



Università
Ca' Foscari
Venezia

Corso di Laurea magistrale in Sviluppo Economico e dell'Impresa

Tesi di Laurea

—
Ca' Foscari
Dorsoduro 3246
30123 Venezia

INDUSTRIAL CLUSTERS IN BRIC COUNTRIES

An analysis of the economic geography of industrial
clusters and the cluster development policies

Relatore

Prof. Giancarlo Corò

Laureanda

Silvia Ballestrin

Matricola 821100

Anno Accademico

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DEVELOPMENT POLICIES

Abstract

La tesi si propone di analizzare la geografia economica dei cluster industriali nei BRIC. Essa è costituita da una prima parte in cui vengono riassunte le principali teorie economiche sviluppatesi attorno al concetto di cluster e si definiscono i principali tratti economici, demografici e sociali dei paesi presi in considerazione, i BRIC (Brasile, Russia, India, Cina). La seconda parte è invece dedicata all'analisi della geografia economica dei cluster industriali nei suddetti paesi, utilizzando una comune chiave di lettura. Lo scopo principale è quello di analizzare come questo modello di organizzazione industriale possa farsi promotore di sviluppo, agendo sul grado di competitività sostenibile delle economie emergenti in oggetto.

The thesis aims to analyze the economic geography of industrial clusters in BRIC countries. It is composed by two sections: in the first one the main cluster theories will be discussed, and a picture of the general economic, social and demographic traits of the analyzed countries will be depicted. In the second part the economic geography of industrial clusters in BRIC countries will be analyzed through a common framework. The main aim of the thesis is to investigate how this model of industrial organization could enhance the development of these emerging economies, acting on their level of sustainable competitiveness.

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Introduction

The term BRIC, which stands for Brazil, Russia, India and China, has become an ordinary word when global economic affairs are discussed. The attention on these countries has been great in the last two decades as their astonishing performances in terms of economic growth. Within just 20 years, indeed, the BRIC economies have come to achieve a significant share of the global GDP, world manufacturing value added and global manufacturing export. The average growth rate of BRIC in the first decades of the 21st millennium was twice as high as the OECD's average, and while exports have played a key role, their growth rate is now increasingly driven by domestic consumption, investment and productivity growth.¹ The aim of this thesis, whereof the main subjects are BRIC countries, is to reconstruct the economic geography of industrial clusters in these emerging economies, and to investigate and analyze the cluster development policies in order to have some insights about the level of the global competitiveness recently reached. In the last two decades the economic events which have involved the BRIC giant have created a loud buzz, as much as many studies have been conducted on the causes of their astonishing growth and, above all on their future role in the global economic scenario. What is clear is that their recent tremendous growth has allowed them to gain position in term of global competitiveness. This event make some urgent issue to arise, among others some important questions are: on what is their competitiveness grounded? Could be it considered sustainable, leading them to a higher level of development? Giving an answer to these questions is a big dare! Through this thesis we will give some insights about the global competitiveness of these emerging economies, if they could still be considered emerging ones! Clusters analysis will be the key used to hit our mark. Some consideration about competitiveness will follow.

Associating the level of competitiveness with the mere rate of growth of the Global Domestic Production have been overpassed far and away. Often an increase of the GDP

¹ BRIC REPORT- Structural Change, Poverty Reduction and Industrial Policy in the BRICS. UNIDO, Vienna, 2012

rate is associated with a higher level of global competitiveness, as it leads to assume a higher level of development. As it is for the level of development, competitiveness, as well, could not be explained with a sole economic index, which it is unable to include the vast bulk of variables from which the level of competitiveness of a country depends. Trying to measure global competitiveness has been becoming one of the central issues of government and industry in every nation. Yet for the many discussion on the topic, there is still no univocal definition of national competitiveness. Many associate it with macroeconomic aspects, such as exchange rates, interest rates, and governmental deficits, which although they are essential in determining the level of competitiveness of a nation, they do not give an exhaustive explanation, since competitiveness depends from many other aspects. Others associate competitiveness with cheap and abundant labor, or with rich endowments of natural resources. If that was true, there would have been no wonders about the level of competitiveness of the countries analyzed in this thesis. Since their huge disposal of cheap labor and natural resources, there would not be any worries about their global competitiveness. Some others explain national competitiveness with specific governmental policy, such as targeting, protection, import promotion, and subsidies. None of these explanations is fully satisfactory; none is sufficient by itself to explain the competitive position of a country. Each contains some truth, but none of them is exhaustive. One of the definition which have reached a great consensus is that one given by M.E Porter, which associates the level of competitiveness of a country with the rate of productivity growth. In one of its masterpiece works he says: *“The only meaningful concept of competitiveness at the national level is productivity. The principal goal of a nation is to produce a high and rising standard of living for its citizens. The ability to do so depends on the productivity with which a nation’s labor and capital are employed. Productivity is the value of the output produced by a unit of labor or capital. Productivity depends on both the quality and the features of products and the efficiency with which they are produced. Productivity is the prime determinant of a nation’s long-run standard of living; it is the root cause of national per capital income”*(M.E.Porter, 2008)². So in order to investigate the competitiveness of a country the analysis should be conduct on the rate of productivity growth. To do that it is necessary not to focus on the economy as a

² Porter, Michael E. *On competition*. Harvard Business Press, 2008. (Page 176)

whole but on a specific industry and industry segments. This is one of the main reasons that lead us to analyze the economic geography of industrial clusters in BRIC countries. As cluster, as we will see later, are models of industrial organization that entail higher rate of productivity growth thanks to a more efficient productivity of the factors of production, we believe that understanding how much they are diffused and supported by the national and local governments is a good key for giving an answer to the competitiveness issue. Clusters are indeed becoming an even more important variable in assessing the global competitiveness of a countries and their level of development is a variable even more used to calculate indexes which measure the level of national competitiveness. Among others, the Global Competitive Index, a comprehensive tool that measures the microeconomic and macroeconomic foundation of national competitiveness. The GCI is calculated on the basis of a definition of competitiveness which is consistent with the Porter's one. Indeed competitiveness is defined as "*the set of institutions, policies and factors that determine the level of productivity of a country*"³.As a result we believed that an analysis on industrial clusters in BRIC countries would let us make some considerations about their national competitiveness, and, as a consequence, about their current and future position in the global scenario. There is one more reason that take us to believe that analyzing the level of cluster development in BRIC countries could be the right way to go through. Nowadays national competitiveness is not measured on the national scale but on the local one. The belief that is the competitiveness of the local productive systems that makes the national competitiveness is even more accepted. Investment decisions are taken on the basis of national competitiveness no more. Leaders of companies or anyone others who takes investment decisions, do that on the basis of the local competitiveness, then on the level of competitiveness of a narrow area, which could be a city, a metropolitan region, an industrial cluster. It is the sum of the level of competitiveness of circumscribed local areas which together form the national competitiveness. For all these reasons we analyzed the economic geography of industrial clusters in BRIC countries. This let us to understand if the level of competitiveness reached by them is consistent with the most recent definition of competitiveness. What is clear is that these emerging countries have

³ World Economic Forum(2013). The Global Competitive Index 2012-2013. Strengthening recovery by rising productivity.

reached a high level of global competitiveness, the question is if it could be considered sustainable, that entails a long-lasting processes of development, or if it is based on “ephemeral” factors such as cheap labor, favorable exchange rate, etc. Some recent events, such as the latest financial crisis which involves the BRICs countries in September 2013, have shown the Achilles heels of these economies, which often lack of strong fundamentals, and are easily hit by external shocks. The adoption of a cluster approach allows to act on the fundamentals of a country, as they become stronger and more solid through a process of trust building, acting as consequences on the level of national productivity. Taking as a starting point the belief that a cluster development approach has positive effects on the rate of national productivity growth, and on the fundamentals of a country, leading to higher level of the global competitiveness of a nation we will try to answer the following questions: are industrial cluster diffused in BRIC countries? How likely is this model of industrial organization to get diffused in these countries? are industrial clusters supported by national and local government? Are there any cluster development policy?

In order to give an answer to these questions our country-analysis will be structured as follows:

1. The starting point is the analysis of the industrial structure. Regional and sectorial distribution of economic activities will be investigated in order to get some first insights about phenomena of agglomeration.
2. Secondly we will focus on the small scale industry, where industrial clusters are more likely to emerge in order to achieve economies of scales.
3. Third, we will try to reconstruct the economic geography of industrial clusters in each one of the BRIC countries.
4. Fourth, we will focus on the cluster developmental policies.
5. Fifth, we will analyze the main qualitative features of industrial clusters, in order to get some insights about the future emergences of new ones.
6. Finally, we conclude with a case-study for each one of the BRIC countries.

The thesis is composed by two parts:

- The first part includes the description and the evolution of the main theories about industrial clusters (Chapter 1), and a focus on the main features of the BRICS countries (In this chapter we will refer to BRICS, that is Brazil, Russia, India, China, and South Africa, even if the latter won't be consider in the cluster analysis) and their latest economic performances (Chapter 2)
- The second part is dedicated to the analysis of the economic geography of industrial clusters in India (Chapter 3), China (Chapter 4), Brazil (Chapter 5), and Russia (Chapter 6). We will conclude making some comparisons and trying to give an answer to the questions from which we start our analysis (Chapter 7).

Chapter 1

CLUSTERS: A REVIEW OF THE MAIN THEORIES AND INSIGHTS FOR CLUSTERS ANALYSIS

1.1 Introduction

In the last 30 years, many studies have been conducted on how and why certain regions are characterized by agglomerated economic activities bringing back to the economic agenda of many countries in the world, economic agglomeration as tool of growth and development . Under the label of 'industrial districts', 'industrial clusters', 'innovative milieu' and 'regional innovative systems', it has been studied why certain regions are successful while others are not. (Brenner, 2000)⁴. The first Chapter of this thesis, whose main aim is to provide an analysis of the economic geography of industrial clusters in BRIC countries and the main policies for their development, will take us back to the end of XVII century in order to reconstruct how cluster theories has evolved up to now. Even if taking as starting point the contribution of Adam Smith could seem too far, we think that this big step back is necessary, in order to fully understand how agglomeration theories took place till the flourishing of the most advanced cluster theories. Thus, the first part of this chapter will bring us back to the past starting with Smith, going then through comparative advantage theory developed by Ricardo in order to reach the very starting point of cluster theory. The most of this first part will effectively dedicated to the pioneer of industrial district theory, Alfred Marshall, which could be considered the biggest ancestor of cluster theory. We conclude with some insights provided by Krugman, who brought back to the attention some of the principles of industrial district economy. The second part of the chapter is totally dedicated to who could be considered the father of the recent industrial cluster theory, Michael E. Porter. After having defined what a cluster is, Porter's Diamond model and the main advantages of clustering will be discussed. In the third part we will try to investigate why, where and how cluster emerge referring to the theory developed by Thomas Brenner, who create a framework to analyze the emergence of local industrial clusters. This framework will be a very useful tool in analyzing the economic geography of

⁴ Thomas Brenner, The Evolution of Localized Industrial Clusters: Identifying the Processes of Self – organization, Papers on Economics & Evolution # 0011, Max Planck Institute, Jena, 2000.

industrial clusters in BRIC Countries and in making some predictions on further development. Finally the latest part will be dedicated to industrial clusters as tool of growth and development. As cluster initiatives are even more used as tool of economic development, in particular in developing countries, understanding why clusters could act as growth catalysts is useful in reconstructing the economic geography of industrial clusters in BRIC countries. Furthermore conceiving clusters as means for spreading growth will be functional to analyze cluster development policies in the above mentioned countries and to make some suggestion about which will be the most desirable path they would follow in order to be as much effective as possible.

1.2 From specialization to Marshallian industrial districts

Industrial clusters development entails an industrial systems where regions are specialized in what they can best do. Specialization theories date back to the end of the XVIII century with the division of labor theory proposed by Adam Smith in his book “*An Inquiry into the Nature and Causes of the Wealth of Nations*” (1776) which became a milestone in classical economics. In his studies, Smith tried to investigate how Nations built their wealth, an objective pursued by industrial clusters theorists too. Indeed, one of the main aim of industrial cluster theory is understanding why certain regions are best performing than others. Attention shifted from nations to regions, or specific locations, but the aim is somehow the same. Since the late eighteen century the modern industrial production based on specialization started to take form. With the well-known pin factory example proposed by Smith the advantages of specialization became clear: through specialization, knowledge and efficiency enhance, leading to a better return on factors. The more the firms are organized implementing labor division, the bigger will be productivity growth and thereby the wealth from which the society can benefit (Corò, Micelli 2010). Smith argued that the efficiency of specialization is a dynamic process tied to the learning capacity of the specialized workers. Through specialization firms can innovate and rise their productivity rate. At that time, when market hasn't known globalization yet, the limit of specialization was almost spatial. Some basis for further specialization theories were put in place. We can consider Smith as a kind of predecessor of Alfred Marshal who in the first decades of the XX century dedicated the most part of his study to industrial districts, which will be discussed later.

