ANALELE ŞTIINŢIFICE ALE UNIVERSITĂŢII „ALEXANDRU IOAN CUZA" DIN IAŞI
Tomul LVI **Ştiinţe Economice** **2009**

TECHNOLOGY, FOREIGN-OWNED FIRMS AND COMPETITIVENESS IN THE MIDDLE-INCOME COUNTRIES

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Abstract

Some economies inside the diverse group of middle-income countries (MIC) have shown an active behavior in exports of technology-intensive goods that is strictly better than the group average. Among the factors explaining such a behavior we find the national technological capabilities that affect the dynamism of their productive and trade structure generating competitiveness gains. Another element is the potential impact that foreign direct investments (FDI) flows generate in those economies since foreign owned firms have contributed to the industrialization and modernization of their productive systems. In this paper we show a descriptive analysis of those competitive factors through the Global Competitiveness Index from the World Economic Forum and the Enterprise Surveys form the World Bank, with the aim of highlighting the relative importance of them and the differences across middle-income economies.

Keywords: competitiveness, technology, foreign firms, middle-income countries.
JEL classification: F23, O14, O33, O57.

1. Introduction

The possibilities that Middle-Income Countries[i] (MIC) have to integrate the most dynamic international markets depend upon their productive and commercial specialization; this is a consequence of their technological capabilities but also of the impact of external factors, such as the influence of the presence of foreign capitals. Therefore, our understanding of the competitive position of countries in this paper would be linked to the combination of both, their own national abilities and their degree of international integration. These aspects are certainly attached to the individual behavior of the firms and to the scientific and technological institutional environment in a given country; in other words, the countries' ability to generate improvements in their technological levels.

In terms of national economies, the evolution of the international commercial patterns reveals that the shift in the advantages of technological specialization ultimately depends upon the industrial structure as well as on the characteristics of a more complex set of ele-

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ments integrated in what is named the national systems of innovation [Narula and Wakelin, 1995]. In the case of developing economies such as the set of the MIC, those abilities would be mainly focused on the adaptation and efficiently use of the already available technology worldwide, at least in the first stages of development (industrialization) [Lall, 1996; 2000]. Although there is a kind of external dependence, the efficient use of them that could be transformed in sustainable growth and higher technological development in the long run comes to underline the importance of the national efforts to build the appropriate absorption capabilities.

We would agree with those several authors who argue that openness does not necessarily mean growth and development per se [Rodrick, 1999; Fagerberg and Srholec, 2008]. However, we would defend here that those national capabilities that can be achieved thanks to trade and openness are helping the MIC to gain competitiveness and therefore economic growth. In other words, the production activities, the generation of value and even the technology transfer corresponding to large internationalized corporations in foreign countries enhance to take into account their influence in the definition of the competitive patterns in these countries. Then, multinational companies (MNC) that have had a crucial role in the large increase on the investment's flows among countries, may also had intervened in the definition of the competitiveness conditions in both home and host economies. Data show that there has been not only a raise in FDI inflows into developing economies [UNCTAD, 2005; 2007] but also the emergence of outward FDI from developing countries as well, a phenomenon that being slow and recent in time, in our view should be integrated in the study of international competitiveness.

In this paper we will make a diagnosis about the competitiveness of middle-income countries based on the aspects of technology, innovation and foreign direct investment – inflows and outflows-; likewise, we will try to identify some elements related to the opportunities for public policies in both national and international spaces. The paper is organized as follows: Section 2 contains the literature review, which will be based on the factors that affect competitiveness levels with a focus into developing countries. Section 3 covers the competitiveness positions of the countries in the technological and innovation aspects according to the Global Competitiveness Index, following the methodology of the World Economic Forum. In Section 4 we analyze several aspects of competitiveness regarding MNC and FDI in the best and worst positioned MIC in the competitiveness ranking; this analysis will be based on the Enterprises Surveys of the World Bank. Section 5 contains some concluding remarks.

2. Literature review

Competitiveness is a concept that allows for several levels of analysis and there is not a common and undistinguished methodology to deal with. Its most pertinent application is at the firm level, refering to a comparative concept of competition or market gains but it has been applicable at the national level as well [Porter, 1985; Nelson, 1993; Fagerberg, 1996; Roessner et al, 1996]. A broad definition of competitiveness relates to productivity and growth of countries [Krugman, 1994], while a more tractable definition focuses on the ability of a country to compete in trade by exporting [Fagerberg, 1996; Lall, 2001]. In any case, the concept has been a facilitator for the discussion and definition of policies and actions to enhance the national performance and as recent contributions show, competitiveness can be

assimilated to productivity and the connected influential factors at national level [Sala-i-Martin, 2008].

Globalization has changed markets functioning and hierarchies while internationalized firms, industries and commerce, have been increasingly reshaped by technology. Then, we assume that the structural competiveness definition seems to be related to a country's ability to enhance collective techno-economic capacities in the world market-place; this implies a relative or comparative notion of performance that is shaped by multiple and diverse factors that would define the competitive results of countries and how they rank in international classifications. Virtually all the countries seek to take advantage of the structural and productive changes that increase their competitive position; in other words, to improve the share of world output, employment and trade of technology-intensive products [Aharoni and Hirsch, 1997].

Turning to the complicated concept of technology, several definitions can be found in the literature. According to Sahal, technology is in brief a set of new processes and products [Bozeman, 2000], while Molero and Buesa [1999] adopt a more complete conception of technology as the set of theoretical and empirical knowledge embedded in equipments, methods, procedures, organization, routines and know-how of the companies and institutions, which are used in the production of goods and services. In whatever case, technology is nowadays an indisputable value in organizations and it is also true that the competitive differences among countries are due to their technological capabilities, to their ability for technology absorption, adaptation, efficiently use, and of course technology creation. This is affected, at the end of the day, by the macro environment conditions, the strategies of business organizations and the institutional framework as well.

The choice between absorption and adaptation of the existing technologies and the creation through the expansion of R&D and innovation are quite unique for each nation and dependent also on the level of initial development [Gerschenkron, 1962] or on its degree of modernization. A less developed country will tend to copy the existing technologies in the market and as long as it acquires more and better technological capabilities, the country would invest more in R&D and it slowly would begin to produce its own technology. Some empirical analysis of the evolution followed by trade patterns and the technological advance in developing countries (mostly Asian economies) argue that the relationship between commercial advantages and the technological advantages is clearer in some economies, such as Hong-Kong, Singapore and South Korea and it is less evident in those like Philippines, Malaysia, Thailand and Indonesia. The analysis for these countries shows that this can be due to the industry structure of many developing economies –where the MIC are among them- in which there is a coexistence of traditional industries labor-intensive and industrial activities technologically complex [Uchida and Cook, 2005].

Moreover, some developing countries have been even able to develop their own technologies (i.e. Brazil in aircraft, electronics, computers; India in computers; Malaysia in electronics) and this is the result of a combined action of States, foreign capital and domestic capital. The succeeding economies have often based their strategy on the adaptation of imported technologies and their upgrading locally (most Asian NIC). Other empirical evidence for Latin American countries shows the existence of a complementary relationship between technology imports and R&D effort [Katz, 1982], allowing us to argue that foreign know-how may stimulate the local absorption of technologies. Thus, the upgrading process can be conceived as the result of the efforts on building new capabilities that would entail two levels of action: On the one hand, the investments at the national level in scientific and

technological skills, information flows, infrastructures and supporting institutions. On the other, at the micro level the firms' efforts to develop new organizational and technological skills and to tap into new information that would permit them to be able to define their appropriate specialization [Lall, 1997]. Furthermore, acquiring technology expertise is a cumulative process that necessarily requires the development of absorptive capacities and the involvement in networks of differentiated nature, the interaction with customers, suppliers and other factors of the environment [Cantwell, 1989; Lundvall et al, 2002; Fagerberg and Srholec, 2007; Álvarez et al., 2009]. All these technological capabilities have the ultimate goal of introducing innovations in the market by companies, which could finally derive into economic growth; then, the pattern of innovations is important to measure its impact in the countries' economy. Then, in this paper we assume that innovation can be understood as the introduction into the market of a new or improved process or good; this issue is precisely a specific pillar of competitiveness that would combine not only aspects related to the firms but also elements from the country environment.

