

# Multinational Companies as engines of Globalization and Technological Developments

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## Abstract

*Globalization and emergence of multinational companies has brought changes in the research and development practice. Research centers were established by developed countries research institutes or large companies generating an unprecedented technological growth, creating a significant technological discrepancy between countries or companies. This paper provides an overview of multinationals expansion strategy and their contribution to the emerging countries technological development.*

*Over the past few decades, as the pace of globalization quickened and Multinational Companies get access to a whole global market, the need for extension of production capacity appeared.*

*The growing populations of developing countries, with rising incomes, resulted in fast-growing markets, asking to change the multinationals strategy to a market-oriented policy instead of off-shoring services and manufacturing.*

*Advanced economies that develop new technologies through Research and Development will transfer them to subsidiaries from all around the world, trying to homogenize the production technologies and management practices, gaining high efficiency in their operations.*

*The sophistication of production process in a country, largely depends on the availability of advanced technologies required for the production, this paper offers an overview of different sources of technology highlighting their strengths and weaknesses.*

**Keywords:** Multinational Companies, Technology, Globalization, Research and Development, Technology Transfer Cost

## **Introduction**

Appearance and development of Multinational Companies (MNC) is closely related to the phenomenon of globalization whose roots, back in history, appeared in the same time as overseas trade and accelerated from the second half of twentieth century.

Globalization as a phenomenon dominates all the social, political and economic life of today. The Globalization of economy can be considered the backbone of the process, including financial capital market, production and all related processes. Around this economic structure developed the other branches, like socio-cultural and political globalization, keeping a close correlation between each other.

By definition, MNC is a business organization whose activities are located in more than one country and its organizational form allows the owners and their managerial agents to control the operations and the flow of capital across national borders. In order to align the production and services, in terms of quality and efficiency standards, MNC transfer organizational and technical knowledge to the newly established units, becoming an important channel for technology diffusion.

## **Globalization and Multinational Companies**

Studies about globalization [8] classify five main phases of the process:

- Germ phase (Europe, 1400-1750) when the first maps of the planet appear as a result of new geographical discoveries, the universal calendar is adopted and the future borders of colonial powers are shaped;
- Early stage (Europe, 1750-1875), in which nation-states appeared and formal diplomacy between them started to be developed. The first international legal conventions appeared, as well as the first ideas about internationalism and universalism;
- Take-off phase (1875-1925) when a process of conceptualization of the world in terms of a single international society and a single humanity started, a process favored by the intensification of trade links from independent nations side, expanding of communication channels, the emergence of mass migration (especially from Europe to America);
- Disputes for world hegemony phase (1925-1969), initiated by the World War and then the Second World War, tempered, to some extent, by the establishment of the United Nations League, which drew attention to the dangers arising from ignoring of global issues (pollution, population explosion, depletion of natural resources, economic underdevelopment, etc.)
- Last decades of the twentieth century, when great progress in space exploring and development of telecommunications were made, various forms of regional integration occurred due to the unprecedented increase in international division of labor.

With the liberalization of financial markets developed companies received the green light to expand beyond national borders. Johanson and Vahlne have explained that in the first stages of internationalization of a firm, as the domestic market grows, local firms tend to invest into their neighboring countries closer to the home market having close social, economic and political atmosphere similar to their home [3]. Later on, when these firms have developed more ownership advantages, they try to move forward into different cultures and environments.

Passing the national borders, companies became the main actor of globalization, tending to open subsidiaries or production facilities wherever the market size allows economies of scale. Accordingly financial capital, ideas, goods, labor and services were transferred to the international market by the companies became multinationals. This phenomenon leads to balancing the consumers need, homogenizing the demand patterns and making possible the standardization of products and services, creating deep social and cultural changes.

By extending their area of activity MNC companies had an important contribution to the development of communication and interchange network so that the world had become a single market for goods, capital and labor, in which companies can operate almost independently of national political arrangements.

The engine of globalization process is the free diffusion of financial capital, whose rate is followed by FDI (Foreign Direct Investment), a statistical indicator that has become a barometer of national economies. FDI will take direction toward economies that afford a satisfactory rate of return to investors, who now have the possibility of placing their capital around the whole world, except some economies dominated by totalitarian governments.

Business environment provides opportunities and challenges for companies, influencing the flow of FDI. This factors are categorized into macroeconomic indicators (e.g. market size, GDP growth, inflation, exchange rate etc.); Ricardian-type factors (e.g. natural resources, level of technology, cultural and physical proximity, population, pressure group, life style, attitude, beliefs, religion, education, language); environmental variables (e.g. political stability, market openness, infrastructure, legal etc.) and business specific advantages of host countries. Besides the government current policies, the business history of the host country will also guide the investment decision of foreign multinationals [7].