Some decades later David Ricardo, influenced by Smith, introduced spatial specialization. In his book [*On the Principles of Political Economy and Taxation*](#) (1817) he investigated comparative advantages of nations and demonstrated that if nations specialize them-selves on the production of the good with the less relative costs

everyone can gain from it. His main finding was therefore that countries can benefit from specializing in the good where they have comparative advantages. What lead to a different rate of productivity is due to what Ricardo defined a kind of “social technology” which is unequally distributed among nations and induce to specialization. This theory was completed some years later when Heckscher and Olin (1933) explained specialization with factors endowments of countries. The main finding was therefore that everyone could benefit from specialization giving rise to the international division of labor which will act as a powerful tool of economic growth.

It is possible to tie these theories in order to derive the following line of reasoning: the extraordinary economic growth which characterized the XX century derived from the cognitive division of labor and the resulting learning process. This mechanism affects enterprises and their productive organization (technical division of labor), production among enterprises (social division), and local and national economic systems (spatial and international division). (Corò, Micelli 2010)

Thus the basis for the economic districts theory was put by the classical economics thought and it didn't take a long time before the concept of economic district started to take form.

The founder of the economic district theory was the British economist Alfred Marshall who is considered the pioneer of the Old Cambridge School, as it was defined by Beccatini (1990) in order to distinguish this one from the more widely known Cambridge School which born around J. M. Keynes. The Old Cambridge School comprises those pupils of Marshall who studied and developed the research fields dear to Marshall and according to a peculiar methodological approach. Among the various areas of interest the most important is industrial economics considered in a wide sense: the detailed and painstaking study of the organization of labor, firms, industry and trade, especially international trade (Becattini,1990, p. 305). Marshall introduced a new way of conceiving productive organization which in some sense went against some crucial aspects of the prevailing theory of production at the end of XIX. As said by Beccatini, Marshall disputed the standard view that the factory system, in which all manufacturing processes are concentrated under one roof with a high degree of vertical integration, was necessarily better than production systems that were technically less integrated but

concentrated geographically (Beccatini 2002). Again Beccatini writing about Marshall: “Marshall quickly came to the conclusion that, at least for certain types of production, there were two efficient manufacturing systems: the established method, based on large, vertically integrated production units, and a second one based on the concentration of many small factories specializing in different phases of the same production process and operating in one location or in a cluster of locations.”

The British economist looking first at English industry tried to understand why different industries were organized concentrating in certain location rather than others. He identified a self-incrementing locational process which lead to a growth process because of what he defined external economies, which will be discussed later. An industrial district isn't a sole concentration of firms, as he clarified especially in his *Principles of Economics* (1920), but could be defined as a socio-economic model which have some specific characteristics leading to some specific competitive advantages.

As Marshall argued there are some primary conditions which lead to spatial concentration of industries which are main physical or demand conditions. The result is the proliferation of what Belussi and Calandri (2009) define ‘primitive’ localization which, if it lasts long enough, becomes a ‘more compound’ localization, that is, it is transformed into an industrial district. (Belussi, Calndri 2009). These localized industries could then count on some advantages analyzed by Marshall in his book *Principals of Economics* (1920) as: hereditary skill, the growth of subsidiary trades, the use of highly specialized machinery, and a local market for special skill. This latter is considered essential. It can be argued that it is tied to a special condition typical of marshallian industrial districts which is defined as “industrial atmosphere”, a special atmosphere that gives special advantages to the firms gathered together in a particular area (Belussi, Calandri, 2009). To the industrial atmosphere is linked another of the great advantages of localized production which could be synthetized with “the knowledge in the air”. Industrial districts are effectively places where knowledge is easier to be created. As Marshall argues, good ideas are promptly adopted, because they are in the ‘air’ of the district, embedded into the social local networks: ‘if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas’ (1920, p. 271) (Belussi, Calandri, 2009).

As a result industrial districts are able to compete with large vertically integrated firms thanks to their external economies that ‘depend on the general organization of the trade, on the growth of the knowledge and appliances common to the trade, on the development of subsidiary industries, and so on’ (Marshall, 1898, p. 50). An industrial district seems to be defined as a productive system with his own identity, where firms and every economic agents became a part of a unique complex. One of the main features of these productive systems is the co-presence of collaboration and competition giving rise to a dynamic environment whose actors compete with each other and at the same time live the same industrial atmosphere. According to Marshall: “The broadest and in some respects most efficient forms of cooperation are seen in a great industrial district where numerous specialized branches of industry have been welded almost automatically into an organic whole (1919, p. 599)”. Very powerful are Belussi and Calandri’s words in explaining cooperation and competition in industrial districts: each firm specialized in its own activity and coordinated with the other firms, is as an “organism” whose vital parts (employers and employees) continuously interact with one another (Belussi, Calandri, 2009).

Marshall could be considered as the father of the industrial district model and the precursor of all the agglomeration theories which have been developed later even if most of them lack many features of industrial districts.

In more recent years many economists have been referring to Marshall’s theory in order to explain local agglomeration, among others the American economist Paul Krugman who actualized the marshallian agglomeration process of production considering the nowadays free movement of goods. In the last decades specific territorial features have gained even more importance leading to a more defined geography of the productive specializations. Krugman referring to Marshall theory argued that there are three main forces which cause spatial agglomeration: the first one is the creation of a specialized labor pool, the second is the rise of particular market for intermediate inputs ,and the third is the presence of spillovers among firms (Corò, Micelli 2010).

The first force is one of the most important industrial districts advantages identified by Marshall and is closely linked to specialization which permits a more effective learning process and therefore higher rates of productivity. Industrial districts ,and more

generally productive agglomerations, are characterized by the process defined as *learning-by-doing*: here experience plays a great role on enhancing worker's expertise and efficiency.

The second force is linked to the presence of pecuniary and technological externalities which are typical of industrial agglomerations. The first one derive from a reduction of transaction costs due to the vicinity of firms which work in the same field , the latter to the environment of cooperation which is established in industrial districts. Cooperation enhances innovation and the diffusion of knowledge. This powerful force have been the center of a lot of studies, among other cluster theory of M. E. Porter, which will be widely discussed later. Finally the presence of technological spillovers is firmly linked to the well-known concept of "industrial atmosphere" introduced by Marshall who argued that some knowledge is actually localized and could be transferred only through sharing the same productive experience. That said, firms which are located in this type of economic agglomeration could have a great competitive advantage compared to those operating elsewhere. (Coro, Micelli, 2010)

1.3 Porter's Diamond model and local competitiveness

The main contribution to cluster theory is given, without any doubt, by Michael E. Porter, the Harvard Professor, who finds on clusters the greatest tool to enhance and improve competition. Porter, trying to investigate which are the present sources of global competitiveness, brought back to the top some of the agglomeration theory principles, bringing part of Marshall's theory to the present days.

With globalization comparative advantages of countries seem not to have importance anymore: everyone can source resources, labor, knowledge, information and everything else all over the world. With this new conception of the globe, local advantages wouldn't have played a role in global competition anymore. But what it has been observed in recent years is that the most powerful and competitive regions in the world are those who have been able to developed specialized skills and have focused on producing something "special".

As argued by Porter, in theory, more open global markets and faster transportation and communication should diminish the role of location in competition (Porter 1998). Porter described this phenomenon as *the local paradox*⁵: in an economy with rapid transportation and communication and accessible global markets, location remains fundamental to competition. (..) paradoxically, then, the enduring competitive advantages in a global economy are often heavily local, arising from concentrations of highly specialized skilled and knowledge, institutions, rivals, related businesses, and sophisticated customers in a particular nation or region. Proximity in geographic, cultural, and institutional terms allows special access, special relationships, better information, powerful incentives, and other advantages in productivity and productivity growth that are difficult to tap from distance. (Porter, 1998) Thus competitive advantage

⁵ For further explanation see The local paradox (page 252), the Competitiveness of Location, On Competition (1998) Harvard Business School Publishing Corporation

remain geographically bounded. Hence, how locations could gain competitiveness is getting even more importance.

In this paragraph cluster model proposed by Porter will be briefly illustrate in order to get the necessary insights to analyze clusters in developing countries and in particular in BRIC countries. The main cluster studies of Porter are based on the analysis conducted in the developed countries, and more specifically, in locations where clusters have been best performing. Despite that the model proposed by Porter has had a great success in emerging countries too and we think that a well understanding of Porter theory is necessary.

Porter defined clusters as *geographic concentration of interconnected companies, specialized suppliers, firms in related industries, and associated institution (for example, universities, standards agencies, and trade associations) in particular fields that compete but also collaborate* (Porter, 1998).

Clusters represent a new way of conceiving industrial organization where vary economic agents, but even no merely economic, work together in order to enhance productivity and create innovation. Porter argued in one of his masterpiece (On competition) that the real economic advantages, on which a region could count aren't, only natural resources, low cost of labor or the possibility to achieve great economies of scale as believed in the past. Today competition is built on the capability to rise productivity and innovate. This are the two main aims of a cluster. One could argue that one of the great advantages of developing countries on developed ones are that they could count on a huge labor market with a very low cost. This could be the main perspective of some years ago, today attention has been shifting towards a more sustainable development and clusters are getting footholds in emerging economies too, but this aspect will be examined in depth further.

Clusters: main features

First of all clusters are characterized by *networks* in which companies and other institutions, which could be public, semi-public or private, cooperate in order to enhance productivity and create innovation. So what determine the boundaries of a cluster depends on linkages (vertical, horizontal or institutional) and complementarities across industries and institution. The strength of the spillovers and their importance to productivity and innovation determine the ultimate boundaries (Porter, 1998). These boundaries aren't fixed but they evolve in the same way the cluster structure does: a cluster is a dynamic system where networks adapt to the needs of its components. Thus, every cluster is unique, has its own features and dimension and rarely conform to standard industrial classification systems, which fail to capture many important actors in competition as well as linkages across industries. (Porter,1998)

Important feature of firms who are part of the same cluster is their *rivalry* with each other. Competition within the cluster is the ingredient which ensure the cluster dynamism and lead to an ongoing process of innovation and research for higher productivity rate. Without competition among firms in the same cluster the all system will not have incentive to amelioration leading the cluster to lose its competitiveness.

The glue which brings firms and institution together is their *inclination to collaborate* giving form to a thick network of agents.

Clusters promote both *competition and cooperation*. Rivals compete intensely to win and retain customers. Without vigorous competition, a cluster will fail. Yet there is also cooperation, much of it vertical, involving companies in related industries and local institutions. Competition can coexist with cooperation because they occur on different dimensions and among different players. (Porter, 1998). Hence, as Marshall argued, an industrial district, which in present years could evolve in an industrial cluster, is characterized by the co-presence of competition and cooperation which gives to this system the vibrancy and dynamism necessary in order to remain competitive.

What makes a cluster competitive in respect to other region is the *quality of the business environment* enabling firms in the cluster to employ advanced logistic technique, get access to high qualified workers, etc. This aspect will be analyzed in depth later (see

paragraph 5) as one of the main constraints in cluster development in emerging economies is the quality of the business environment.

In order to understand why clusters are important in competition, Porter adapts the model described in *The Competitive Advantage of Nations* to a more restricted area, the localized cluster area. The effect of location on competition is explained using four interrelated forces, which graphically form a diamond, and for this reason is known as *Porter's Diamond Model*. The model was developed in order to explain national advantage but has been applied either to locations and clusters. The success and the derived competitiveness of a cluster is embedded in the four elements of the diamond which are the following: the factors conditions, the presence of related and supporting industries, the demand condition and the context for firm strategy and rivalry. Clusters constitute one facet of the diamond (related and supportive industries), but the performance of a cluster is closely linked to the interaction among all four forces, therefore a deep understanding of what constitute the facets of the diamond is essential.

The first element is tied to the tangible assets that beyond natural resources, which for the development of certain industries are essential, comprise human resources, capital resources, physical infrastructure, administrative infrastructure, information infrastructure and scientific and technological infrastructure. The competitiveness of a cluster will depend on the level of quality of the input factors and on the rate of specialization. Hence, a cluster which can count on e.g. a high skilled specialized labor pool, specialized financial resource, specialized physical infrastructure, etc., will be characterized by high performance. In addition to that, specialized factors not only foster high levels of productivity but tend to be less tradable or available from elsewhere (Porter, 1998) enhancing the competitiveness of a cluster. Second, the presence of related and supporting industries depends on the networks that ties customers and suppliers and firms which belong to different industries but are somehow complementary. As said before one of the main features which distinguishes clusters from other forms of industrial organization is the presence of overlapping networks which could be horizontal (firms belonging to different sectors, firms-institution) and vertical (suppliers and customers). Thus, the more the cluster could count on the presence of capable, locally based suppliers and competitive related industries, the

greater the cooperation among firms, leading the cluster to higher degree of competitiveness. Third, cluster success depend on demand conditions. The presence of sophisticated and demanding local consumers brings firms to specialization and to innovation. Other demand condition from which clusters could benefit are the presence of customers with needs that anticipate those elsewhere and unusual local demand in specialized segments that can be served globally. Forth, a successful cluster needs a context for firm strategy and rivalry. As underlined before rivalry among firms operating in the same cluster is a key element as it foster competition, pressing firms to innovate and ameliorate their productivity rate. Beside that a local context that encourages appropriate forms of investment and sustained upgrading is fundamental to maintain the vibrancy and the dynamism in the cluster. In the matter of the context for firm strategy and rivalry, Porter argued that to move to an advanced economy vigorous local rivalry is necessary. Rivalry must shift from low wages to low total cost, which requires upgrading the efficiency of manufacturing and service delivery (Porter, 1998). This is true especially for developing countries where the change have to take this road in order to became sustainable.