The concept of national systems of innovation generally refers to the influence and evolution of the activities of production and the institutional setting, considering both informal institutions (such as trust) and formal arrangements (such as intellectual property rights or contract laws). The shift toward a higher economic and political stability, as long as the countries improve their level of development and their growth opportunities, derives into a higher potential of markets' dynamism. In this sense, some of the MIC have committed important amount of resources and made specific policies to activate their productive and education systems and have successfully upgraded their national capabilities [Mowery and Oxley, 1995; Hobday, 1995]. The determinant factors for catching up are not only found among technology, FDI and trade but also on the state of the institutional framework, the educative system, the financial markets or the political system; that is to say, the elements of the innovation system in a given country [Fagerberg and Srholec, 2008].

Regarding the relationship between foreign MNC and competitiveness and thus with the economic development of countries, it is meaningless to try to find a univocal causal relationship between them [Narula and Dunning, 2000]. Even though, FDI and the activities of foreign companies have had an important role in the industrialization and modernization processes of many developing countries, with notable effects in some of their productive transformations; this is a consequence of the combination of both ownership and localization advantages of the incoming MNC that would contribute to the establishment of value creating activities in their territories [Dunning, 1993; 2006]. Furthermore, the MNC-assisted development approach defends that international divergences among economies are due to both supply and demand factors and this aspect would explain the international configuration of FDI [Ozawa, 1992; Lall, 2002; Rugman and Doh, 2008]. This would recall the existence of complementarities between both types of entry modes, namely FDI and trade, since large internationalized firms can be seen as creators and traders of intangible assets. For this reason, it is suitable to underline the role of MNC as big players in the complex relationship between internationalization and competitiveness. For instance, the upgrading capabilities of Malaysia and Thailand as active exporters of electronics have driven and have been driven by the development of technological capabilities in these two MIC where FDI has evolved from the expansion into production operations to the process technology development [Rasiah, 2003; Rodrick, 1996].

Being aware that MNC are able to provide new production facilities, managerial practices and also technology transfer to host locations, it should also be noticed the possibilities

that arise from the outward perspective; in other words, the competitive implications from investing abroad that exist, for example, due to the reverse flows from the host economies to foreign subsidiaries since firms' strategies look to tap into new knowledge in host locations [Cantwell, 1989; 1995; 2005; Frost, 2001; Piscitello, 2004; McCann and Mudambi, 2005; Singh, 2007; Mudambi, 2008]. Specifically, in a recent contribution based on the analysis of patent citation data, Singh [2007] demonstrates the existence of significant outflows back from the host country to foreign MNC. This result would give support to moderate the existing fears about the extent of the knowledge leakage that spillover effects generate abroad; on the contrary, MNC abroad have the potential for the absorption of new knowledge even in less advanced countries.

Finally, making a specific reference to the MIC, one of the main outstanding features of them is their tremendous heterogeneity [Álvarez and Magaña, 2007]; some of these economies have an important potential for catching-up while others are sharing a set of features that are more owned by the most laggard economies [Durlauf and Johnson, 1995; Alonso, 2007; Castellacci, 2008]. The individual peculiarity is very relevant and it would reinforce the need for carrying out specific analysis of competitiveness in developing countries. There are some examples of succeeding economies such as those strategies followed from the Asian economies that have shown a spectacular growth and although they have been very diverse, they have in common the role of the national systems of innovation supporting inward technology transfer [Mowery and Oxley, 1995]. In the cases of Malaysia and Thailand, these two countries have expanded their exports by combining low labor costs with enhanced skills that allowed them to export high-tech components. In some larger economies such as India, they have adapted technology for local consumption to create local industries and this has been able to take advantage of growing number of skills in computer programs. Likewise, companies from some of the so-called emerging economies are changing their international strategies and becoming more integrated in international flows and this could derive into competitive improvements for developing economies [Brouthers et al., 2005; Singh, 2007].

3. Competitiveness in the MIC

3.1. Global competitiveness

One way to measure the nations' competitiveness is trough the Global Competitiveness Index (GCI). It has been elaborated since 1979 under the Global Competitiveness Report (GCR) -where the potential for productivity growth in countries is analyzed and shown- and it is sponsored by the World Economic Forum (WEF). A special element of this report is the countries' ranking, that provides policy makers with systematic and comparable information about national economies in order to make public policy more efficient [Schwab, 2008]; then, the GCI[ii] constitutes a very useful tool for benchmarking countries strengths and weaknesses and since 2004, the comparison can be made through macroeconomic and microeconomic factors that affect competitiveness. The term competitiveness is defined as "the set of institutions, policies, and factors that determine the level of productivity of a country" [Sala-i-Martin et al., 2008]. The GCI is built over 12 different components related to the aspects that would define the countries' competitiveness level. These components are called pillars and are grouped into 3 subindexes: 1) *Basic requirements*, 2) *Efficiency enhancers* and 3) *Innovation and sophistication factors*, which allow us to know the ranking position

of countries in terms of competitiveness –see Table no. 1- [Sala-i-Martin et al., 2008]. In the last edition of the GCR, the GCI is calculated for 134 countries and, as it can be expected, the more developed countries achieve the best general scores being indisputable the positive relationship that exists between gross domestic product (GDP) per capita and competitiveness. Nevertheless, we will note later that there are some middle-income countries that behave particularly well in some of the analyzed pillars, adopting themselves better positions than some high-income economies. At least partially, this can be due to the fact that competitiveness is based in elements different than the obvious relationship between income and openness level, requiring the introduction of other contextual factors that relate science, technology and the institutional environment of countries [Rodrick, 1999; Fagerberg and Srholec, 2008].

Table no. 1 - The composition of the Global Competitiveness Index

Subindex	**Pillars**
Basic requirements	1. Institutions 2. Infrastructure 3. Macroeconomic stability 4. Health and primary education
Efficiency enhancers	5. Higher education and training 6. Goods market efficiency 7. Labor market efficiency 8. Financial market sophistication 9. Technological readiness 10. Market size
Innovation and sophistication factors	11. Business sophistication 12. Innovation

Source: [Sala-i-Martin et al., 2008, 7]

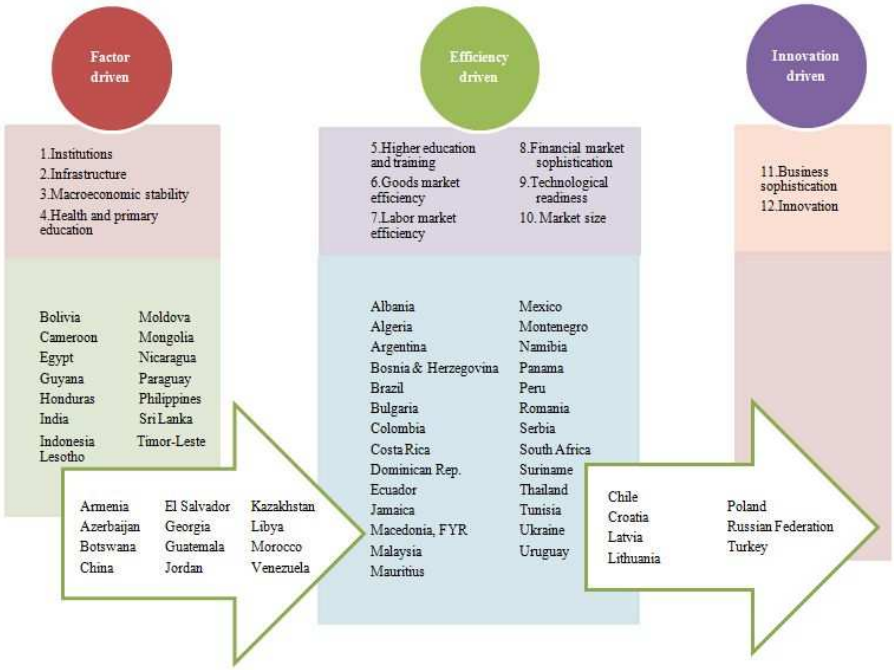
Getting into the GCI scores, Table no. 2 shows the top ten countries in the world and the top ten positions achieved by middle-income countries in this index. The top ten places are occupied for high income countries, some of them are European such as Switzerland and the Netherlands, while other are American countries -obviously United States and Canada- and the rest are Asian economies, particularly Singapore and Japan. Regarding the MIC, the better positions achieved by these economies in the world ranking range from the places 21st to 51st –out of 134 countries-. The first country of the group is Malaysia (21st), followed by Chile (28th) and China (30th). As a matter of fact, Malaysia and Chile are above countries such as Ireland (22nd) or Spain (29th), while some middle-income economies such as China, Thailand or Tunisia rank in better positions than i.e. Portugal and Italy. This would reveal the possibility of some developing economies showing certain capabilities that are enabling them to have better results in their competitiveness, although they do not belong to the richest and most developed countries. At the end of Table no. 2 we can also see that the larger and more active economies among the MIC such as India (50th) and the Russian Federation (51st) are not yet performing very well in terms of competitiveness. Then, this diverse competitive behavior among the MIC would justify the interest to carrying out a detailed analysis about the factors that would be behind the countries performance. To carry out this analysis, we will begin to establish the stage of development of the middle-income countries, the factors of innovation and technological readiness and finally, we will study the role of FDI on the competitiveness of this group of countries.