Market size is important not only from commercial perspective but bigger markets also provide efficient utilization of the resources and exploitation of economies of scale [5].

Investing into a country, firms can get access to the whole region through exports like inside of European Union, where operating in one of the member state the company gets access to the whole European market.

MNC prefer to invest in countries with healthy economic indicators with little fluctuations on prices and exchange rate. An unpredictable and volatile inflation creates problems in assessing the profit and future planning of the market [2]. Several empirical analyses confirmed that low inflation, high and sustained growth of GDP attracts FDI inflows in the region [1].

The natural resources play a crucial role in the decision of multinationals to invest in region. A vast literature explains that companies have been motivated due to the availability of natural resources like minerals, petroleum, timber, fishery and agricultural products. Through backward vertical FDI multinationals try to assure cheaper raw material for their parent firms.

Countries are interested to attract FDI in order to create new jobs and increase the national economy. In order to encourage the FDI inflows governmental incentives are developed like: tax incentives, government grants, investment treaties.

In a free global market investment decisions are made based on profitability of the region, tending to a global equilibrium by a constant move of financial capitals. The fast movements of last decades encouraged the researchers to develop analytical models helping to understand, forecast and support decisions related to the placement of investment.

Since they are usually large scale movements, investments by MNC can have a deep economic and social impact on their host or home country, especially if it is about relocation of activities. In order to protect themselves against high fluctuation, national governments try to establish regulations by investments treaties trending to isolate national economies. In spite of these efforts, the events that happened in the last few years proved that economic shocks propagate easily from country to country demonstrating the global nature of the economy.

A significant and most recent example is the economic crisis of 2007, of which the first signals were detected in the United States, and then propagated to the whole world with devastating effects on all national GDP and FDI.

**Productivity**

In developed economies and emerging countries also, productivity gets increasingly more and more attention. In the decision of production outsourcing to emerging countries, an important factor is the cost of labor which can be considered a driver of globalization, especially for the early stage of expansion, when the cost reduction is the main driver of moving abroad. Although the cost per hour of labor is very important it does not define the cost of production by itself. The technology available, the mentality and knowledge level of human factor are just as important for achieving efficiency. Low cost of labor combined with efficiency may come to justify relocation of productive capacity (in addition to many other factors: logistics cost, cost and availability intermediate goods and raw materials, etc.).

Productivity in a key driver of operating costs and in today's global competition between companies will get high attention. In order to keep their operations competitive, multinationals will invest in development of new technologies which will be transferred to all subsidiaries.

Considering globalization as expansion of the best players of the market gets an important role in development and deployment of most efficient production and management practices. Having large scale operations, multinationals can allocate resources for R&D and they have access for all the existing knowledge of the incorporated companies from which, using adequate knowledge management, they succeed to improve the global operations.

Experience shows that in most cases the transferring of know-how is only in one direction, from the parent company to the newly incorporated subsidiary or production unit. The desire to have a globally standardized operation, with methodologies based on the existing best practices, multinationals can lose knowledge and create tensions inside the newly acquired unit. This assimilation tendency is encouraged also by the dimensional contrast between the new acquisition and the parent company, in most cases the units to be integrated being smaller and already having difficulties.

**Technology**

Productivity is influenced by a series of factors related to the geographic region (legal, social, environmental) or the domain of activity (automation level) but the most important are the available technology and know-how.

The sophistication of production process in a country, largely depends on the availability of intermediate goods required for the production.[5]

From this point of view Comin distinguish three categories of intermediate products:

Alt - Local Intermediate products, those products that are available for production only in the country of origin, N

Agt - Global intermediate products, products that have penetrated into the country of destination, now are available for production both in the country of origin, N, and the country of destination, S

ATt - Intermediate products transferred, those intermediate products whose production was transferred to the country of destination and then exported and destination country and available for production both in the country of origin and country of destination.

Sustainability of economic and industrial performance is subject to the organization's innovation capacity. In the economic environment characterized by global competition is essential that technology be renewed at least with the dynamics of the market.

### New intermediate products

Expanding the product portfolio, manufactured in a production unit, involves implementation and commercial exploitation of new technologies. Technology meaning the knowledge necessary for the manufacturing of new product, some of which is embodied in the machinery, equipment and tools needed for fabrication but also the know-how necessary for efficient operation, marketing or distribution.

The technology accessible for the production unit can originate from different sources, having their own specifics.

As a primary source for new technologies can be considered the company's internal resource, technology developed inside as result of research and development (R&D) efforts sustained by the organization. The curiosity and affinity for improvement are natural features of the human being, becoming a key factor in the development of the human society. This native disposition of humans to innovate and improve is an important element in the R&D process but when we are talking about technology development results are closely related to the efforts and resources endowed. Accordingly the technology developed inside of the organization ( $T_{ci}$ ) has its own cost advantages and weaknesses.