Obviously a general macroeconomic and political stability is fundamental in order to allow the all four forces to operate. In the perspective of developing countries there's a lot to work in these foundations whose instability is often the cause which prevent the formation of sustainable growth clusters.

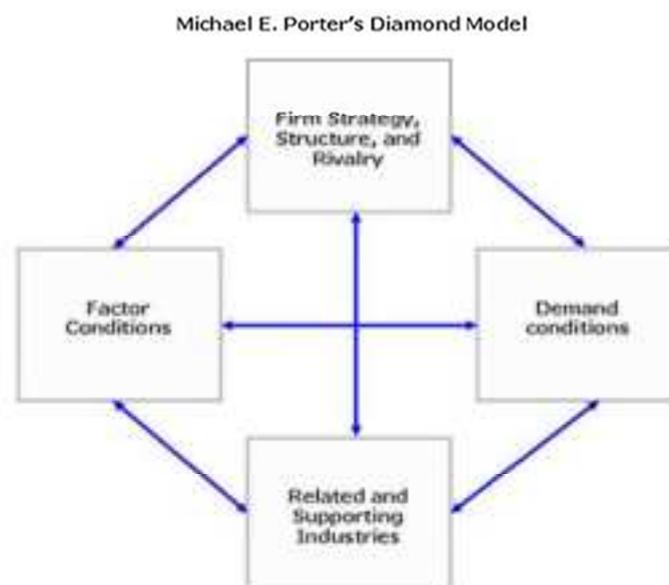


Figure 1 Michael E Porter's Diamond Model. Source: <http://www.businessmate.org/Article.php?ArtikelId=49>

How do clusters affect competition?

Porter identified three broad ways through which clusters affect the competition of a specific location: first of all by increasing productivity, then by increasing the capacity for innovation of the constituent industries, and third by stimulating new business formation which supports innovation and expands the cluster. (Porter, 2008). All these three ways of affecting clusters competition is in some sense supported by a common root which consist in the external economies or spillovers among firms and industries. Indeed without spillovers and relations among industries and the other actors constituent the cluster it wouldn't be a cluster at all. The increase of the productivity rate is achieved thanks to the deep relations among industries and firms, which lead to the diminishing transaction costs and to the development of a shared common pull of knowledge and resources. This results in a better performance for the firm embedded in the cluster, which can benefit of the greater performance of the cluster as a whole. The same is true for the higher rate of innovativeness of a company operating in clusters. This is great emphasized on Porter's analysis too: each of the three broad influences of clusters on competition depends to some extent on personal relationships, face to face communication, and interaction among networks of individuals and institutions. (Porter, 1998) What could be a mistake in understanding what a cluster is and how it operates is conceiving this relations as taken for granted. On the contrary they are far from to be automatic and depend on formal and informal organizing mechanisms and cultural norms, which often play a role in the developing and functioning of clusters. Bearing in mind this in analyzing clusters in developing countries is fundamental.

Now a brief description of which are the advantages of clusters in productivity, innovation and new business creation terms is presented.

Better productivity rates are achieved through the access to specialized inputs and employees which are more likely to occur in a cluster rather than in a system based on vertical integration or other formal relations. The advantages of benefiting local outsourcing could be summarized in lower transaction costs, minimized need for inventory, no importing costs and delay, more transparent and trustful relationships, eased communication, the presence of a specialized and experienced labor pool. Productivity is enhanced by the chance to exploit the cluster's information heritage,

accumulated in firms, industries and other institutions which are accessed better and with a lower cost within the cluster. Porter describes this kind of advantage as a public or quasi-public good which a firm can enjoy only operating in a cluster. Linked to this aspect is the advantage to benefit from specific public investment in specialized infrastructure, educational programs, information, trade fairs, and other forms. Furthermore a cluster could enhance productivity by facilitating complementarities between the activities of cluster participants, which are expressed in services delivery, product design, logistics, and after-sales service.

As regards innovation advantages, some of the same cluster characteristics that enhance current productivity are even more important to innovation (Porter, 1998). Being part of a cluster results in learning early and consistently about evolving technology, sharing knowledge, competing for novelty, which together lead to high rates of innovation. As said by Porter, a firm within a cluster often can more rapidly source the new components, services, machinery, and other elements needed to implement innovation in respect to an isolated firm. The result is a higher pressure to innovate which allows to build a very dynamic environment, both competitive and cooperative.

The vibrancy of a cluster is seen in its attractiveness of new business activities too. Because of the innovation and productivity advantages new firms are more likely to start up a business where a cluster still exists. The reasons are embedded in the availability of better information about opportunities like the easier perception of gaps in products, services, or suppliers to fill in. This translates into lower barriers to entry than elsewhere and so to a higher propensity to new business formation. The system which constitutes the cluster itself as a pool of knowledge and new ideas spurred through the networks of relations continued in this way to grow in depth and breadth over time, further fostering cluster advantages.

1.4 The emergence of local industrial clusters

After the brief review of the main contributions to cluster theory described in previous paragraphs the attention will be shifted to which factors cause the emergence of local clusters. Before going through the main objective of this thesis, the analysis of industrial clusters in BRIC countries, it is necessary to understand where, why and when cluster emerge. This kind of approach will let us to analyze the economic geography of industrial clusters in the above mentioned countries. A comprehensive answer to the question about why industrial clusters emerge in an geographic area rather than others is needed. In this paragraph the question will answered referring in particular to the theory developed by Thomas Brenner who tries to investigate which mechanisms are behind the emergence of a local industrial cluster.

Where and why do clusters emerge?

In some specific locations at some time, an evolutionary process creates particular circumstances and dynamics that lead to a phenomenon which is called industrial district, cluster or innovative milieu in the literature (Brenner, 2000). So what matters is trying to investigate the process that leads to and that feeds the growth of such a local productive system, no matter it is defined as industrial cluster, industrial district or innovative milieu. Basically there are two main conditions which are common to all local productive systems, geographical proximity and a certain grade of interaction among firms in an industry, among industries and more generally among different type of economic and no merely economic agents. What are then the forces that lead these actors to locate in the same geographic area and to interact with each other?

As Brenner argued there is a self-organizing system in which firms and the other actors within the cluster profit from being co-located in geographic proximity, and at the same time their co-location creates certain specific conditions which foster geographical proximity, giving rise to a self-feeding process. The analysis of the model by Brenner lead to distinguish three main conditions which affect the emergence of a local industrial cluster: prerequisites, triggering events and self-augmenting processes.

Further studies elaborated the conditions proposed by Brenner in order to create a comprehensive framework used to conduct a meta-study which compared more than 150 industrial clusters around the world⁶. This framework will be presented in this paragraph as useful tool in understanding the economic geography of industrial clusters in BRIC countries.

Prerequisites

First, before a cluster emerge, the region can be characterized by some specific preconditions which allow the emergence of an industry, such as endowment and other features relevant for an industry which act as push in giving rise to a particular economic activity. One could argued that this conditions have been overpassed by the globalization process which has made available everything one could need in every place in the world. Despite that local specialization seem not to have disappeared. Prerequisites are all local factors and resources given in a region when a local cluster emerge (Brenner, Mühlig,). The presence of such prerequisites in a region doesn't signify that a cluster or simply an industry will automatically rise, but it influences the likelihood of an emergence of a cluster. Some of this factors and resources have been put forward in the literature, sometimes confusing them with other local factors that may occur once a cluster has emerged. Notice that now we are referring to some specific preconditions which exist before the cluster birth. Thus there are certain region where the emergence of industrial clusters is more likely, therefore a deep understanding of which are these preconditions could help in analyzing the economic

⁶ For further information see Factors and Mechanisms causing the emergence of local industrial cluster- a meta-study of 159 cases. Thomas Brenner & André Mühlig. Papers on economics and evolution.

geography of industrial cluster. For instance if the aim is the analysis of local industrial clusters in China, knowing which Chinese regions could benefit from some of these preconditions could be helpful in the identification of such clusters and could be either a good starting point in predicting the emergence of local industrial clusters.

As said by Brenner at an initial point some (exogenous) initiation is needed to move the state of a local system above the critical mass which is necessary to give start to the self-augmenting mechanism, which is in some extent the same mechanism described in marshallian industrial districts. Hence, these prerequisites could be seen as the exogenous pushing effect, the initiation for the evolution of an industrial cluster. The framework we are referring to, distinguish 17 main preconditions, some of them already analyzed in Porter's Diamond Model (see paragraph 1.3). To use this framework as tool in analyzing the economic geography of industrial clusters in BRIC countries, a further distinction among natural-environmental-geographical, business, political and cultural preconditions was appropriate.

To the natural-environmental-geographical preconditions belong those conditions which are specific of a certain geographic area because of its own nature, its urban structure and its living environment. The natural preconditions include the presences of natural resources, the access to a natural transport infrastructure, geographical specificities and so on. This kind of preconditions could be identified as the national, in this case regional, comparative advantages on which Ricardo's theory referred to. To the same group other resources, which are linked to the quality of the environment that characterizes a specific region, have been included. We are referring to all that kind of conditions which lead to a certain level of the quality of life a location could offer. This aspect has gained attention in recent years as skilled people are more likely to move where a high quality of life level is offered. Hence a good presence of highly-skilled people in a certain area makes more likely the emergence of a local cluster in that area. To this group belong transportation infrastructure, which affects the accessibility of a specific area. The more accessible an area is, the more likely the emergence of an industrial cluster. Finally the type of the region could influence the emergence of a cluster. Often an industrial cluster is more likely to emerge on the proximity of a big city, which, as stated by Jacobs (1996), provide a mixture of many different industrial

activities. As we will see later, some of the main industrial clusters in developing countries emerged nearby big cities.

Within the group of business-economic preconditions are the presence of a qualified labor pool, the presence of an already existing network among firms, the existing industrial structure, the presence of a specific supplier, a strong local demand, the presence of a good local capital market which could sustain the local start-ups and finally low wages. This latter one has caused the emergence of a number of local industrial clusters in developing countries as it will be discussed in more depth later.

Political preconditions could have a great influence in the emergence of local industrial cluster. Both local and national policies are taking in account. Notice that policies are intended as the policies which were in place before the emergence of a cluster.

Finally to the cultural conditions belong all the aspects which deal with cultural and traditional aspects of a specific region. Van Den Berg et al referred to such an aspect in one of his work identifying it as *cultware*⁷, that is the attitude of the people living in a certain area to engage in strategic cooperation, their willingness to adapt to new product and their attitude towards entrepreneurship. This category encompasses traditional and historical precondition too, that is characteristics and past regional developments. In effect some case studies have shown that regional tradition matters for the development of local clusters, as demonstrated by Van den Berg for a number of cases (2001) and Storper (1993) who highlights the impact of the history of a region on its developments.

Triggering Events

While the specific local circumstances might provide the initiation for the evolution of an industrial cluster, the internal self-augmenting mechanisms determine the evolution itself (Brenner, Mühlig,). Before the self-augmenting mechanisms play their role some triggering events are needed in order to make the process to take off. As it is repeatedly

⁷ For further details see Growth clusters in Europe cities: an integral approach. Page 17. Leo van den Berg, Erik Braun, Willen van Winden. European Institute for Comparative Urban Research Erasmus University

argued in the literature, benefiting of a number of favorable local preconditions it's not enough to lead a cluster to emerge, to confirm that many case studies have demonstrated that the emergence of a cluster is possible even where such preconditions are less favorable. There have to be actors in the region who seize opportunities as they arise (Brenner, Mühlig,). Such triggering events have been put in forward in various forms in the literature and most of the main contributors to the cluster theory have recognized their role as "pushing effects". For example Porter encompassed such events as variable in determining the competitive position of a region. The same has been recognized in studies conducted by Rauch (1993) and St. John and Poudet. These latter state: "there is generally an element of chance in the origin of a particular geographical cluster of firm" (Brenner, Mühlig,). Hence, triggering events could be defined as the capacity to take the momentum, to exploit a favorable condition leading to the emergence of a local industrial cluster. Six main triggering events are discerned: the first one is promoting activities launched by actors who have a vision and take the initiative. These actors could play a relevant role in developing a local cluster; specific policy measures supporting the emergence of local cluster; historical events which lead to reverse the course, mentioned among the list of random events identified by Porter; specific innovations, included in the same Porter's random event list; founding of leading firms as argued by Van den Berg⁸; and finally even chance could play a role.