Table no. 2 - Best ranked countries in the Global Competitiveness Index (GCI)

All Countries	Rank	Middle-Income Countries	Rank
United States	1	Malaysia	21
Switzerland	2	Chile	28
Denmark	3	China	30
Sweden	4	Thailand	34
Singapore	5	Tunisia	36
Finland	6	Lithuania	44
Germany	7	South Africa	45
Netherlands	8	Jordan	48
Japan	9	India	50
Canada	10	Russian Federation	51

Source: [Porter and Schwab, 2008, 10]

There are three stages of development according to the methodology employed in the GCR, and these are set by the level of competitiveness achieved by the countries in the different pillars of the index, the stages are: (1) the *factor driven* stage; (2) the *efficiency driven* stage; and (3) the *innovation driven* stage. In figure 1 we can see the stages of development, the pillars that are integrating each phase and the MIC that belong to each stage of development. We can observe that MIC do not follow a common pattern but on the contrary, they split among the several stages: First, some of them are in the *factor driven* stage where the countries depend crucially on their endowments -the subindex is built over basic requirements including pillars 1 to 4 that correspond to features of some basic conditions of development-; in this stage, most of the countries found are low-middle income economies. Secondly, in *the efficiency driven* stage countries compete on quality and their production processes are improved; the subindex of this stage is efficiency enhancers and is integrated by pillars 5 to 10, those related to aspects such as labor and financial markets, higher education and training and even technological readiness. As it is shown in Figure 1, the MIC are mainly oriented by this efficiency driven motivation since most of the countries in the group are placed in this stage. The third stage is, we can say, the more sophisticated since it is *innovation driven*, a stage where countries must try to replace technology imitation strategies and they should definitively embark on innovation; this would include pillars 11 and 12 that precisely refers to innovation and business sophistication [Sala-i-Martin et al., 2008]. It should be noted that any of the MIC are found yet in this sophisticated stage.



Source: Own elaboration with information from Sala-i-Martin et al. [2008]

Figure no.1. Stages of development, factors of competitiveness and middle income countries

Nevertheless, some changes are observed regarding the position of the middle-income economies: in the first transitional arrow a set of MIC are included and although they do not share an indisputable profile, it is noticeable the inclusion among them of economies such as China and Jordan, that have shown a dynamic behavior recently and they are moving toward a more efficient driven competitiveness –see Figure 1-. Moreover, the second arrow would represent the upgrading of countries toward a more complex level of competitiveness, namely innovation driven. We could note that most of them are European middle-income countries such as Poland and the Russian Federation. In sum, most of the MIC (44%) are in the efficiency driven stage, 25% of them are in factor driven stage and anyone is in the innovation driven level. However, there is still 20% of the MIC that are in the transitional phase from factor-driven to efficiency-driven stages being still a clear minority; and finally, only 11% of them are moving toward a transition from efficiency driven stage to innovation driven stage.

3.2. Technology, innovation and competitiveness

Inside the GCI, there are two particular pillars that are especially interesting according to the purposes of our analysis, the "**technological readiness**" (TR) and the "**innovation**" (I) pillars. The TR pillar has a weight of 17% in the *efficiency subindex* while the pillar I represents 50% in the *innovation* and *sophistication* subindex.

The technological readiness pillar is a measurement of the capacity and the speed for the absorption and adoption of knowledge and technology as well as the access to ICT in the

country. The variables that integrate this pillar are defined in Table no. 3; the first four variables are coming from surveys while the last four correspond to hard data from national statistics. Among the eight components, some of them are particularly related to the availability of new technologies in the country (variable no. 1), to the abilities of firms for the absorption of technology (variable no. 2) and to the possibilities for technology transfer that inward FDI generates (variable no. 4). On the other hand, this is a pillar that concedes an important role to the ICT in countries since the other five components relate to the regulation and use of ICT (variables no. 3, 5, 6, 7 and 8).

Regarding the Innovation pillar, it measures the countries' skills to introduce new or improved products and processes into the market. The components of this pillar are also shown in Table no. 3; in this case, most of the variables come from surveys but the last one that comes from the national statistics. Among the seven components integrated in the pillar, some of them are directed related to the capacity of innovation and whether the companies are more or less dependent on external sources or they perform their own R&D (variables no. 1 and 3) as well as to the ability of technology creation in the country, approached by the patents utility (variable no. 7). On the other hand, there is a component related to human scientific and technological resources (variable no. 6) and finally, three of the components are related to the institutional framework of the national systems of innovation (variables no. 2, 4 and 5).

Table no. 3 - The components of the Technological Readiness pillar and the Innovation pillar

Technological Readiness pillar	**Innovation pillar**
1. Availability of latest technologies	1. Capacity for innovation
2. Firm-level technology absorption	2. Quality of scientific research institutions (university laboratories, government laboratories)
3. Laws relating to ICT (electronic commerce, digital signatures)	3. Company spending on R&D
4. FDI and technology transfer	4. University-industry research collaboration
5. Mobile telephone subscribers	5. Government procurement of advance technology products
6. Internet users	6. Availability of scientists and engineers
7. Personal computers	7. Utility patents
8. Broadband Internet subscribers	

Source: [Porter and Schwab, 2008, 460-467 and 486-492]

In Table no. 4 are shown the top ten places of the technological readiness pillar; as we can see, some European countries such as The Netherlands, Sweden, Denmark, Norway, Switzerland, Iceland and the United Kingdom occupy the first positions, although there are others outside Europe such as Canada, Singapore and Hong-Kong. In the same Table no. 4 we can see the innovation pillar ranking, and just like the last ranking, it shows the predominance of high-income countries. However, Korean Republic and Taiwan rank among the top ten positions; the first one is considered a low-income country and the second one is not treated separately from China in the World Bank classification.

Table no. 4 – Top ten world places in the technological readiness and innovation pillars

Technological Readiness		**Innovation**	
Country	**Rank**	**Country**	**Rank**
Netherlands	1	United States	1

Sweden	2	Finland	2
Denmark	3	Switzerland	3
Norway	4	Japan	4
Switzerland	5	Sweden	5
Iceland	6	Israel	6
Singapore	7	Taiwan, China	7
United Kingdom	8	Germany	8
Canada	9	Korea, Rep.	9
Hong Kong	10	Denmark	10

Source: [Porter and Schwab, 2008, 16-18]

Before analyzing the MIC performance in these two pillars, it seems necessary to make some calculations for a better understanding of their world rank positions and scores in terms of competitiveness. For this purpose, some descriptive statistics for the Global Competitiveness Index and its components are shown in Table no. 5. Focusing on the role of the technology and innovation, we can observe that the general average score obtained for the 134 studied countries in the Technological Readiness pillar is 3.62, while the values obtained for the top ten places range from 6.1 to 5.6, which are above the total average. Regarding the Innovation pillar, the total average score is 3.38 and the score obtained by the top ten places varies from 5.84 to 5.09.