An important advantage of the internally developed technology is the competitive advantage created by it. A new technology or product developed through internal R&D will be available only for the organization for the period protected by the patent. During the implementation of the newly developed technology the organization will don't need external support or consultancy, having all the knowledge available thru the development team, reducing company's dependence and implementation costs. During the time technology can be improved and adapted to productions requirements. Assuring a close collaboration between research and production the experience and know-how gained during production will be easily integrated in the new developments.

The investments in R&D enclose specific risks and are not necessarily always rewarded, results depending on the efficiency of the process. Several factors was identified which can contribute to the success of the technological developments but the formula which can define its efficiency are marked by the uncertainties of innovation progress. The budget allocated ( $I_{R\&D}$ ), the experience of the research team and time assigned ( $T$ ), the human capital ( $Hc$ ), the knowledge base ( $Sc$ ), the equipment and technology available ( $Bt$ ) will affect the effectiveness of the research process, outlining the perspective that the scale of the company is crucial to can sustain this efforts.

Efficiency of the R&D process and therefore cost of technology developed within the organization depends on multiple factors:

$$C_{Tci} = f(I_{R\&D}, T, Hc, Sc, Bt) + C_i \quad (1)$$

Where:

$C_{Tci}$  - Cost technology developed within the organization

$I_{R\&D}$  - Budget allocated to R&D

$T$  - Time assigned for development

$Hc$  - Human capital available to the organization

$Sc$  - The knowledge database available to the research team

$Bt$  - The technology and equipment to which the organization has access

$C_i$  - Implementation cost

The cost involved in the development of a new technology have to be recovered from the margins gained from the sales of the products incorporates it, which requires a certain level of production and sales.

Globalization and emergence of MNC has brought changes in the research and development practice. Research centers were established by developed countries research institutes or large companies who

generated an unprecedented technological growth, creating a significant technological discrepancy between countries or companies.

In order to identify the potential in this technological detachment and taking into account the three features of the R&D process: risky, expensive and time consuming, companies specialized in R&D appeared. Providing consultancy and/or ready to use technology, to companies that have decided to do not invest or whose development process was not proved effective enough to keep up with the market, these specialized companies opened access to another source of technology ( $T_{ce}$ ) created outside of the company.

This option has many advantages: companies can choose the most suitable technology for their needs, depending on the available budget, equipment and manpower available, operation cost and capacity assured. Being technologies already developed and tested implementation time is relatively low and the unit can receive support during the implementation considerably reducing the risk of a failure. This new source of technology provides access for new actors to market segments protected by technological know-how and secrets, they becoming now available to all those who have the necessary resources to invest.

At the same time have to be considered the disadvantages somewhat deriving from the aforementioned advantages: these technologies are freely available on the market, reducing technological advantage over the competition. Technologies procured are protected by strict licenses, patents which in many cases do not allow their subsequent adaptations by the customer or future improvements. Technology being developed outside the company, external consultancy from supplier is vital, recipient having to take this exposure, missing the necessary human resources and knowledge base. Leave behind internal R&D in favor of cooperation with an external partner the companies have to assume all risks induced.

Externally developed technology is the only options for companies intending to enter a new market by green field developments and an opportunity to align with the technology available on the market, when a company realized that remained behind, relying on their research outcomes.

In the real business environment we can find companies using a mix of this two technology resources, having their own R&D activity and resort to external resources also ensuring a continuous leadership by taking the advantages of both resources.

In the case technology comes from external sources we speak about technology transfer cost, enclosing the cost of machinery, tools and the know-how embedded into and the additional knowledge transfer required to ensure the efficient operation by the recipient, the costs installation, training, logistics costs, etc.

The technology transfer cost ( $C_{tr}$ ) can be influenced by a number of factors depending on the environment of origin country ( $O_c$ ) and destination country ( $D_c$ ) and the features of technology ( $Ch_T$ ).

$$C_{Tce} = C_{tr} = f(O_c, D_c, Ch_T) \quad (2)$$

Where:

$C_{Tce}$  – Cost of technology created outside

$C_{tr}$  – Transfer cost

$O_c$  – Origin country

$D_c$  – Destination country

$Ch_T$  – Features of technology

The technology acquired externally can become the groundwork for future developments, respecting the license terms, if desire and resources are assured indeed of the company.

Like an alternative solution for technological update we can find cases where entire companies are taken over mainly for the technology and know-how they own. In this case the assessment of technology value ( $T_a$ ) became more challenging. The cost can be determined as the difference between the total transaction value and fixed assets and other elements of intellectual capital.

$$C_{TA} = C_a - V_{CF} - V_{Ci} \quad (3)$$

Where:

$C_{TA}$  - Cost of technology, through the acquisition of new production unit

$C_a$  - Total cost of acquisition

$V_{CF}$  - Value of fixed assets

$V_{Ci}$  - Value of other intellectual capital

In this case additional costs for implementation are not involved the technology been operational in the production unit. In many cases the technology and knowledge available in the newly acquired production unit will be encoded, transferred and adopted to the other entities within the company, using as a lever to improve the technology and knowledge base of the entire system.