Self-augmenting Processes

As argued by Brenner a sort of cluster life cycle exists: the main feature of the first phase is the presence of some exogenous conditions, mentioned above as preconditions and triggering events; the cycle goes into the second phase when, thanks to the presence of the preconditions and the action of the triggering events, the self-incrementing

⁸ For further explanation see Growth clusters in Europe cities: an integral approach. Page 23. Leo van den Berg, Erik Braun, Willen van Winden. European Institute for Comparative Urban Research Erasmus University

process takes off (endogenous).⁹ It is in this phase that the self-augmenting processes play their role. We can define these elements as the main feature of a local industrial cluster, as they were considered by Marshall, even if known under the name of local externalities. As argued by Brenner “self-augmenting processes are the underlying mechanisms responsible for the existence of local clusters”. It is thanks to this endogenous process that industrial activities are led to agglomerate in one or few regions. Their existence is considered essential to the emergence and growth of an industrial cluster. The mechanisms which will be discussed here are those ones that cause the emergence of local cluster and have to be distinguished from those that make being located in a local cluster profitable, which are more tied to the competitiveness analysis conducted by Porter. We are not excluding the fact that most of the self-augmenting processes described below overlap with the competitive advantages derived from the co-location of a group of firms in the same area. Despite that what is important to underline is that if in an area occur one or more of these endogenous processes a local industrial cluster is likely to emerge and grow leading to all the competitive advantages described by Porter. Quite all of these processes deal with interaction between firms, among industries, among different actors operating in the same geographic area. We discern a number of business interactions which comprise buyer-supplier relations, choices of certain firms of co-location with other firms, cooperation among firms, interaction with local venture capitalists, support of star-ups by existing firms, the presence of inter-industrial spillovers and intra-industrial spillovers. Spillovers, both inter and intra-industrial, are defined as information which flows through personal interaction between workers and their movement between local firms which deals a lot with the marshallian “industrial atmosphere”. Finally spin-offs generated by firms in a specific location are embedded in this category. They are considered self-augmenting processes because the more firms already exist, the more likely further spin-offs will occur, thus a process spreading growth and development will take off. As spillovers, even spin-offs has been stated in a number of conceptual works on clusters formation.

⁹ For further explanation see *The Evolution of Localized Industrial Clusters: Identifying the Processes of Self-organization*. Thomas Brenner. Papers on Economics & Evolution # 0011, Max Planck Institute, Jena, 2000.

Private-public relation plays a great role as self-augmenting process. To this category belong those interactions with public education and research, which are considered a self-augmenting process as the presence of this kind of relation attract further firms with the same needs. Interactions with local policy makers are part of the same group.

Finally to the other types of interaction belong those ones with public opinion, which are often seen as supportive of the development of local clusters.

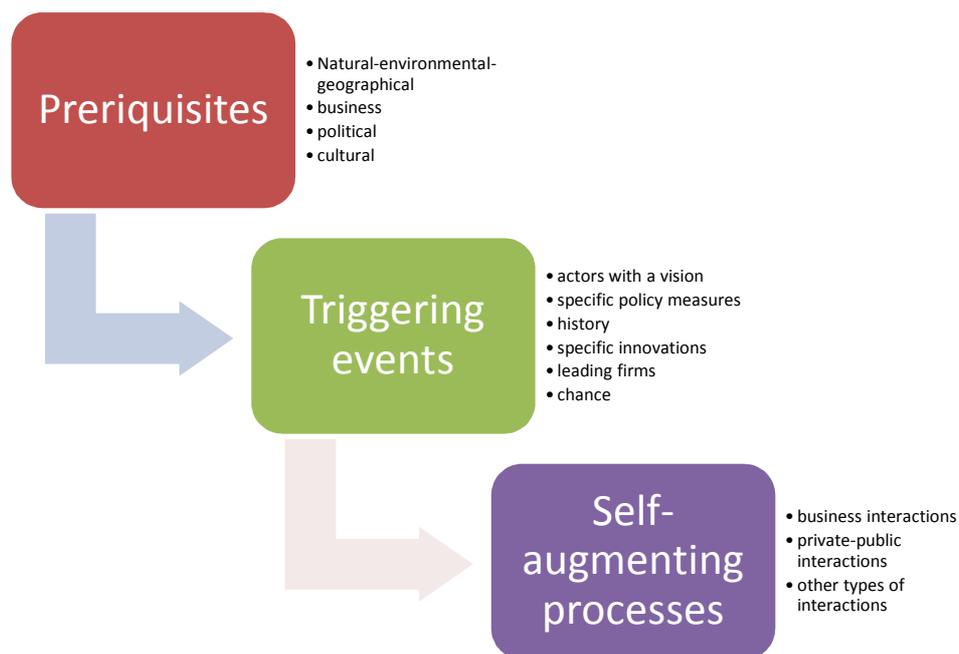


Figure 2 *Thomas Brenner Framework: Source: Author*

1.5 Clusters as growth and development tool

In recent years clusters initiatives have gained attention in world economic development agenda as they have proved to be a very powerful tool in enhancing local development. Hence, governments and organizations aiming to promote economic development are increasingly taking into account cluster initiatives in their programs. Clusters could be considered real catalysts to policy reforms and economic development because, as UNIDO¹⁰ states, they can generate employment, income and opportunities for the local community becoming drivers of broad-based local economic development.

This “new” trend have been supported by the recent approach which melted principles from both the growth theory and the new economic geography. Many studies have been conducted on how the growth rate could be influenced by local agglomeration revealing that a trade-off between growth and spatial equity exists¹¹.(Fujita and Thisse, 2003). The main findings in this field seem supporting the idea that growth and agglomeration will go hand in hand. Thus, policies of economic development should promote and support clusters which, as we have seen before, imply local agglomeration, at same time paying attention not to create disparities on the broader national territories. Cluster policies, in order to be efficient on the development ground, have to be sustainable avoiding to be too focused on a certain successful location or industry on the territory.

¹⁰ UNIDO is the specialized agency of the United Nations that promotes industrial development for poverty reduction, inclusive globalization and environmental sustainability. For further details go to <http://www.unido.org>

¹¹ For further details see Does geographical agglomeration foster economic growth? and who gains and loses from it? Masahisa Fujita and Jacques-François Thisse. *The Japanese Economic Review* Vol. 54, No. 2, June 2003

Which are the main features that make clusters catalysts of economic development?

First of all, as argued by most of cluster theorists, among others Porter¹², clusters are a socio-economic phenomenon, thus they are able to arise economic value which is even social value. The success of firms which are part of a cluster depends not only on its own self performance but on the environment around them. Thus, every actor operating within a cluster will be interested in the broader cluster development because it entails its own development. As said by Porter, a firm's identification with and sense of community, derived from membership in a cluster, and its "civic engagement" beyond its own narrow confines as a single entity translate directly, according to cluster theory, into economic value (Porter, 1998). The sense of community and the "civic engagement" featuring this systems permit clusters initiatives to be a useful growth and development tool. Clusters initiatives are gaining effectively a lot of importance in the new way of conceiving value creation which consists in reinvent capitalism as means of creating shared value¹³. One of the most powerful tool for creating growth and shared value in developing countries is indeed enabling local cluster development as they play a crucial role in driving productivity, innovation and competitiveness, as we have seen earlier. As promoting cluster development signifies to tackle bigger issue than simply economic growth, the value that will be creating will involve the broader socio-economic environment. Building a cluster entails the amplification of the connection between companies and community's success. As said before, when a cluster emerges a sort of multiplier effect initiates, spreading growth and development. This self-augmenting or multiplier effect is far behind to be automatic or easy to be activated. It entails acting on the broader local framework which will encompass the industrial cluster. Thus, the growth and development effect will be seen in the long run, as it requires an action on some structural local features, above all in developing countries where the main obstacle in clusters formation is the lack of a solid structural

¹² See M. E. Porter. The socioeconomy of clusters (page 241). Cluster and competition. On competition

¹³ For a deeper understanding of Shared Value see M.E. Porter and M.R. Cramer "Creating Share Value- how to reinvent capitalism- and unleash a wave of innovation and growth", Harvard Business Review. January-February 2011

framework. Hence, clusters in these countries could flourish only if the root causes of underperformance are tackled.

As argued by UNIDO in one of its report, there are three main arguments that can be advanced to explain why cluster-based interventions have gained momentum in the framework of private-sector development initiatives: collective efficiency gains, spatial proximity effects, and pro-poor potential. With the first one we are referring to the external economies which have been discussed earlier and which could be summarized in the availability of a specialized labor-force, machinery and input suppliers and in the marshallian “industrial atmosphere” where knowledge and information are easily spread within the cluster just because they are “in the air”. Collective efficiency gains featuring the cluster entail the achievement of higher and sustained growth rates. Spatial proximity effects are the advantages which come from agglomeration such as those on transaction costs, trust and collaboration among cluster actors and the easier diffusion of knowledge. Finally cluster could be an efficient means to tackle poverty in developing countries because, as said before, clusters are socio-economic systems where the population of firms overlaps with the community of people and their families, living and working in a delimited territory. In that respect cluster development entails social development and shared value creation.

In order to let these three forces to be activated, great efforts in changing the mentality of both the population and the institutions, especially in the development countries, are needed. In fact, in developing countries the advantages arising from cluster development are often out of reach because firms tend to work in isolation and institutions don't seem to perceive firms' needs. In spite of the great effects of clusters development discussed above, there are some obstacles which constraint collaboration among enterprises and institutions to work together in order to achieve the broader local economic growth. First of all the lack of trust among them entails transaction costs in order to gather information, second small-scale firms are often oriented to magnify short-term costs, preventing them-selves from identifying long-term benefits. Furthermore the costs related to collaboration increase where institutions are weak and unable to exercise control. The result is an institutional environment which is weak, often politicized or dominated by a few large enterprises entailing a low trust level

among firms and a disincentive to collaborate. Thus, the first step in order to let cluster development to be a growth catalyst is to tackle the problems which affect the foundation of cluster development. This means to build trust and governance in order to remove obstacles and reduce the cost of collaboration, to strengthen the institution capacity in helping and supporting clusters, and unlocking pro-poor effects. In order to allow clusters to unleash their growth effects a multi-stakeholders approach is needed, in this way clusters could pave the way for growth and development.

Chapter 2

BRICS: ECONOMIC AND SOCIAL ASPECTS

2.1 BRICS: the origin

The acronym BRIC was first coined in 2001 by the chief economist of Goldman Sachs, Jim O'Neill, and stands for Brazil, Russia, India and China. With this term O'Neill wanted to promote his vision for the economic future, which, in his thought, will be dominated by the four major emerging economies, which within 2041 will generate a GDP that will be higher than the one generated by the major industrialized economies, the G7.¹⁴ This acronym, at the beginning born as marketing tool to promote financial operation involving BRIC countries, has acquired more and more importance as the recent boom of the economic performance of the four countries. Even if geographically and culturally disparate, the BRIC countries share the same economic take-off and they are expected to play an increasingly important role in the global economy. Because of its growing economic global significance, in 2010 the group opens its doors to another emerging country, South Africa. Therefore an S was added to BRIC giving rise to the new acronym BRICS, which symbolizes the collective economic power of Brazil, Russia, India, China and South Africa. From the buzz word used to promote analysis provided by a bank, even if not simply a bank but the Goldman Sachs, the word BRICS points out a political entity, whom leaders meet every year at the BRICS summit, convened to seek common ground on areas of importance for these major economies¹⁵. Thus, as BRICS countries are playing a prominent role in the global economic scenario, the entire world is wondering about how they will manage this extraordinary, but at the same time upsetting growth and what will be the consequences for both the present industrialized economies and the countries where this astonishing process is taking place. In order to get an idea of the extent of the problem, one need only consider that

¹⁴ The **G7** is an international finance group consisting of the finance ministers from the seven formerly largest and wealthiest industrialized nations in the world: the US, UK, France, Germany, Italy, Canada, and Japan.

¹⁵ For detailed information see <http://www.brics5.co.za/>

together the BRICS account for more than 40 per cent of the global population, nearly of the 30 per cent of the land mass, and a share of the world GDP (in PPP terms) that increased from 16 per cent in 2000 to nearly 25 per cent in 2010 and is expected to rise significantly in the near future.¹⁶ That's astonishing! In the further paragraphs some basic information about the recent economic performance, the demography, and the present social structure and conditions in BRICS countries will be depicted. This will let us to gather the hallmarks of the main characters of this analysis.

¹⁶ See THE BRICS REPORT, A Study of Brazil, Russia, India, China, and South Africa with special focus on synergies and complementarities, Oxford University Press, 2012

2.2 The causes of an astonishing growth

Despite the great differences between the five BRICS countries they all share the acquisition of a dominant role as producer of goods and services, receivers of capital, and as potential pool of a huge new consuming class. In recent years the performance of the BRICS economies lead the entire world to recognize them to be first in line among the fastest growing economies and the engine of the global recovery process. Some economic aspects will be briefly analyzed in order to understand how they reach this position in the global scenario and how it will evolve in the next decades.

GDP figures proof the increasing economic importance of these countries, of which four economies figure among the top ten compering the GDP in PPP terms, with China, India, Russia, Brazil and South Africa in 2nd, 4th, 6th, 8th, and 26th places, respectively. Considering the contribution to growth of PPP-adjusted global GDP of the world, the BRICS accounted for 55 per cent during the period 2000-2008, and their contribution is expected to rise in the future. What are the factors which have caused this extraordinary growth?