Table no. 5 - Basic descriptive for competitiveness indexes and components

	Average	**St Dev**	**Max**	**Min**	**Median**
Global Competitiveness	4,20	0,67	5,74	2,85	4,11
Basic requirements	4,52	0,82	6,18	2,96	4,42
Efficiency enhancers	4,06	0,72	5,81	2,69	4,02
Business sophistication & innovation	3,77	0,77	5,80	2,70	3,65
Technological readiness	3,62	1,09	6,01	2,06	3,35
Innovation	3,38	0,84	5,84	2,06	3,15
Availability of latest technologies	4,65	1,02	6,70	2,70	4,60
Firm-level technology absorption	4,79	0,79	6,60	3,00	4,70
FDI & technology transfer	4,81	0,62	6,40	3,30	4,90
Utility patents	19,58	50,04	270.4	0	0,20
Company spending on R&D	3,36	0,94	6	2,1	3,00
Capacity for innovation	3,35	0,94	6	2	3,1
Availability of scientists and engineers	4,18	0,80	5,9	2,2	4,20

Source: Own elaboration with information of [Porter and Schwab, 2008, 460-467 and 486-492]

Table no. 6 shows the top ten and the last ten places in the Technological Readiness and Innovation pillars rankings for the MIC. Looking to the different positions in the former pillar, we can note that China is the first MIC in the ranking, obtaining the 33rd place. The top ten middle-income countries are between the 33rd and the 48th places, while the score of these countries varies from 4.48 to 3.7, values that also are found above the total average (3.62). Turning now to the last ten places occupied by middle income countries, we can note that Bolivia and Colombia are in the very last places of the world ranking, occupying the 133rd and 134th places respectively; the rest of the MIC that occupy the latest positions range from 109th to 125th places. The score obtained for these countries varies from 2.61 to 2.06, more than 1 point below the global average for the 134 studied countries. The MIC economies range from 22nd to 47th places in the Innovation pillar, with scores that vary from 4.28

to 3.42, values that again are above the total average. It is noteworthy that Brazil, India and China, are among the first ten middle-income countries in the ranking; these three countries are part of the BRIC and they have important notation in the world because of the large size of both their territory and population that derive into the importance of their internal markets. However, far from generalizations, Russian Federation, the other integrant of the BRIC, is in the 48th place, after Indonesia. Other countries that are also well positioned in this pillar are Tunisia, South Africa and Chile. Analyzing the last positions in the ranking, we can note that the last ten middle income countries occupy the spaces 118th to 134th with scores from 2.56 to 2.06, both of them far below the total average (3.38). It is noticeable that the last 8 places in the ranking are occupied by some MIC, mainly from Latin American and the European regions.

Table no. 6 - Top ten and last ten places of the MIC in Technological Readiness and Innovation

Technological Readiness				**Innovation**			
Top Ten		**Last Ten**		**Top Ten**		**Last Ten**	
Country	**Rank**	**Country**	**Rank**	**Country**	**Rank**	**Country**	**Rank**
China	33	Bosnia and Herzegovina	109	Malaysia	22	El Salvador	118
Malaysia	34	Cameroon	110	China	25	Guyana	124
Chile	35	Armenia	112	Tunisia	27	Nicaragua	127
Lithuania	38	Algeria	114	India	32	Bosnia and Herzegovina	128
Latvia	41	Timor-Leste	118	Sri Lanka	36	Ecuador	129
Costa Rica	42	Paraguay	119	South Africa	37	Colombia	130
Montenegro	43	Nicaragua	122	Azerbaijan	40	Timor-Leste	131
Jamaica	45	Lesotho	125	Chile	41	Albania	132
Poland	46	Bolivia	133	Brazil	43	Bolivia	133
Romania	48	Colombia	134	Indonesia	47	Paraguay	134

Source: [Porter and Schwab, 2008, 16-18]

Getting deeper into some components of the two pillars of our interest, Tables no. 7 and no. 8 provide us with a more detailed view of the abilities in technology and innovation of the MIC. In Table no. 7 we can see the countries that achieved the best positions in a selection of components in the Technological readiness pillar and all of them achieved values above the world average. Malaysia, Chile, Tunisia and India appear in the top ten MIC in the whole selection of components; while South Africa, Jordan and Turkey appear in two of them. It is noticeable the difference in the rank of the FDI and technology transfer component that goes from 6 to 31, while the others range from 19 to 50; in other words, MIC are very well positioned in the FDI component; for example: Malaysia and Costa Rica are among the top ten countries of the world in this component, in the 6th and 8th places respectively, with values in their scores found notably over the world average and the median and closer to the max value – see Table no. 5-.

Table no. 7 - Best scored MIC in some components of Technological Readiness

Firm-level technology absorption			Availability of latest technologies			FDI and technology transfer		
Country	**Rank**	**Score**	**Country**	**Rank**	**Score**	**Country**	**Rank**	**Score**
Malaysia	21	5,6	Malaysia	29	5,6	Malaysia	6	5,8
India	26	5,5	Jordan	31	5,6	Costa Ri-	8	5,7

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South Africa	32	5,5	Tunisia	36	5,4	Serbia	14	5,5
Chile	33	5,4	South Africa	37	5,4	Panama	19	5,4
Tunisia	34	5,4	Chile	42	5,2	India	20	5,4
Jordan	35	5,4	India	43	5,2	Indonesia	24	5,3
Brazil	42	5,3	Jamaica	44	5,2	Tunisia	27	5,3
Sri Lanka	45	5,2	Turkey	45	5,1	Honduras	29	5,3
China	46	5,1	Mauritius	47	5,1	Guatemala	30	5,3
Turkey	48	5,1	Thailand	50	5,1	Chile	31	5,3

Source: [Porter and Schwab, 2008, 16-18]

Table no. 8 - Best classified MIC in a selection of components in the Innovation pillar

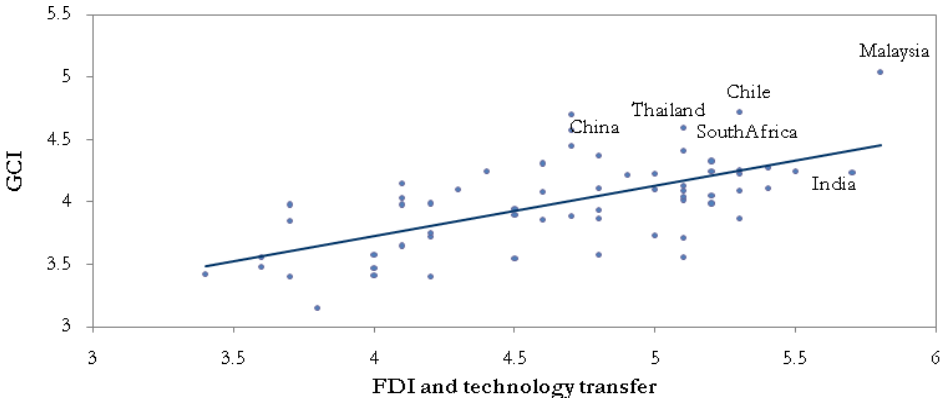
Utility patents			Company spending on R&D			Capacity for innovation			Availability of scientists and engineers		
Country	**Rank**	**Score**	**Country**	**Rank**	**Score**	**Country**	**Rank**	**Score**	**Country**	**Rank**	**Score**
Malaysia	29	6	Malaysia	18	4,6	Malaysia	21	4,3	India	3	5,7
Croatia	35	3,3	China	24	4,2	China	25	4,2	Tunisia	10	5,5
South Africa	39	1,7	South Africa	28	4	Brazil	27	4	Malaysia	24	5
Chile	40	1,5	India	29	3,9	Ukraine	31	3,8	Azerbaijan	28	4,9
Russian F.	41	1,3	Costa Rica	30	3,9	Sri Lanka	34	3,8	Sri Lanka	30	4,9
Lithuania	43	1,2	Brazil	31	3,9	India	35	3,8	Indonesia	31	4,9
Georgia	44	1,1	Sri Lanka	32	3,9	South Africa	36	3,8	Russian F.	34	4,8
Argentina	45	0,9	Indonesia	34	3,8	Tunisia	38	3,7	Chile	35	4,7
Uruguay	47	0,9	Tunisia	38	3,7	Azerbaijan	39	3,7	Jordan	39	4,6
Poland	48	0,8	Croatia	45	3,5	Croatia	42	3,5	Algeria	41	4,6

Source: [Porter and Schwab, 2008, 16-18]

With respect to the pillar of Innovation, in Table no. 8 we can see that Malaysia is the country that appears in the whole selected components, even is the first country in three of them and it is in 3rd place in the other. Several countries appear in three of the selected components, such as South Africa, India, Tunisia, Croatia and Sri Lanka, being noticeable that the 3rd and 10th places were obtained by India and Tunisia in the Availability of scientists and engineers component. In these four components, the values that obtained the MIC shown in the Table are above the general world average as well as the median of the distribution. The exception would correspond to the variable of utility patents that is the indicator with the higher dispersion and where the MIC show values much lower than the world average although above the median.