In addition to these two main sources, internal and external, there are several hybrid technology sources, resulting from collaboration between companies, research institutes or universities. As a result their characteristics are combination of features of the two main sources, depending on the form of collaboration, trying to incorporate benefits from both resources.

The growth of the efficiency inside the company or national economy is related to the knowledge capital available, which is determined by internal innovation or technology diffusion. In the last decades the trade with technological knowledge represents a significant percentage of international trade, being supported mainly by transfer within MNC that tried streamlining operations of all production units by encouraging the submission and implementation of best available technology and best practices.

In the global economy foreign direct investment (FDI) became a main channel of for knowledge diffusion helping the developing countries to align their technological capabilities to global needs. Multiple studies were conducted to analyze the spatial distribution of the technological diffusion (Jaffe and Trajtenberg 1998; Maurseth and Verspagen 2002; Bottazzi and Peri 2003; Thompson and Fox-Kean 2005) and to build statistics about technology transfer, resulting in a whole technology transfer literature.

Once a technology is developed or acquired the innovator or owner is protected by a patent, ensuring monopolistic use of technology or product, during the recovery of investments in the development. Organizations will keep investing in technology development till they can recover the costs from commercial exploitation, marketing the new good, assuring equilibrium condition:

$$\sum_{x \in S} (\lambda \cdot P_{Tx} - C_{Tx}) \geq 0 \quad ; S = \{ci, ce, a\} \quad (4)$$

Where:

ci - Technology created inside

ce - Technology created outside

a - Technology through the acquisition of new production unit

$\lambda$  - Scale coefficient

$P_{Tx}$  - Profit from the commercial exploitation of technology x

$C_{Tx}$  - Cost of technology x

Once the company have decided to invest in a new technology performance tracking becomes essential to understand how the organization perform exploiting it. For an efficient performance tracking Management Control Systems are necessary.

Once it has developed a new technology or a product, innovator is protected by a patent which assures monopolistic use and sale of technology or product during the recovery of estimated market value,  $v_i$ , in order to recover the investments in development. Under equilibrium conditions, organizations engage in R&D process till they can recover the investments from the sales of new goods.

## Conclusions

The phenomenon of globalization and evolution of MNC must be strictly correlated.

*Globalization is an old and continuous process part of human economic and social development.*

The origins of the modern multinational enterprise and globalization go back well beyond the nineteenth century crossing different stages, from the germ stage of geographical discoveries to today's information based world.

In the first era of globalization, the strategies of multinationals in the developing world had been straightforward, lurching search for the minerals, commodities, and foods needed by the developed world, and start to build up the physical and services infrastructure needed to exploit them. Innovation had rested more in the area of execution without much concern about environmental effects or work conditions.

The World Wars, Great Depression, and its aftermath in the form of exchange controls and tariff barriers, dramatically reduced international trade, and halted the growth of multinational investments. The world entered in a de-globalization tendency. The companies which wanted to survive had to build political contacts with local governments and strengthen their local identities.

The appearance and growth of global financial markets, in 1960's fuelled the restart of globalization by weakening governmental restrictions on capital movements and foreign investment. Is a period shaped by the trade-off between opportunity and risk.

MNC seized opportunities to exploit the low cost labor of developing countries and as concern for the environment rose in Western world, multinationals have transferred more hazardous operations to developing countries.

With the development of emerging countries appeared new risks and opportunities for multinationals like: concerns about human rights abuses and a new market with high growth potential.

*Multinationals adapt themselves for the global market changes.*

In order to explore the newly shaping market firms began to invest in product innovation designed to deliver products especially for developing country markets. This step changed the meaning of MNC from companies acting in several low cost countries to serve Western market to multi- market player which adopts marketing and product strategy for local needs.

The channel for diffusion of technologies enlarged from outsourcing production to business extension of MNC, looking for new markets.

*Competition and the last years global economic crises reshaped the world in many aspects, countries starting to develop regional strategies to protect their economies.*

The revolution in the speed of communications provided new opportunities for multinationals and developing countries by relocation of services (IT, Financial, Logistic, etc.) being forced to innovate in their strategies in response to competition.

Are several concerns about MNC, which supported by their home governments, could dictate their terms to developing countries, which are not the subject of this paper, what we can conclude is that they have an important role in the technological development all around the world.

It remains unclear how globalization and multinationals begun to unravel as a result of the global financial crisis started in 2007 and how the world will change with the efforts of national governments to protect themselves against global diseases.

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