Table 1 Overview of the BRICS. Source: The BRICS REPORT 2012

Table 1.1 Overview of BRICS, 2010

	GDP in PPP (in US\$ billion)		GDP (US\$ billion)		Share in World GDP (in per cent)		Per Capita GDP (US\$)	
	Rank in World	GDP	1990	2010	1990	2010	1990	2010
1	2	3	4	5	6	7	8	9
Brazil	8	2,172	508	2,090	3.3	2.9	3,464	10,816
Russia	6	2,223	-	1,465	-	3.0	-	10,437
India	4	4,068	326	1,534	3.1	5.4	378	1,265
China	2	10,086	390	5,878	3.9	13.6	341	4,582
South Africa	26	524	112	357	0.9	0.7	3,456	7,158

Source: IMF database.
Note: - Not available.

One of the main factors is the huge amount of *natural resources* on which these countries could count and which let them to maintain this bullish rate of growth.

Without any doubt the presence of this amount of natural resources is due to the huge land share of the world occupy by the BRICS which together, as said before, represent nearly 30 per cent of the land mass. Indeed, in the group there are the two countries which are at the second and third place in land size, respectively Russia and China. Brazil, which covers 47 per cent of South America, is the fifth largest countries surpassed only by Russia, Canada, China and the USA. Large land size means the disposal of natural resources, this is true for China, which has about 12 per cent of the world's mineral resources, Russia which is well known for its oil and gas reserves, which accounts for about 20 per cent of the entire world ones, and Brazil with 60 million hectares of arable land. Despite South Africa hasn't a geographical extension as wide as the other four countries, it benefits from a big disposal of mineral reserves which count for a lot of its economic growth.

Table 2 Land use in BRICS, 2008. Source: THE BRICS REPORT 2012

Table 1.2 Land Use in BRICS, 2008

Country	Land Area (1,000 ha)	Arable Land (1,000 ha)	Area Harvested for Cereals (1,000 ha)	Production of Cereals (1,000 t/mte)	Irrigated Land (1,000 ha)	Irrigated Land (per cent of arable land)
1	2	3	4	5	6	7
Brazil	845,942	61,000	20,220	71,288	4,500	6.6
Russia	1,637,687	121,649	41,716	95,079	4,346	3.5
China	932,749	108,642	86,593	483,680	64,141	52.3
India	297,319	158,145	99,880	246,774	62,286	36.8
South Africa	121,447	14,500	3,319	14,586	1,498	9.7
World	13,003,469	1,380,515	708,495	2,489,302	306,247	21.1

Source: FAO Statistical Year Book, 2010.

Therefore the enormous economic growth in BRICS countries has been partly pulled by the presence of multiple and different “natural” attributes, which still represent a huge potential to develop. Another relevant aspect which characterize the five countries is the enormous growth of their *population* which took place in the last decades. This aspects could be considered as a “natural” growth potential in BRICS countries, as they can count on a growing working force which has fed and continues to feed their economic expansion. As we will see later, industrial cluster development could be a great tool in exploiting this precious endowment in a more sustainable manner.

BRICS' endowments and growth factors

Very briefly we want to underline which are the main factors that characterize the five countries and which represent the basic foundations of their economic development. Starting from Brazil, it is extremely rich in fertile lands which let it be one of the biggest producer of products like coffee, soybeans, sugar cane, iron ore, and crude oil. Russia is known for its massive deposit of oil, natural gas and minerals. India has distinguished it-self as strong service provider with a rising manufacturing base. Despite its great availability of natural resources, China is known as the biggest manufacturing work-shop in the world with its enormous workforce which is at same time highly-skilled and low wages. This has acted as a powerful magnet for FDI. Finally, South Africa, the world's largest producer of platinum and chromium with the world's largest known reserves of manganese, platinum group metals, chromium, vanadium, and alumino-silicates. In addition to that South Africa is one of the greatest electricity producer in the world, providing the 45 per cent of Africa's electricity and figuring as one of the powerful competitor in this field, offering the 4th cheapest electricity in the world.

Table 3 Growth rate of Gross Domestic Product. Source: BRICS REPORT 2012

Table 1.3 Growth Rate of Gross Domestic Product

	(per cent)							
	1991-2002	2002	2005	2006	2007	2008	2009	2010
1	2	3	4	5	6	7	8	9
BRICS								
Brazil	2.6	2.7	3.2	4.0	6.1	5.2	-0.6	7.51 ^P
Russia	-	4.7	6.4	8.2	8.5	5.2	-7.8	4.01 ^P
India	5.7	4.6	9.2	9.8	9.4	7.3	5.7	10.4
China	10.3	9.1	10.4	11.6	13.0	9.6	8.7	10.3
South Africa	2.1	3.7	5.3	5.6	5.0	3.7	-1.7	2.8
Advanced Economies	2.8	1.7	2.7	3	2.0	0.5	-3.2	3.0
Euro Area	2.1	0.9	1.7	3	2.0	0.6	-4.1	1.7
USA	3.5	1.8	3.1	2.7	2.1	0.4	-2.4	2.8
World	3.2	2.9	4.5	5.1	5.2	3.0	-0.6	5.0

Source: World Economic Outlook, IMF (2011).

Note: P: Projection; - Not available.

On the way to understand the economic growth in the BRICS countries it isn't sufficient considering their rich endowments. Obviously the presences of these powerful factors has been and will continue to be essential for, and on the base of, the economic growth, but it is the combination of this first aspect with other aspects that lead their economy to prosper at a higher speed than the industrialized countries 'one, surpassing them (in term of growth rate). As they have known an extraordinary growth of the population, they have been characterized by a *fast growing demand*, which entailed an increase in the production, thus the GDP raised and is still rising. Analyzing the demand in the five countries one could state that among the BRICS, Brazil and India are more domestic demand-driven economies. Despite both of them could benefit from strong external linkages, their economic growth depend for the most part from the increasing domestic demand, which let them to overcame the 2008 financial crisis better than the advanced and the other emerging market economies (EMEs). On the other hand China and Russia benefit from strong outwards linkages which ensure the vibrancy of their economy. South Africa takes advantage of the untapped growth potential of the African continent. Although these differences in the qualitative demand composition, it is common to all the five countries the great potential to establishing the most stabilizing of forces, that is, the increasing middle class with their enormous and new needs to satisfy. In all of these countries the *middle class* will both broaden and deepen, providing a solid base for further economic development. That's doesn't mean just further growth but a great challenge for BRICS countries, will they be able to sustain and satisfy this enormous rising mass of population? Heads of governments are wondering about that.

Going into the causes of the economic growth in depth, sustained *economic reforms* and improved macroeconomic fundamentals played a great role in the current decade. The major improvement have been translated in high saving and investment rates, even if Brazil and South Africa have still room to increase these rates. China is the country with the highest investment and saving rates, followed by India. This help them to reduce the contribution of the net exports to the GDP, because high saving let high investment-led growth to be financed by the domestic market.

Investments, together with consumption, public expenditure and net export, constitutes one of the elements of the total demand of a country, that is, the GDP. What is relevant in analyzing the economic growth of BRIC countries, it's the great impact that investment have had in the composition of the GDP in recent years. Considering the BRIC countries, that is excluding South Africa, the contribution of investments to the GDP increased from 24 to 32 per cent in the period 2000-2008. That's astonishing if we compared this data with that regarding the six most powerful economies in the world (the G6), where, in the same period, investments remain stable around 20 per cent of the total GDP.

Table 4 Gross Domestic Investment and Saving. Source: BRICS REPORT 2012

Table 1.4 Gross Domestic Investment and Savings

		(per cent to GDP)							
Country		1990	1995	2000	2006	2007	2008	2009	2010
1		2	3	4	5	6	7	8	9
Brazil	Investment	20.2	18	18.3	16.8	18.3	20.7	16.5	19.3
	Saving	21.4	16.5	16.5	19.7	18.8	18.4	16.1	17.0
Russia	Investment	-	25.4	18.7	21.4	24.1	26.2	22.7	19.8
	Saving	-	28.8	38.7	34.1	33.2	34.9	33	24.7
India	Investment	24.2	26.6	24.2	36	37.6	35.6	34.5	37.9
	Saving	22.7	25.4	23.2	32.9	33.5	30.2	29.8	34.7
China	Investment	36.1	41.9	35.1	43.6	41.7	42.5	44.8	48.8
	Saving	39.6	44.1	37.5	51.3	50.5	50.2	54.2	54.0
South Africa	Investment	-	18.2	15.9	19.7	21.3	22.0	19.4	21.7
	Saving	19.1	16.5	15.8	14.4	14.1	14.9	15.4	20.0

Source: World Bank Database.

Note: - Not available.

Net exports represent another affecting element of the BRICS demand. Trade in fact plays a great role in boosting their economic growth, and its share in the global trade continues to grow at a rapid pace. In terms of exports all the BRICS economies feature persisting trends of rising share of export in GDP, as they have all experienced avenues for exports based on comparative advantage supported by productivity gains. Although they are well-known as exporters of commodities they have gained ground in the manufacturing and services fields too. As regards BRICS imports, they plays a catalytic role in the global growth process as these countries needs more than they produce for feeding their fast-growth. The composition of the imports basket reflects the process of large-scale industrialization, thus the major chunk consists of capital goods. Besides, as the middle class continues to enlarge, the imports of services are gaining ground in the basket.

2.3 The output structure

After having analyzed how the total demand have influenced the GDP dynamics in BRICS countries, now the attention will be shifted to the offer side, more precisely on how it is structured and which are the more influential sectors in the growth process. Even if agriculture still maintains a strong position in all the five economies, it has been observed a declining share of its influence on the GDP over the past years. With the exception of Brazil, where the agricultural sector is one of the leading one, and Russia, where the sector is quite stable, in China and India agricultural performances have shown great volatility. Agri-business is one of the most vibrant sector for Brazilian economy, engaging 35 per cent of the working-force and contributing to almost 42 per cent of its export dollars.¹⁷ Brazil is indeed at the first place for the production of oranges, coffee, beans, at the second one for beef, tobacco and soy beans production, and among the greatest producers of pork, grain and cotton seeds¹⁸. That's incredible considering that until 1970 Brazil was a net importer of grains food and now it has emerged as the major net exporter of food products. The same process took place in India, where the Green Revolution¹⁹ and the biotechnology development let the country to become almost self-sufficient in food production. As said before, the agricultural sectors still plays a dominant role in the other three economies too. To get some insights, China, India and Russia occupy three of the four position among the top grain producers, and together with Brazil they represent 37 per cent of the global grain

¹⁷ THE BRICS REPORT, A Study of Brazil, Russia, India, China, and South Africa with special focus on synergies and complementarities, Oxford University Press, 2012

¹⁸ Andrea Goldstein (2011) BRIC. Brasile, Russia, India, Cina alla guida dell'economia globale. Il Mulino

¹⁹ The Green Revolution identifies those agricultural policies which consist in the introduction of high-yielding varieties of seeds and the increased use of fertilizer and irrigation, which provided the increase in production needed to make India self-sufficient in food grains. See http://en.wikipedia.org/wiki/Green_Revolution_in_India

production. Despite the economic development will lead to shift the attention towards other sectors, for example the services one, agriculture sector will continue to represent a source of growth for the Brazilian country, as the demand for food continues to rise, and the urgent scarcity of arable land in the world.

Table 5 Sectorial Share in GDP. Source: BRIC REPORT 2012

Table 1.5 Sectorial Share in GDP (percentage to GDP)

Country	Sector	1990	1995	2000	2005	2008	2009
1	2	3	4	5	6	7	8
Brazil	Agriculture	10.1	5.8	5.6	5.7	5.9	6.1
	Industry	29.9	22.0	27.7	29.3	27.9	25.4
	Services	60.0	72.2	66.7	65.0	66.2	68.5
Russia	Agriculture	-	7.6	6.7	5.4	4.9	4.7
	Industry	-	27.9	31.4	32.9	29.7	32.9
	Services	-	64.6	62.0	61.6	65.6	62.4
India	Agriculture	30.0	26.8	23.2	18.9	19.0	17.1
	Industry	22.3	23.2	20.7	21.0	21.0	28.2
	Services	47.7	50.0	56.1	60.0	60.0	54.6
China	Agriculture	26.0	19.7	15.2	12.2	11.6	11.0
	Industry	35.5	40.6	40.7	42.2	42.8	48.0
	Services	38.5	39.7	44.1	45.6	45.7	41.1
South Africa	Agriculture	4.6	3.9	3.3	2.7	3.2	3.0
	Industry	40.1	34.8	31.8	31.2	32.5	31.1
	Services	55.3	61.3	64.9	66.2	64.3	65.8

Source: United Nations System of National Accounts.

Note: - Not available.

In the late 30 years other sectors got a foothold, triggered by structural economic policies or as the result of the process of development which was taking place in the five countries. In China, for example, especially since 1991, when the socialist market economy system was introduced, the share of the primary industry went down making space for the secondary and tertiary ones. Nowadays China is known as the biggest manufacturing laboratory of the world, which dominates the most part of its economy. Though Brazil is the best among the five BRICS in term of value added and exports per capita in the manufacturing field, China is the most specialized. This result in the greatest contribution of the manufacturing sector to the Chinese GDP and to the exports. The other three countries lag behind China and Brazil in the contribution of the added value linked to manufacturing activities to the GDP. In Russia the secondary sector overlaps with the mineral one, while the manufactory doesn't seem to be considered relevant for its economy. The same could be argued for India, where the manufacturing production per capita is almost derisory. This doesn't prevent the development of Indian

industries which compete all over the world, as the well-known pharmaceutical Indian industry which is third place ranking in the world production of general drugs (in volume terms), and ranks fourteenth for the production value. Well-known is that the most prosperous sector in Indian economy is the service one, which account for more than half of the total GDP and which has known a tremendous development during the last decades. South Africa, as said before, could benefit from its rich lands from which derive the vibrancy of its mineral industry. Here, as for India, a great share of the economy is dominated by the service sector, which account for more than the 60 per cent of the total GDP.