There are two important issues in the results just showed; on the one hand, looking into the component of FDI and technology transfer inside the technological readiness pillar, the MIC have achieved very good places among the whole countries of the report: Malaysia occupies the 6th position in the world ranking and India is in the 20th while in terms of global competitiveness the position of the latter is 50th. Moreover, it must be noted that five out of the top ten MIC are lower-middle income countries. It is also noticeable because the MIC group improves notably in this one regarding other components of the technology and innovation pillars. On the other hand, differences across countries seem to be more pronounced

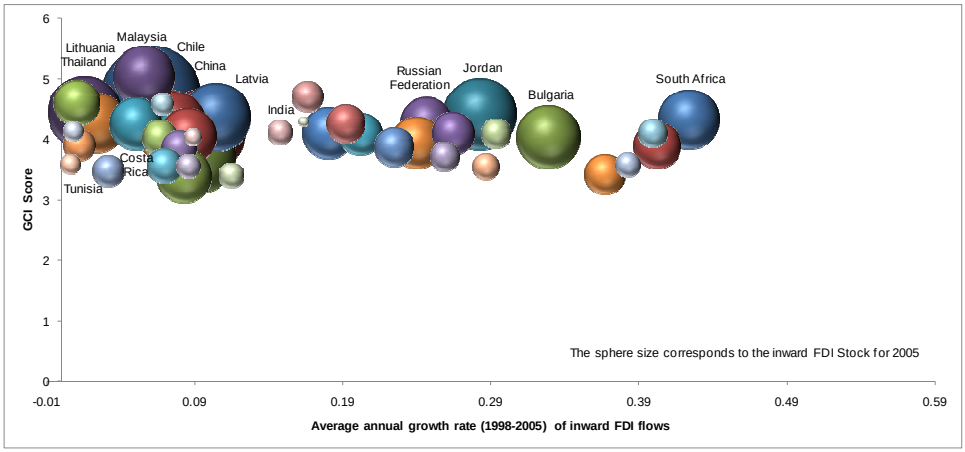
in this FDI component since the MIC economies with the worst scores are certainly at the very end of the world ranking. Graph no. 1 shows the positive relationship existing for the MIC between their global competitive position and their behavior in the FDI and technology transfer component, being notable the better behavior shown by a set of countries integrated by Malaysia, Chile, South Africa, China and India among the MIC. Their high positions in the ranking as well as in the relationship of the variables previously described justified a more detailed analysis that we will develop in the next section.



Source: Own elaboration with information of [Porter and Schwab, 2008, 10 and 463]

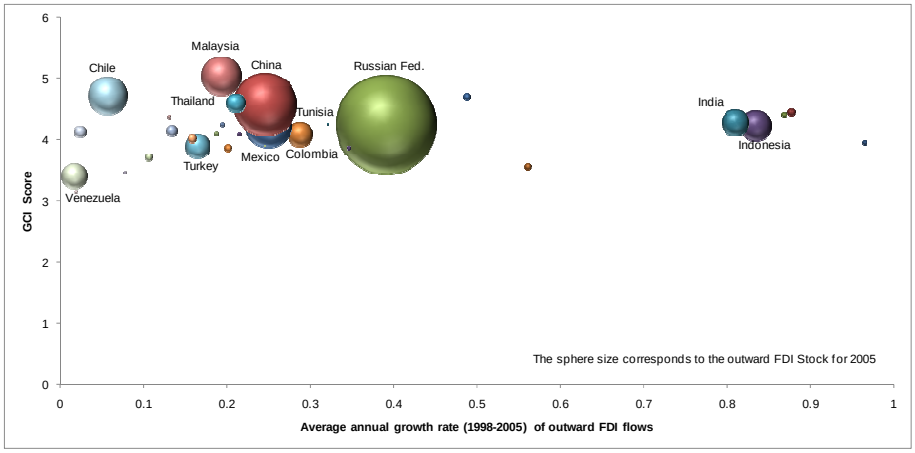
Graph no. 1 - Global competitiveness, FDI and technology transfer in the MIC, 2008

Another illustration of the relationship between competitiveness and FDI that is complementary to our diagnosis can be done taking into account the dynamics of FDI and its cumulative path in the MIC in relation to their global competitive performance. Graph no. 2 shows the GCI in the vertical axis, the rate of growth of inward flows between 1998 and 2005 is in the horizontal while the stock of inward FDI in 2005 in absolute terms is illustrated by the size of the spheres corresponding to each country. We can observe that some of the MIC that outperform in terms of competitiveness are placed in the upper left quadrant of the Graph. Particularly, economies such as Malaysia and Chile share their excellent ranking in competitiveness with a large size of FDI inward stock although their more recent evolution in terms of FDI growth being positive is still moderate. In a lesser extent, other countries such as Thailand, Lithuania, Tunisia and Costa Rica are nearby positioned but they are showing important volume of foreign capital presence in their national economies while others like Latvia and China are taking-off toward a more dynamic FDI behavior. On the other hand, there are some economies that show large rates of growth in FDI and they are above the average of GCI; this is the case of South Africa, Bulgaria and Jordan, all of them showing an important accumulation of foreign capital in their economies. There are others MIC that even having a positive competitive behavior, the size of the FDI stock is not yet so notable although they show a potential positive evolution, such as the Indian case.



Source: Own elaboration with information of [UNCTAD, 2008 and WEF, 2008]

Graph no. 2 – Competitiveness, inward FDI dynamism and inward FDI stock for some MIC



Source: Own elaboration with information of [UNCTAD, 2008 and WEF, 2008]

Graph no. 3 – Competitiveness, outward FDI dynamism and outward FDI stock for some MIC

Regarding the evolution of outward FDI in the MIC, we can see in Graph no. 3 that this shows a higher dispersion among the cases and in general, these countries have not yet consolidated a large accumulation of outward FDI as the size of the spheres shows. Nonetheless, it is noticeable that the most competitive MIC (what we could call here our target countries) have began to show a positive behavior in the relationship shown in the Graph, with the exception of South Africa that does not follow the rest of competitive economies. A very positive evolution is clearly observed in some Asian emerging economies such as India and Indonesia that have experienced some of the highest rates of growth in the outward FDI in the last years although the size of the stock is not yet very large. There is also a rather positive evolution on the outward dynamism of some of the most competitive MIC such as Malaysia and China although their rates of growth have been more moderate. On the other

hand, there are some of them that showing larger outward stock such as Russia Federation and Mexico do not hold the best competitive performance.

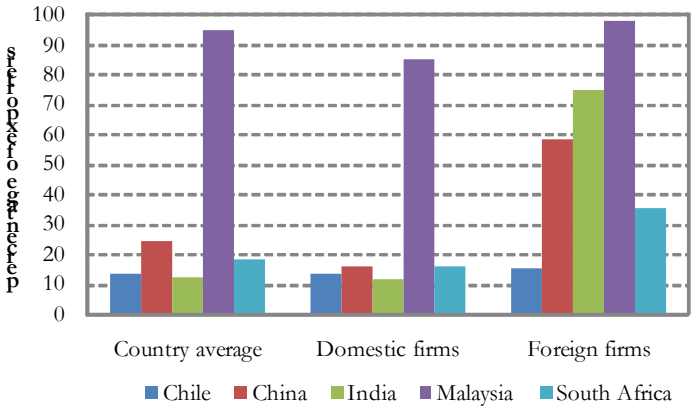
4. Foreign owned firms and competitiveness

We turn now to another data source that collecting data at the micro level would allow us to explore the issue from a point of view related to the firms abilities; the data source is the *Enterprise Surveys*, elaborated by the World Bank Group, that would reveal the relative importance of the enterprise structure in the MIC that have shown a comparative better behavior in competitiveness[iii]. Data from this source are available on more than 90,000 firms in 111 countries, covering business perceptions and dozens of indicators on the quality of the business environment. The *Enterprise Surveys* capture business perceptions on the biggest obstacles to enterprise growth, the relative importance of various constraints to increasing employment and productivity and the effects of a country's business environment on its international competitiveness.

