay for technology are too high that developing nations would pay at the expense of the economy, then counter trading is recommended. Under this arrangement, raw materials like crude oil, etc could be exchanged for appropriate technology.

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