Table 6 Global Competitive Index. Global Competitive Report 2011-2012, The World Economic Forum

Country	Global Competitive index	Infrastructure	Macroeconomic Environment	Higher education and Training	Market Size	Business Sophistication	Innovation
Brazil	53	64	115	57	10	31	44
Russia	66	48	44	52	8	114	71
India	56	89	105	87	3	43	38
China	26	44	10	58	2	37	29
South Africa	50	62	55	73	25	38	41

Interesting are data about Global Competitiveness (table 6) which reveals that China is the most competitive county among the BRICS and one of the most competitive country in the world, ranking 26 in 2011-12. Its high position in the global ranking is due to its huge market, the second largest market in the world, its favorable macroeconomic environment and its good position in term of innovation. Data shows that all the five countries are well-placed in term of market size but there are some indicators of competitiveness on which they have still a lot to work.

2.4 Demography, social conditions and conclusion

Demographically, with their increasing population, BRICS countries have represented a very prolific area in the last decades. This is one of the key element in order to explain their economic potential. As said before an expanding population entails a growing demand and at the same time a rising labor pool and, thus a growth of the production. This is one of the common dividend of these countries, which make them different from advanced ones whose population is rapidly aging. Indeed, while developed countries are worried about their older population, BRICS countries are experiencing an increasing share of working-age population, as the child dependency ratio has recently decreased. This has been reflecting in the share of urban population, as an increasing population in the working-age entails large-scale migration towards cities. Although this aspect is one of the most powerful engine of the growth of these countries, it represents at the same time a very big challenge. Managing a rising population is a great dare above all where governmental fundamentals are weak. That's a problem which have risen a sense of urgency and which the BRICS countries are facing right now. Urgency needs to be created for the near future too: how they will manage a decrease in the share of the population in the working-age? In some of the BRIC countries, the aging of the population is expected to take place at a faster pace than in advanced economies. At present, the population in the age group of 0 to 14 years is the highest in India (32.1 per cent), followed by Brazil (27.9 per cent), China (21.4 per cent), and Russia (15.3 per cent)²⁰. India and Brazil are the countries where the population is growing with the highest rate with a diminishing dependency rate. Thus the two are expected to host the biggest working-force pool in the world which will pick respectively in 2040 in India, and around 2020-2025 in Brazil. The first to reach the maximum in term of number of

²⁰ THE BRICS REPORT, A Study of Brazil, Russia, India, China, and South Africa with special focus on synergies and complementarities, Oxford University Press, 2012

people in the working age will be China, where the growth of the population was limited through the drastic birth policy adopted since the 80s which, according to the government, avoided the birth of 400 million babies. The paradox is that nowadays China is worried about facing a labor deficiency. The only country that isn't experiencing this demography trend is Russia, where the fertility rate isn't high enough to endorse the balance and the population is both decreasing and aging. Russia is the sole BRICS country where the economic improvement haven't corresponded to an higher life expectancy. As said before the challenge for every of the BRICS countries is the management of this growth of the population which have to be followed through structural policies with the aim to guarantee an acceptable quality of life level. They have to be able to build the capacity to transform the richness into growth, which is not merely economic growth but a more sustainable growth. BRICS economies have to work for their population and the quality of the social services. Various social sectors indicators suggest that there is a large scope for improving social condition in BRICS countries. Although monetary poverty have reached lower levels in the last few decades, there is still a lot to do. To get an idea, excluding South Africa from the group, more than half of the people living below the poverty line²¹ live in BRIC countries. In terms of Human Development index the Russia federation ranks highest while South Africa and India are ranked the lowest (Table 1.8) . Although they still rank very low, in the period 1980-2010 India and China are the BRICS countries where there have been the greatest improvement in terms of HDI.²² Data reveals that poverty is a great problem in these countries, where disparities are very pronounced. Indeed the growth being equal, an increase of the disparity within the society neutralizes the growth impact on poverty. The two countries where have been recorded both high growth rates and an increase of the inequality are China and India. In the period 1993-2005, the Gini Index, which is a measure of the statistical dispersion, recorded the greatest increase within the BRICS,

²¹ The poverty threshold, or poverty line, is the minimum level of [income](#) deemed adequate in a given country. In 2008, the World Bank came out with a revised figure of \$1.25 at 2005 purchasing-power parity (PPP). (Ravallion, Martin *Poverty freak: A Guide to Concepts and Methods*. Living Standards Measurement Papers, The World Bank, 1992, p. 25)

²² Andrea Goldstein (2011) BRIC. Brasile, Russia, India, Cina alla guida dell'economia globale. Il Mulino

although Brazil and South Africa are the countries with the highest value in terms of disparities (Table 1.8)

Table 7 Social Sector Indicators, 2007. Source: THE BRICS REPORT 2012

Table 1.8 Social Sector Indicators, 2007

	Brazil	Russia	India	China	SA
1	2	3	4	5	6
Human Development Index (HDI, 2007)					
HDI Rank	75	71	134	92	129
Adult Literacy (per cent of 15 yrs and above during 1999–2007)					
Male	89.8	99.7	76.9	96.5	88.9
Female	90.2	99.4	54.5	90	87.2
Child-related Indicators					
Gross Enrolment Ratio (2007)	87.2	81.9	68.7	61.0	76.8
Children under Age 0–5 yrs (during 2000–6)	6	3	46	7	12
Population below Income					
National Poverty Line	21.5	19.6	28.6	2.8	-
Population not Using Improved Water Supply (2006)	9	3	11	12	7
Life Expectancy (yrs)					
Male	68.6	59.9	62.0	71.3	53.2
Female	75.9	72.9	64.9	74.7	49.8
Inequality Measures					
Richest 10 per cent vs Poorest 10 per cent	40.6	11	8.6	13.2	35.1
Gini Index	55.0	37.5	36.8	41.5	57.8

Source: UNDP, *Human Development Report*, 2010.

Note: - Not available.

Conclusion

A population which has been growing at a fast rate, a new middle class which is both deepen and broaden, a huge labor pool are some of the main features of the BRICS countries. These features have to be analyzed with some caution as there are other aspects to take in account: the capacity of these governments to manage a huge population with new social needs, the capacity to host this enormous mass of households, the need of new big infrastructures, the need of social policies which promote a more equal society and policies which lead to a sustainable development, the impelling necessity of stability in order to build a vision for the future. We think that adopting a “cluster thinking” will be useful to take a multiple approach which let to take in account both economic and social aspects. As said in the previous chapter a cluster is a socio-economic model where social issues are very relevant aspects in order to

succeed. Clusters development signifies economic prosperity and at the same time social improvements which are gained through a more sustainable and forward-looking approach. We think that clusters building could be one of the keys to success for these countries as they have proved to be a successful tool of development. (see chapter 1 paragraph 1.5). This is why the aim of this thesis is the analysis of the economic geography of industrial clusters in BRIC countries with the additional aim of providing some insights for further industrial clusters development .

Chapter 3

INDIAN INDUSTRIAL CLUSTERS

3.1 Introduction

Before going into the main purpose of this thesis we think that an overview of the general traits of Indian industry is necessary, as clusters are tools of industrial organization. We will focus on data which will let us reconstruct the economic geography of industrial clusters. Thus, we will first have a look at some general data, for example the weight of industrial activities on Indian economy, then we will focus on which are the main sectors of Indian industry and where are localized Indian industrial enterprises, which is the proportion of SMES, where SMES are located in India, which economic sectors they dominate and finally, analyzing data about Indian cluster system, we will try to reconstruct the economic geography of Indian industrial clusters. The analysis of Indian clusters will be concluded with a qualitative analysis following the framework by T. Brenner as seen in chapter 1, some information about the Indian policy for cluster development and a case-study.

3.2 Some data about the Indian Industry

In 2011 Industrial activities account for 26.4 per cent of the GDP at current factor costs²³, while agriculture and services account respectively for 17.2 and 56.4 per cent. While agriculture and services sectors have known an opposite trend during the last fifteen years (agriculture registered a decrease in term of contribution to the GDP, on the contrary the services sector registered an increase), the industrial one seems to be quite stable in term of growth remaining around 26-27 per cent of the output structure, and knowing a small increase only in the period 2004-09. In terms of employment, industry is the sector which employed the lowest percentage of labor force, while agriculture, which gives the least contribution to the Indian output structure, is that one which still employ the greatest part of the active population. This data haven't to lead us to think that industry in India has no more room for development. As we will see later Indian industry is composed by some excellences and above all by a huge mass of small

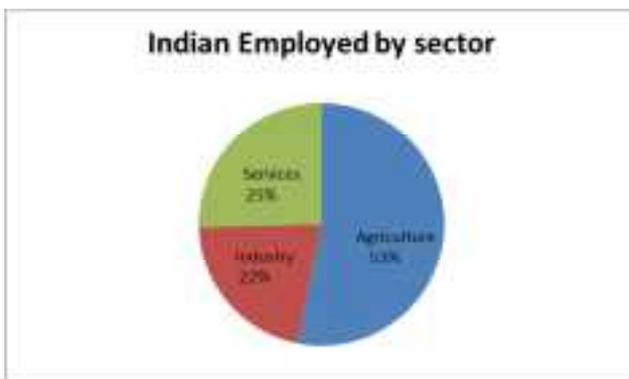


Figure 3 Indian employment by sector source: Asian development Bank

and medium vibrant enterprises rooted to ancient traditions. Thus an analysis of the economic geography of industrial clusters in India could be a very useful tool of industrial organization and industrial development, proving that there's still a lot of room for further development.

²³ Asian development bank. Key Indicators for Asia and the Pacific 2012. www.adb.org/statistics

For a more detailed analysis of the Indian industry some observation about industrial sectors and localization of workers and enterprises is appropriate. In order to analyze which industrial sector predominate Indian economy, data about number of workers and number of fabrics by industrial sectors were observed. Indian industry is dominated by the manufacturing sector, which accounts for about the 94% of the all Indian factories and for about the 97% of the total number of workers in the Indian industry. We have seen in first chapter that the manufacturing sector is the sector in which the first industrial districts were born. Thus there is reason to believe that industrial cluster is an appropriate model of industrial organization for Indian industry. It is no coincidence that clusters are very widespread throughout Indian country. As we can observe from the graph below (figure 4), the sector with the highest number of enterprises is the “food products” sector (16.07% of the total number of Indian fabrics), while that one with the highest number of workers employed is the “textile” sector (12.49% of the Indian workers).²⁴ Beyond the food products and the textile sectors, the sectors with high number of fabrics and workers are metallic and no-metallic mineral, chemical, machinery sectors and sectors which are linked with the textile one. The automotive

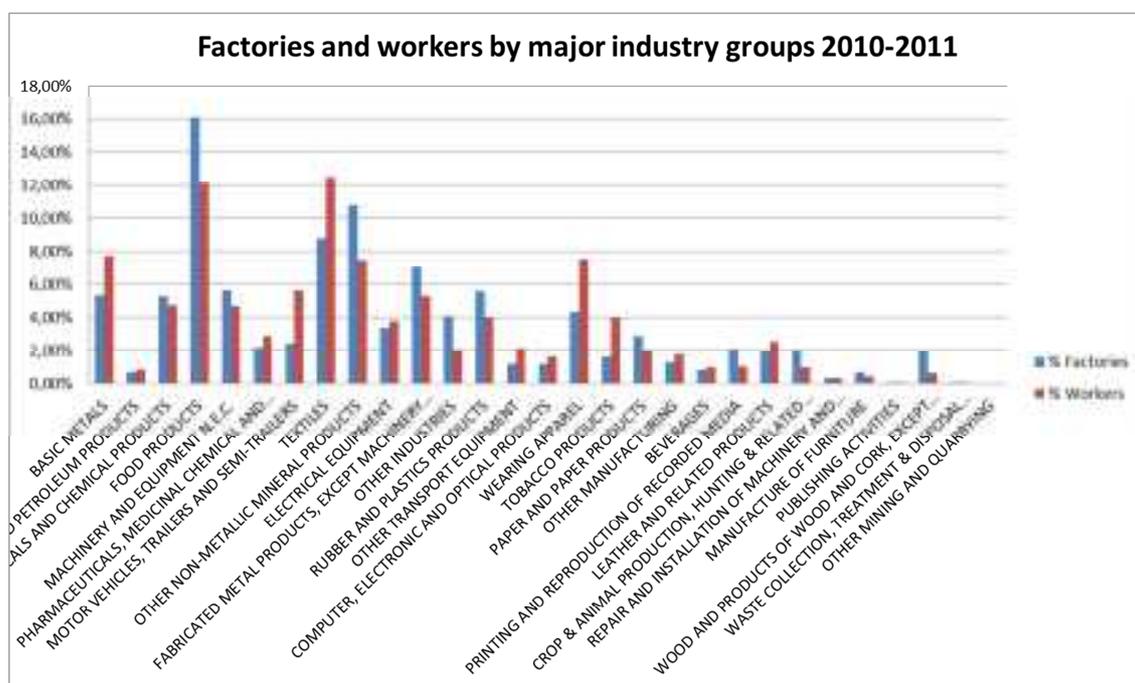


Figure 4 Factories and workers by major industry groups 2010-11. Source: Annual survey of industry (2010-2011)

²⁴ Source: Annual Survey of Industry (2010-11). Government Of India Ministry of Statistics and Programme Implementation

sectors stands out for the number of workers employed, although a moderate number of fabrics is recorded.