Graph no. 4 shows that the best position that Malaysia obtained in terms of competitiveness -as it has been seen in the previous section-, seems to be clearly associated with a notable best export performance of their firms in comparison to the other more competitive MIC that are included in our selection of best rankers. If we look into the country average, more than 90% of Malaysian firms are exporters while this proportion is under 30% in China and even under 20% in South Africa, being closer to 10% in Chile and India. If we consider only the domestic firms of these countries, the values are lower, but the tendency is the same as the one showed before. On the contrary, when we look into the foreign companies the pattern is very different for most of the countries - with the exception of Chile where the proportion of exporters among foreign firms is only slightly better than for the average of the country-, we can note that there are more foreign companies exporting than domestic firms. It is extremely high the value in the case of the Malayan economy where the proportion of exporter firms is near 100% for the foreign companies, although the percentage of exporters in domestic firms is also high specially compared with the rest of the countries in our selection. The differences regarding the domestic owned firms are more spectacular in India where the value of the foreigners reaches 70% and in China where it is closer to 60%; even in South Africa we can observe that near 40% of the foreign firms are exporters. This behavior in these countries makes affordable our affirmation about the importance that MNC could play in the definition of competitiveness in developing countries and particularly in the group of the MIC.

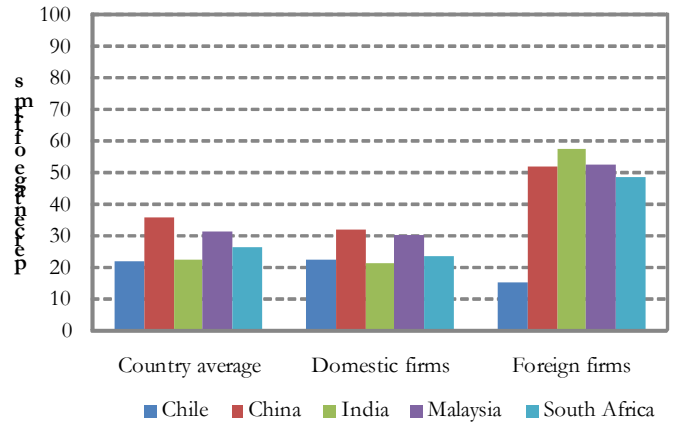
Another aspect that could reveal the technological ability of the enterprises of the MIC in order to integrate the requirements that allow them to compete in the exigent international market' segments is the accomplishment of the quality standards in their production outputs, measured through the international certifications they obtain. In the productive systems of developing economies where a combination of advanced and traditional industries coexists, this can be considered a good proxy or indirect indicator of the technological capacity to integrate innovative protocols and processes at the level of international standards. In Graph no. 5 we can see that the five highly competitive MIC show a similar behavior in the general average of the proportion of firms with international quality certificates that is rather better in the Asian economies: in China the value of this indicator is above one third of the firms and in Malaysia it is higher than 30%. The domestic firms in these economies follow the same pattern described for the general average with only minor variations. However, differ-

ences are again notable when taking into account the proportion of foreign firms that accomplish quality certification according to international standards in these economies. In four out of the five countries (with the only exception of Chile), the differences are extraordinary notable since more than 50% of the foreign companies take these certificates, being above the domestic enterprises in more than 20 percent points in Malaysia and China while the differences with regard to the domestic companies are even more substantial in the cases of South Africa and India.



Source: Own elaboration with information of [World Bank, 2008]

Graph no. 4 - Proportion of exporter firms in some competitive MIC

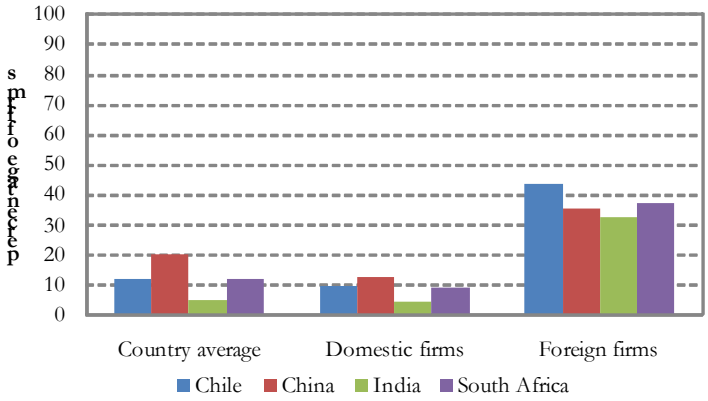


Source: Own elaboration with information of [World Bank, 2008]

Graph no. 5 - International quality certificates in some competitive MIC

Regarding the use of technology licenses from foreign companies, in Graph no. 6 we can note that China is, following the country average, the nation that shows the highest proportion of firms acceding to technology licensing from foreign companies, being around 20%, while in South Africa and Chile that proportion is close to 10% and in India is notable lower -the availability of information allow us to use data only for four out of the five MIC

selected, Malaysia is excluded-. Focusing in the case of domestic firms, these proportions are notably reduced in the whole selection of countries. However, in the case of foreign firms there is a different pattern; there is a more important access to technology licensing in more than 40% of the foreign companies in Chile, as well as in the other countries where the proportion of foreigners using this technology source is rather similar. Then, according to these results, the presence of foreign firms seems to be associated to a higher level of access to foreign technology as well.



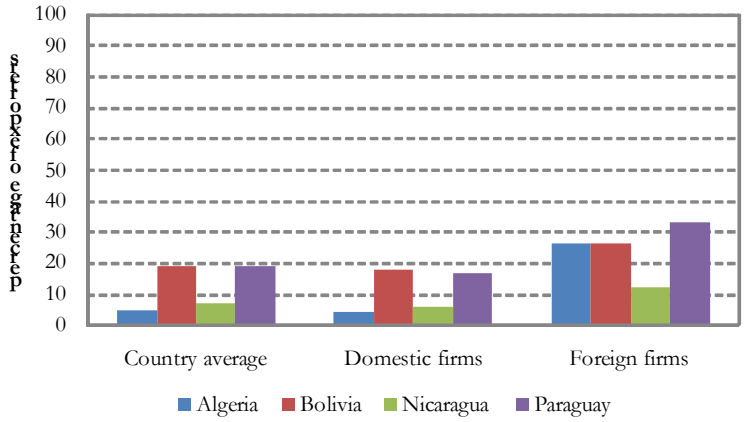
Source: Own elaboration with information of [World Bank, 2008]

Graph no. 6 - Technology licenses from foreign companies in some competitive MIC

Going now with the lowest positioned MIC in the competitiveness index, there is a handful that coincides in the ranking of several innovation and technology subindexes: Algeria, Bolivia, Nicaragua and Paraguay; the next graphs allow us to see what are their entrepreneurial features and whether there are differences in comparison to the more competitive MIC in the same competitiveness components that we have previously commented. In Graph no. 7 we can observe that really few companies are exporters in the three points of comparison; however, foreign firms present a slightly better pattern than the domestic firms in this set of least competitive MIC. In the country average, only Bolivia and Paraguay show a proportion of exporter firms that is near 20% while in Algeria and Nicaragua the value is far below 10%. The domestic firms in these countries behave rather similar. Likewise, it is important to note that in these four economies there are not so notable differences in the case of foreign companies while this fact was clearly manifested and different for the highly competitive MIC as it was revealed. There are some differences but the proportion of exporters among the foreign companies is only slightly superior. It is noticeable that in the case of Paraguay the proportion of foreign exporter companies is higher than 30%. In Algeria and Bolivia this indicator shows results above 20%, while it is notably lower in Nicaragua.

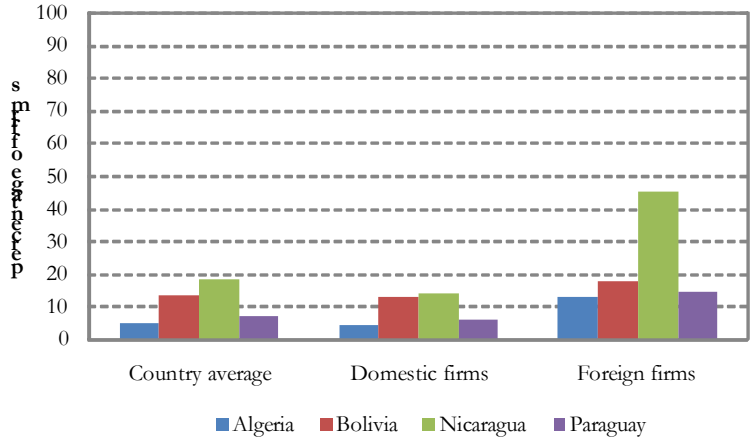
We find a rather similar picture with regard to the firms succeeding with international quality certificates in these countries. The lack of competitiveness seems to be associated also to the lack of technical skills of their firms in relation to international standards, one more reason that would justify their backward positions in the competitiveness ranking. Graph no. 8 shows the extremely low values that in this indicator achieved Algeria and Paraguay, both of them are below 10% in the general national average that accomplish with international

quality certificates. On the other hand, the best result corresponds to Nicaragua, country that achieves a higher value although still below 20%. This description does not hold for domestic firms where the picture is even worst; however, there is a slight improvement in the case of foreign firms since all the countries show higher values for these companies. It is only especially noticeable the case of Nicaragua where the proportion of foreign companies that accomplish with the international quality standards is above 40%.



Source: Own elaboration with information of [World Bank, 2008]

Graph no. 7 - Proportion of exporters in some of the least competitive MIC

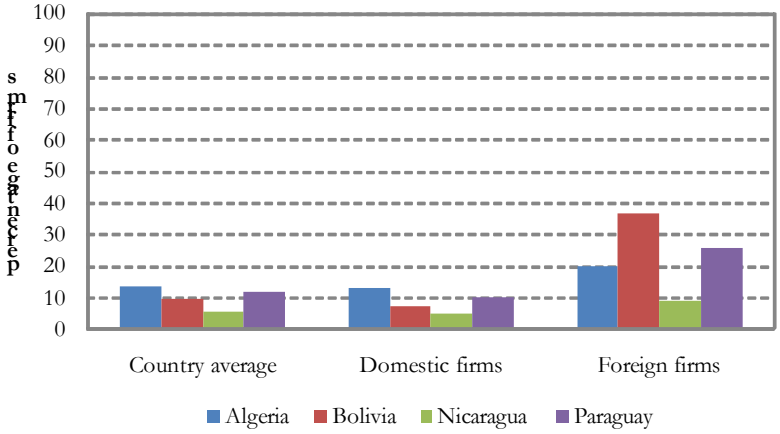


Source: Own elaboration with information of [World Bank, 2008]

Graph no. 8 - International quality certificates in some of the least competitive MIC

Considering now the firms that have access to foreign technologies through the acquisition of licenses to foreign companies, the country average shows a proportion that is 10% or less in Algeria, Bolivia and Paraguay while is notably lower in the Nicaraguan case –see Graph no. 9-. It is practically the same case when seeing the behavior of the domestic companies considered alone although with lower values in Nicaragua and Bolivia. However,

looking at the proportion of foreign companies, it is rather high in Bolivia where almost 40% of these firms acquire foreign technology; in Paraguay the value is around 25% and in Algeria there is a proportion of 20%. Therefore, the aspect of technology acquisition seems to be more differentiated between foreign companies and domestic in least competitive economies than across countries, being possible to assert that precisely these companies could generate a reinforcing mechanism of access to foreign technologies.



Source: Own elaboration with information of [World Bank, 2008]

Graph no. 9 - Technology licenses from foreign companies in some of the least competitive MIC

In sum, from this description we can say that a close relationship emerges between the elements that conduit to a good competitive performance and the relative importance that foreign firms achieved in the national systems of innovation, at least according to the set of elements that have been specifically studied. Nevertheless, it can be underline that this constitutes an element of differentiation of being more competitive, as it has been revealed in the comparison between the best and the least positioned MIC. In the latter, the strength of foreign companies as exporters as well as regarding the implementation of international quality standards is not so noticeable. These results bring us to pinpoint the idea about the existence of a potential threshold effect in host countries and the reinforcing mechanism that foreign firms could generate in those developing countries with higher abilities to catch up.

5. Conclusions

The MIC is a set of countries that shows a wide diversity: some of these economies present levels rather similar to high-income countries in some elements while others can be systematically found in the last places of the world classifications regarding competitiveness. We have tried to set some kind of general position for these countries and then we have selected a subset of them that presents the best and the worst behavior in the aspects related to competitiveness. Our proposition here has been based on the interplay between national technological capabilities and the impact of the international integration that FDI may generate, aspects that will be deeply developed in further research.

Nonetheless, in this exploratory analysis, we found that countries like Chile, China, India, Malaysia, South Africa and Tunisia have a better performance than the rest of the MIC;

they have been gaining competitiveness, in a great extent, due to the effect that MNC have had on the production structure of these economies. This effect is not only caused because of the mere presence of foreign owned companies in these countries, but it is due to the impact of the MNC on the whole national system of innovation that makes possible the development of technologies, to the realization of activities of higher value content and even to increase the exports levels. These results could be related to the existence of a potential threshold effect in host countries that would permit the reinforcing mechanisms that foreign firms could generate in some industries of the developing economies, increasing the likelihood for catching-up. It is also noticeable the difference found between domestic and foreign firms; although some countries show a exceptional behavior, in most of them foreign companies have a better performance that domestic firms in the variables used. On the other hand, in the countries with the worst positions in the competitiveness ranking (Algeria, Bolivia, Nicaragua and Paraguay) the differences between foreign and domestic firms were not so marked but they still appear.

From our description, it can be said that governments and international institutions could conduct some sort of policies in middle-income countries to improve their technological capabilities. If the countries would have the ability to identify the relevant knowledge for their most competitive industries and then adopt and adapt this knowledge to their particular circumstances, they will enhance the capacity to generate their own technology and gradually integrate the dynamic international markets. This is not an easy task; however, this paper has been shown that many countries are working on these issues and are achieving positive results. These policies must also be accompanied by policies aimed at strengthening the national system of innovation in the countries, i.e. to improve institutions, education, scientific and technological infrastructure, to foster a close relationship in universities and industry, among others. In other words, the countries are able to influence the pieces of the national system of innovation that could frame a more dynamic economy and to define a sustainable strategy based on their own productive and commercial capacities.

Regarding future research, it would be of interest to analyze the group of MIC with more detail, regarding the industry level, measuring competitiveness in the different sectors of the economy and also linking their performance with the MNC set in the country, without leaving aside the effect that FDI outflows generate in each industry. From this kind of analysis some suggestions for public policies can be obtained to define some more clear and precise objectives that would impact national competitiveness.

References

Aharoni, Y, Hirsch, S. (1997) “Enhancing competitive advantages in technological intensive industries” in J.H. Dunning and K.A. Hamdani, *The new globalism and developing countries*, United Nations University Press, Tokio, NY, Paris.

Alonso, J.A. (2007) *Cooperation with middle-income countries*, Editorial Complutense, Madrid

Álvarez, I., Magaña, G. (2007) “Technological capabilities in middle-income countries”, in Alonso, J.A. *Cooperation with middle-income countries*, Editorial Complutense, Madrid.

Álvarez, I., Marín, R., Fonfría, A. (2009) “The role of networking in the competitiveness of firms”, *Technological Forecasting & Social Change*, 76.

Bozeman, B. (2000) “Technology transfer and public policy. A review of research and a theory”, *Research Policy*, 29.

Brouthers, L. E., O'Donnell, E., Hadjimarcou, J. (2005) "Generic Product Strategies for Emerging Market Exports into Triad Nation Markets: A Mimetic Isomorphism Approach", *Journal of Management Studies*, 42.

Cantwell, J. (1989) *Technological Innovation and Multinational Corporations*, Basil Blackwell, Oxford.

Cantwell, J. (1995) "The globalization of technology: What remains of the product cycle model?", *Cambridge Journal of Economics*, 19, 1.