Being clusters phenomena of economic agglomeration, a cluster analysis implies the analysis of the territorial distribution of the industrial activities. Thus data about how factories and workers in the industry are distributed throughout on the Indian territory was observed. To do that the number of factories and workers were divided by states. The results could be observed in the graph below: four states stand out for the high number of factories and workers, Tamil Nadu, Maharashtra, Andhra Pradesh and Gujarat. A high number of fabrics and workers is recorded to be located in the National capital region²⁵, which comprises the state of Delhi and the surrounding states. A number of well-developed industrial clusters are located exactly in that region.

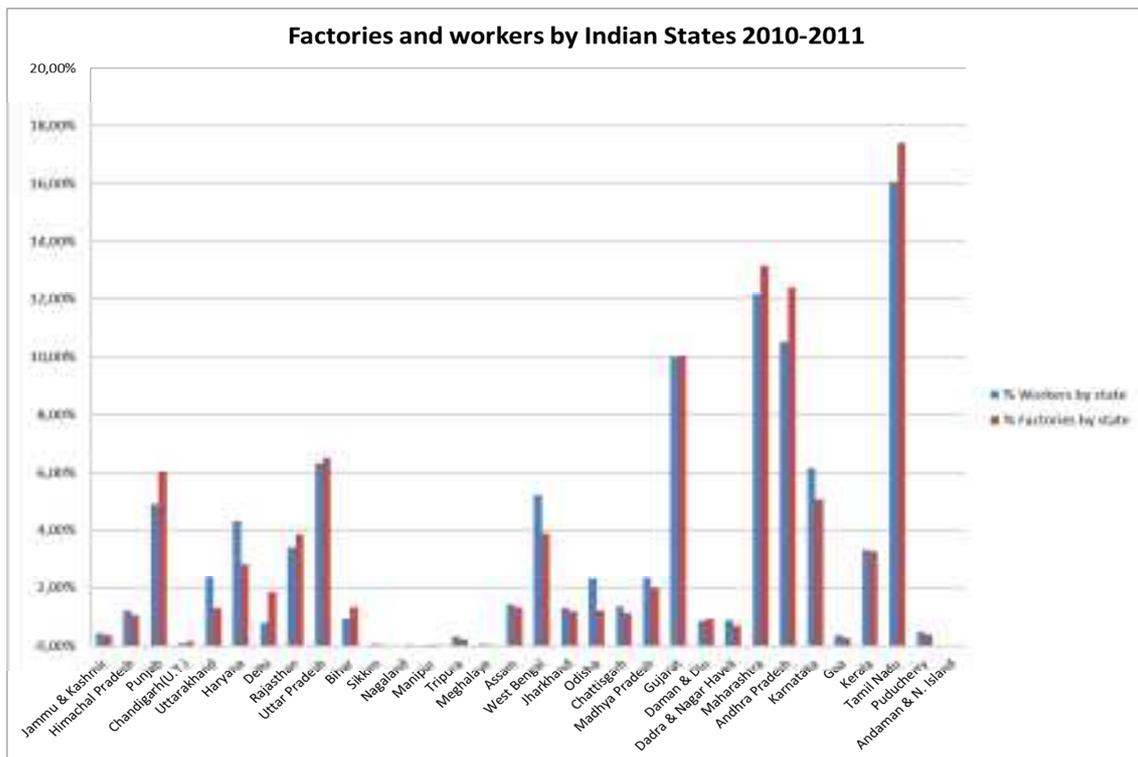


Figure 5 Factories and workers by Indian States 2010-11. Source: Annual survey of industry (2010-2011)

²⁵ The National Capital Region (NCR) in India is a name for the conurbation or metropolitan area which encompasses the entire Delhi as well as urban areas surrounding it in neighboring states of Punjab, Haryana, Uttarakhand, Uttar Pradesh and Rajasthan.

On the map below the states with the highest concentration of enterprises and workers are identified with a red point. This will be useful to have a first idea about where industrial activities are agglomerated letting us to reconstruct the economic geography of industrial clusters in India. As we can observe from the map the most part of industrial activities are located near the biggest Indian cities. We know from theory about emergence of clusters that cities are breeding ground for cluster development, this could be another useful clue to localize clusters.



Figure 6 *Indian states with the highest concentration of enterprises and workers*

3.3 Micro, Small and Medium enterprises in India

In order to analyze clusters as tool of industrial organization in India we will first have a look at the current status of small and medium Indian enterprises. As said in previous chapters, clusters are tools of productive organization that consist in agglomerations of small and medium enterprises which take advantages of being co-locate and collaboration. Thus, as the aim of this thesis is to reconstruct the economic geography of industrial clusters, and clusters are made up for the most part of small and medium enterprises, an analysis about Indian SMEs will follow.

The Micro, Small and Medium²⁶ enterprise sector is the real engine of growth for Indian economy. It provides gainful employment to a large chunk of population. The share of MSM sector in the manufacturing output and export is significant and has been growing consistently (Virbhadra Singh).²⁷ The MSME sector is indeed one of the most vibrant sector of the Indian economy, as it has been revealed by the SMEs Chamber of Indian Statistics. Data proves that India's small and medium enterprises (SME) account for the 45 per cent of the industrial output, 40 per cent of the export and employed 60 million people. SME sector has emerged as a jewel in crown of Indian economy creating 1.3 million jobs and producing over 8,000 marketable products.²⁸ Thus, this sector represent a breeding ground for entrepreneurship at grass root level , as it continues to show dynamism in term of employment generation, contribution to the Gross Domestic Power (GDP) ,and share of exports. It has been widely recognized the importance of this sector for its contribution in generating equitable growth and promoting balance,

²⁶ An enterprise is defined Micro, Small, or Medium on the basis of the investment in plant and machinery. For further details see Final report-Fourth All Indian Census of Micro, Small and Medium Enterprises 2006-2007 Development commissioner MSME. Ministry of Micro, Small, Medium Enterprises, Government of Indi, Nirman Bahva, New Delhi.

²⁷ Virbhadra Singh (born June 23, 1934) former Chief Minister of Himachal Pradesh

²⁸ See <http://www.indianexpress.com/news/intangibles-make-smes-prosper/996414>

insomuch as both Indian government and national and international institutions, e.g. UNIDO, have been giving so much attention to the MSMEs sector putting special emphasis on its growth and progress. In order to have a general outlook of the MSMEs sector we will refer to the *Fourth All India Census of Micro, Small and Medium Enterprises 2006-2007*, through which Indian Government provided a comprehensive database about all the registered MSMEs in the Indian territory.

Table 8 MSMEs in India. Source: Fourth all India census

MSMEs in India²⁹			
Total No of MSM enterprises		15,64	
No of rural enterprises		7,07	45,2%
No of renterprises by type	Micro	14,85	94,9%
	Small	0,76	4,9%
	Medium	0,03	0,2%
Enterprises by type of activity	Manufacturing	10,49	67,1%
	Repairing & Maintenance	2,52	16,1%
	Services	2,62	16,8%
Employment	Micro	65,34	70,2%
	Small	23,43	25,2%
	Medium	4,32	4,6%
	Total	93,09	

Among 1.54 million working registered MSM enterprises have been analyzed through the Fourth All India Census, the most part are micro enterprises which account for about 95 per cent of the total. The remaining 5 per cent is composed by small enterprises, while the number of medium ones is derisory. How it can be easily deduced, the greatest number of employed people work in micro enterprises which generate jobs for more than 6.5 million people. It is important to underline that this data refer only to registered enterprises, excluding a large amount of no-registered ones, so figures are smaller than the real ones. Despite the dominance of the service sector in the Indian economy the greatest number of MSMEs is in the industry sector, more precisely in the manufacturing one, that accounts for about 67 per cent of the total enterprises.

²⁹ Data are expressed in lakh which is a unit in the South Asian numbering system equal to one hundred thousand.

Notable is the number of enterprises which are located in the rural area. India differs from the other emerging countries, e.g. China, for its high rate of population density in contrast with its low rate of urbanization. Thus a great part of the population is still living in the rural areas and consequently a large share of MSMEs is located in rural areas. As clusters are production models which involve small scale enterprises it could be deduced that Indian clusters don't represent an urban phenomenon only, being diffused in the rural area too. Data shows indeed that the 45 per cent of the MSM enterprises is located in the countryside. As we will see later, a lot of Indian clusters, especially those ones which are tied with tradition and culture, developed in small villages, thus, outside big cities, where, on the contrary, we will find clusters which have been developed recently and which are in some sense less tied to Indian artisan traditions. Interesting are data about state-wise distribution of working MSMEs (table 9): state of Tamil Nadu has the largest number of working enterprises with a share of 14.95 per cent in all India, while Gujarat ranks at the second place with a share of 14.70. Notable is that top ten state in number of working enterprises account for a total share of 82.13 per cent, while the remaining 17.87 per cent of the working enterprises are located in the other 25 states. That let us gather that business activities are, for some reasons, concentrated in certain states.

Table 9 State wise distribution of working MSMEs. Source: Fourth all India census

State wise distribution of working enterprises³⁰			
Rank	State	N of working MSMEs	Share
1	Tamil Nadu	2,34	14,96%
2	Gujarat	2,30	14,71%
3	Uttar Pradesh	1,88	12,02%
4	Kerala	1,50	9,59%
5	Karnataka	1,36	8,70%
6	Madhya Pradesh	1,07	6,84%
7	Maharashtra	0,87	5,56%
8	Rajasthan	0,55	3,52%
9	Bihar	0,50	3,20%
10	Punjab	0,05	0,31%

³⁰ Data are expressed in lakh which is a unit in the South Asian numbering system equal to one hundred thousand.

Total above 10 states	12,85	82,16%
Others	2,79	17,84%
Total	15,64	100,00%

Considering data of registered and no-registered enterprises the outlook seems to be quite different due to the high number of no-registered enterprises. Tamil Nadu shifts to the second place while Gujarat, which was ranked second falls to the tenth position. The new chart is dominated by Uttar Pradesh where a high number of no-registered MSMEs is recorded.

Table 10 State wise distribution of registered and no-registered MSMEs. Source: Fourth all India census

State wise distribution of registered and no-registered MSMEs			
Rank	State	N of MSME	%
1	Uttar Pradesh	3113316	11,93%
2	Tamil Nadu	2595127	9,94%
3	Maharashtra	2582870	9,90%
4	West Bengal	2513303	9,63%
5	Andhra Pradesh	2005044	7,68%
6	Karnataka	1611655	6,17%
7	Kerala	1468104	5,62%
8	Madhya Pradesh	1290536	4,94%
9	Rajasthan	1271463	4,87%
10	Gujarat	1097101	4,20%
	Total of above 10 states	19548519	74,90%
	Others	6552278	25,10%
	Total	26100797	100,00%

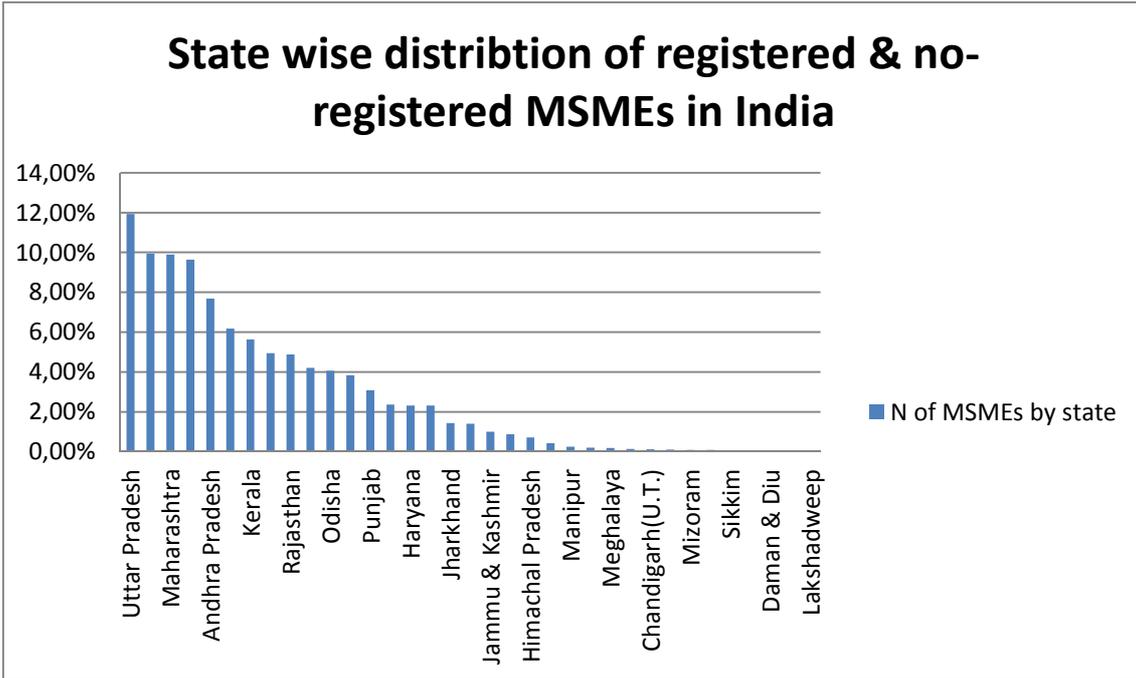


Figure 7 State wise distribution of registered and no-registered MSMEs. Source: Fourth all India census