Cantwell, J. (2005) "Innovation and competitiveness", in: J. Fagerberg, D. Mowery, R. Nelson (Eds.), *The Oxford Handbook of Innovation*, Oxford University Press, Oxford.

Castellacci, F. (2008) "Technology clubs, technology gaps and growth trajectories", *Structural Change and Economic Dynamics*, 19, 4.

Dunning, J.H. (1993) *Multinational Enterprises and the Global Economy*, Addison Wesley, New York.

Dunning, J.H. (2006) "Towards a paradigm of development: implications for the determinants of international business activity", *Transnational Corporations*, 15, 1.

Durlauf, S.N., Jonson, P.A. (1995) "Multiple regimes and cross-country growth behaviour", *Journal of Applied Econometrics*, 10.

Fagerberg, J. (1996) "Technology and competitiveness", *Oxford Review of Economic Policy*, 12.

Fagerberg, J., Srholec, M. (2007) "National innovation systems, capabilities and economic development", *Research Policy*, 37.

Fagerberg, J., Srholec, M (2008) "Technology and development: Unpacking the relationship(s)", *TIK Working Papers on Innovation Studies* , no. 20080623, Centre for Technology, Innovation and Culture, University of Oslo, Oslo

Frost, T. (2001) "The geographic sources of Foreign Subsidiaries' Innovations", *Strategic Management Journal*, 22.

Gerschenkron, A. (1962) *Economic Backwardness in Historical perspective*, Berlknap Press, Cambridge Mass.

Hobday, M. (1995) *Innovation in East Asia*, Edward Elgar, Aldershot.

Katz, J. (1982) *Technology Generation in Latin American Manufacturing Industries*, Pergamon Press, Oxford

Krugman, P. (1994) Competitiveness: a dangerous obsession, *Foreign Affairs* ,73.

Lall, S. (1996) *Learning from the Asian Tigers*. Macmillan, London.

Lall, S. (1997) "Investment, technology and international competitiveness" in J.H. Dunning and K.A. Hamdani, *The new globalism and developing countries*, United Nations University Press, Tokio, NY, Paris.

Lall, S. (2000) "Technological Change and Industrialization in the Asian Newly Industrializing Economies: Achievements and Challenges", in Kim and Nelson, *Technology, Learning & Innovation Experiences of Newly Industrializing Economies*, Cambridge.

Lall, S. (2001) "What Competitiveness is and why it is important", in Lall, S. *Competitiveness, technology and skills*, Edward Elgar, Cheltenham.

Lall, S. (2002) "Implications of Cross-Border Mergers and Acquisitions by TNCs in Developing Countries: A Beginners' Guide", *QEH Working Paper*, no. 88.

Lundvall, B.A., Johnson, B., Andersen, E.S., Dalum, B. (2002) "National systems of production, innovation and competence building", *Research Policy*, 31.

McCann, P., Mudambi, R. (2005) "Analytical differences in the economics of geography: the case of the multinational firm", *Environment and Planning A*, 37.

Molero, J. and Buesa, M. (1999) "Innovación y cambio tecnológico" in García Delgado, J. L. (Coord.) *Lecciones de Economía Española*. Civitas. Madrid.

Mowery, D.C., Oxley, E. (1995) "Inward technology transfer and competitiveness: the role of national innovation systems", *Cambridge Journal of Economics*, 19, 1.

Mudambi, R. (2008) "Location, control and innovation in knowledge-intensive industries", *Journal of Economic Geography*, 8.

Narula, R., Dunning, J.H. (2000) "Industrial development, globalisation and multinational enterprises: new realities for developing countries", *Oxford Development Studies*, 28, 2.

Narula, R. and Wakelin, K. (1995) "Technological competitiveness, trade and foreign direct investment", *Research Memorandum*, 2/95 - 019, MERIT, Maastricht.

Nelson, R. (1993) *National innovation systems: a comparative analysis*, Oxford University Press, Oxford.

Ozawa, T. (1992) "Foreign direct investment and economic development", *Transnational Corporation*, 1, 1.

Piscitello, L. (2004) "Corporate diversification, coherence and economic performance", *Industrial and Corporate Change*, 13, 5.

Porter, M.E. (1985) *Competitive Advantage*, Free Press, New York.

Porter, M.E., Delgado, M., Ketels, C., Stern, S. (2008) "Moving to a new global competitiveness index", in Porter, M. and Schwab, K., *The global competitiveness report 2008-2009*, 2008, at www.weforum.org

Porter, M.E., Schwab, K., *The global competitiveness report 2008-2009*, 2008, at www.weforum.org

Rasiah, R. (2003) "Foreign ownership, technology and electronics exports from Malaysia and Thailand", *Journal of Asian Economics*, 14.

Rodrik, D. (1996) "Coordination failures and government policy: a model with applications to East Asia and Eastern Europe", *Journal of International Economics*, 40.

Rodrik, D. (1999) "The New Global Economy and developing countries: Making Openness Work", *Policy Essay*, no. 24, Overseas Development Council, Washington.

Roessner, J.D., Porter, A.L., Newman, N., Cauffiel, D. (1996) "Anticipating the future high-tech competitiveness of nations: indicators for twenty-eight countries", *Technological Forecasting & Social Change*, 51.

Rugman, A.M., Doh, J.P. (2008) *Multinationals and development*, Yale University Press, New Haven and London.

Sala-i-Martin, X., Blanke, J., Drzeniek, M., Geiger, T., Mia, I., Paua, F. (2008) "The global competitiveness index: prioritizing the economic policy agenda", in Porter, M. and Schwab, K., *The global competitiveness report 2008-2009*, 2008, at www.weforum.org

Schwab, K. (2008) "Preface", in Porter, M. and Schwab, K., *The global competitiveness report 2008-2009*, 2008, at www.weforum.org

Singh, J. (2007) "Asymmetry of knowledge spillovers between MNCs and host country firms", *Journal of International Business Studies*, 38.

Uchida, Y., Cook, P. (2005) "The Transformation of Competitive Advantage in East Asia: An Analysis of Technological and Trade Specialization", *World Development*, 33, 5.

UNCTAD (2005) *World Investment Report Transnational Corporations and the Internationalization of R&D*, United Nations, New York and Geneva.

UNCTAD (2007) *World Investment Report Transnational Corporations, Extractive Industries and development*, United Nations, New York and Geneva.

UNCTAD, *FDI Statistics*, 2008, at http://www.unctad.org/

UNCTAD, *Latin America and the Caribbean 2004*, 2008a, at http://www.unctad.org/en/docs/iteiit20044_en.pdf

UNCTAD, *FDI Country profiles*, 2008b, at http://www.unctad.org/Templates/Page.asp?intItemID=3198&lang=1

UNCTAD, *United Nations conference on trade and development*, 2008c, at http://www.unctad.org/sections/dite_fdistat/docs/wid_ib_cl_en.pdf

WORLD BANK, *Enterprise Surveys*, 2008, at http://www.worldbank.org/

WORLD BANK, *World Development Report*, 2009, Washington: The World Bank

WEF, *Global Competitiveness Report 2008-2009*, 2008, at http://www.weforum.org/

Notes

[i] Accordingly to the criteria of *GDP per capita*, the *World Bank* classifies countries into three main groups: High, Middle and Low income countries. Our target group is integrated by middle-income economies (from $936 to $11,455), that is also divided into upper-middle and lower-middle income groups [World Bank, 2009].

[ii] The GCI as we know it at present days has been modified with the pass of the years. In the Report published in 2000, two indexes were built namely the Growth Competitiveness Index and the Business Competitiveness Index (BCI), these created by Jeffrey Sachs and Michael Porter, respectively. In 2004, Xavier Sala-i-Martin created the present Global Competitiveness Index (GCI) and this year, 2009, the WEF is preparing a New Global Competitiveness Index (NGCI) that tries to become an improved version of the GCI and the BCI [Porter et al., 2008]. The NGCI will incorporate most of the variables that the GCI is integrating now but it will try to be a more robust model that will focus on the level of productivity of the countries in a more accurate manner, aspect that is clearly related to competitiveness.

[iii] The countries selected have been Chile, China, India, Malaysia and South Africa. Tunisia has not been included due to unavailability of statistic information.