Observing where MSMEs are concentrated could be helpful in order to localize where clusters have been developed. In order to have a more comprehensive vision, data about state wise distribution of MSMEs were compared with those regarding the all Indian industrial sectors. What emerged is that the state wise distribution of small scale enterprises follows more or less the same trend of the entire industrial sector. We derive the conclusion that industrial activities (MSMEs comprise data about the service sector but being a small share of the total MSMEs its presence is considered irrelevant) are concentrated in twelve Indian states, i.e. Uttar Pradesh, Tamil Nadu, Maharashtra, West Bengal, Andhra Pradesh, Karnataka, Kerala, Rajasthan, Gujarat, Punjab, Madhya

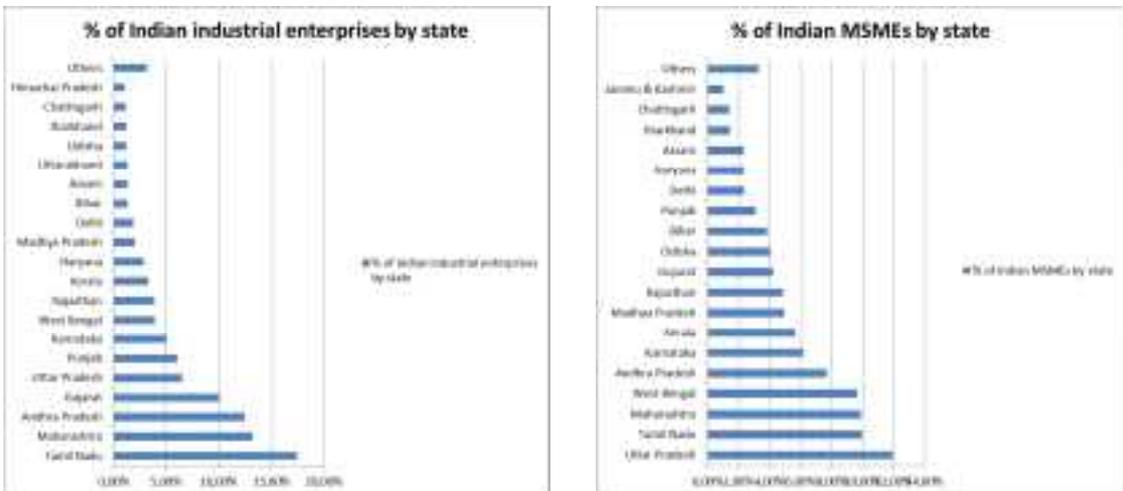


Figure 8 Comparison between state wise distribution of industrial enterprises and MSMEs

Pradesh, Bihar (Madhya Pradesh appears only in the Small Scale enterprises ranking). In terms of activity wide distribution the most part of the MSME are in Food Product & beverage (14.26% of share) and textile (13.67%) sectors following the industrial activity distribution, which differs for the greater incidence of the mineral and chemical sector.

3.4 Economic geography of Indian Clusters

Cluster represent a face of the Indian industrial reality, being a productive model which is well-diffused all over the country and rooted in the Indian tradition. Clusters are not a novelty in the Indian economy, where a great number of small and medium enterprises play a great role.

In the last decades Indian government and other institutions which aim to promote sustainable economic development in India have put a lot of emphasis in sustaining and promoting Indian clusters. This is why in relative recent years a lot of cluster initiatives have been launched in order to foster the economic power of the myriad of small scale enterprises which together form the Indian industrial woven. Great emphasis have been put on the social and environmental influences that cluster development initiatives could have on the Indian territory, this has contributed to give more emphasis on clusters in the Indian industrial policies. Gathering information about Indian clusters, one will immediately realize the great significance that this productive model has for Indian Industry, and Indian economy in general. Indian government seems to be particularly dedicated to the promotion of new cluster initiatives and seems to make great efforts in order to support the crowd of Indian clusters scattered all over the Indian territory. To be precise it's the Ministry of Small Scale Industry who takes care about clusters policy in India and about clusters monitoring. One of the aim of the Ministry, which works together with national and international agencies, institutions, foundations with the same aim of promoting cluster development in India, is to gather data and information about clusters in order to let the significance of clusters for the Indian economy be known. With this aim a cluster observatory have been instituted and periodical surveys about clusters in India are made. This have smoothed our way in the aim of reconstructing the economic geography of industrial cluster in India.

3.4.1 Reconstructing the economic geography of Indian clusters

In order to reconstruct the economic geography of the Indian industrial clusters system, in the previous paragraphs we have gathered information about which are the main industrial sectors and how Indian industrial enterprises are distributed among Indian states. Being clusters economic models of industrial organization which, in most cases, imply the presence of a group of small scale enterprises which belong to the same sectors, are co-located and co-operate and compete at the same time, the Indian small scale enterprise system has been analyzed. Information about the main sectors in which small and medium scale enterprises operate, and about the state wise distribution of this kind of enterprises was gathered from surveys conducted by the Indian Ministry of Micro, Small, Medium Enterprises. This analysis let us get some first insights about the economic geography of Indian industrial clusters. Now data about clusters will be analyzed in order to reconstruct their distribution all over the Indian territory and to get some insights about their weight on Indian economy. Data are provided by the Indian cluster observatory³¹.

In order to analyze the Indian cluster system, the characteristics which identify a cluster were defined, letting us distinguish what is a cluster from what isn't a cluster. Surveys on Indian clusters have been conducted on the base of the following definition:

“A cluster is defined as a concentration of enterprises producing same or similar products or strategic services and is situated within a contiguous geographical area spanning over a few villages, a town or a city and its surrounding areas in a district and face common opportunities and threats. Accordingly, we have not considered activities which are of daily use services and/or where scope for joint action or passive cooperation is minimal or where the product grouping is too wide for common threats/opportunities to emerge.”³²

³¹ See <http://clusterobservatory.in/index.php>

³²The definition is based on <http://clusterobservatory.in/clustermap.php>

In this definition we find all the features identified in the main cluster theories, that have been analyzed in the first chapter. Thus, clusters, which have been the subjects of surveys all over the Indian country, are characterized by agglomeration of enterprises operating in the same sector and located in a contiguous geographical area which share the same economic environment. Clusters were then classified by number of enterprises and by sectors. Thus, three type of Indian clusters have been identified: industrial clusters, which have at least 100 enterprises and/or a minimum turnover of Rs. ³³100 million³⁴; Micro enterprises clusters, which are composed by micro units, mostly household units with prevalence of home-base workers. In this category two further distinctions are made between artisanal, which comprise handicraft clusters and handloom clusters, and other micro enterprises clusters. Finally IT and service clusters, which are clusters of enterprises operating in the information-technology sector and in the service one, where the tourist sector dominates. As the aim of this thesis is to analyze the industrial cluster geography, we will focus on the first two cluster

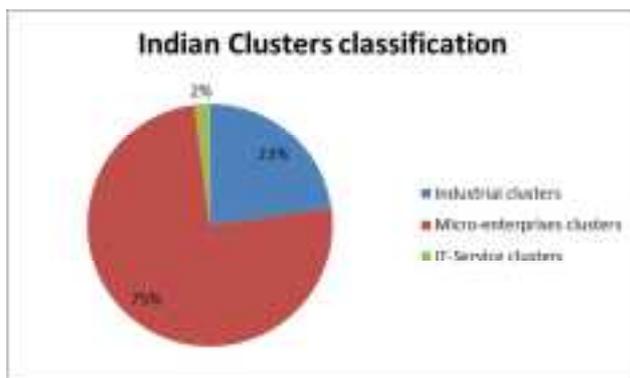


Figure 9 Indian clusters classification. Source: Indian clusters

categories. Despite that, IT and service Indian clusters are worth an analysis as the great influences of the service sector on Indian economy. Although clusters are productive models which dominate Indian industrial sectors, the model is also spreading out in the service sector and the number of IT and Service Indian

clusters, even if still minimal if compared with the industrial sector one, is expected to rise in the near future. Indian clusters were first analyzed by typology: the graph (figure 9) shows the great predominance of Micro-enterprises clusters which account for the 75 per cent of the total classified Indian clusters. Industrial clusters, that are the biggest clusters in terms of both number of enterprises and economic weight, are the 23 per

³³ Indian Rupees. The current exchange rate is 1 euro-70,4743 (exchange rate on April, the 18th)

³⁴ Units in these clusters are functioning from factory premises with hired workers. Such clusters have a mix of micro, small, medium, few large and sometimes all micro units.

Table 11 *Comperison of state wise distribution. Source: Indian clusters observatory*

Comperison of state wise distribution					
Indian Industrial enterprises		Indian MSMEs		Indian clusters	
Tamil Nadu	17,41%	Uttar Pradesh	11,93%	Uttar Pradesh	11,77%
Maharashtra	13,18%	Tamil Nadu	9,94%	Odisha	8,08%
Andhra Pradesh	12,42%	Maharashtra	9,90%	West Bengal	7,64%
Gujarat	10,05%	West Bengal	9,63%	Gujarat	7,60%
Uttar Pradesh	6,50%	Andhra Pradesh	7,68%	Maharashtra	6,72%
Punjab	6,03%	Karnataka	6,17%	Andhra Pradesh	5,91%
Karnataka	5,07%	Kerala	5,62%	Madhya Pradesh	5,70%
West Bengal	3,89%	Madhya Pradesh	4,94%	Tamil Nadu	5,38%
Rajasthan	3,86%	Rajasthan	4,87%	Karnataka	5,19%
Kerala	3,27%	Gujarat	4,20%	Rajasthan	4,34%

Observing in more detail the industrial sector, and so clusters operating in the industrial sector with at least 100 units and or a minimum turnover of Rs. 100 million, the state with the highest number of industrial clusters is Uttar Pradesh, followed by Tamil Nadu, Maharashtra, Gujarat, Andhra Pradesh, Kerala and Karnataka. The distribution of industrial clusters follows more or less that one of the industrial enterprises, showing that big industrial clusters tend to locate in area with a high intensity of industrial activities. The same could be said looking at data about industrial clusters by sector (Figure 11). Most of the enterprises in industrial clusters operate in the food product and

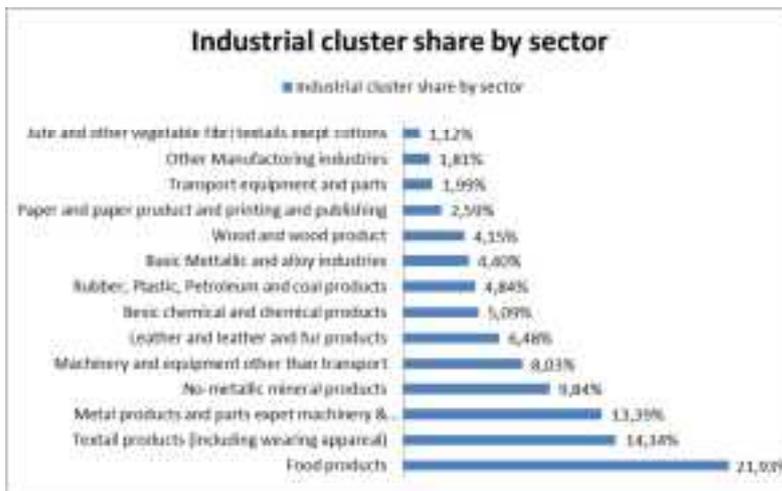


Figure 11 *Industrial clusters by sector. Source: Indian clusters observatory*

textile sectors, as we have seen previously analyzing Indian Industry. Relevant are data about metallic and no-metallic mineral sectors and machinery sectors. As regards micro-enterprises clusters, which represent

the most part of the Indian cluster system accounting for the 43 per cent of the total number of clusters, we observed that their activities are highly tied to Indian traditional productions. Indeed the sole handloom clusters account for about 15 per cent of the total number of micro-enterprises clusters, which comprise handicraft, handloom and other micro-enterprises clusters. In terms of state wise distribution the state with the largest share of micro-enterprise clusters is Uttar Pradesh where are located more than the 11 per cent of the micro-enterprises clusters, followed by Odisha, West Bengal and Gujarat. The Indian states with the highest number of handloom clusters are Uttar Pradesh, Madhya Pradesh, Odisha and Bihar; those with the highest concentration of artisan activities are Uttar Pradesh, Odisha, West Bengal and Gujarat. Beyond handloom sectors and so textile, the handicraft sectors which record the highest number of clusters are Basketry, mat weaving and cane articles, woodwork and metal-ware (see Figure 14).

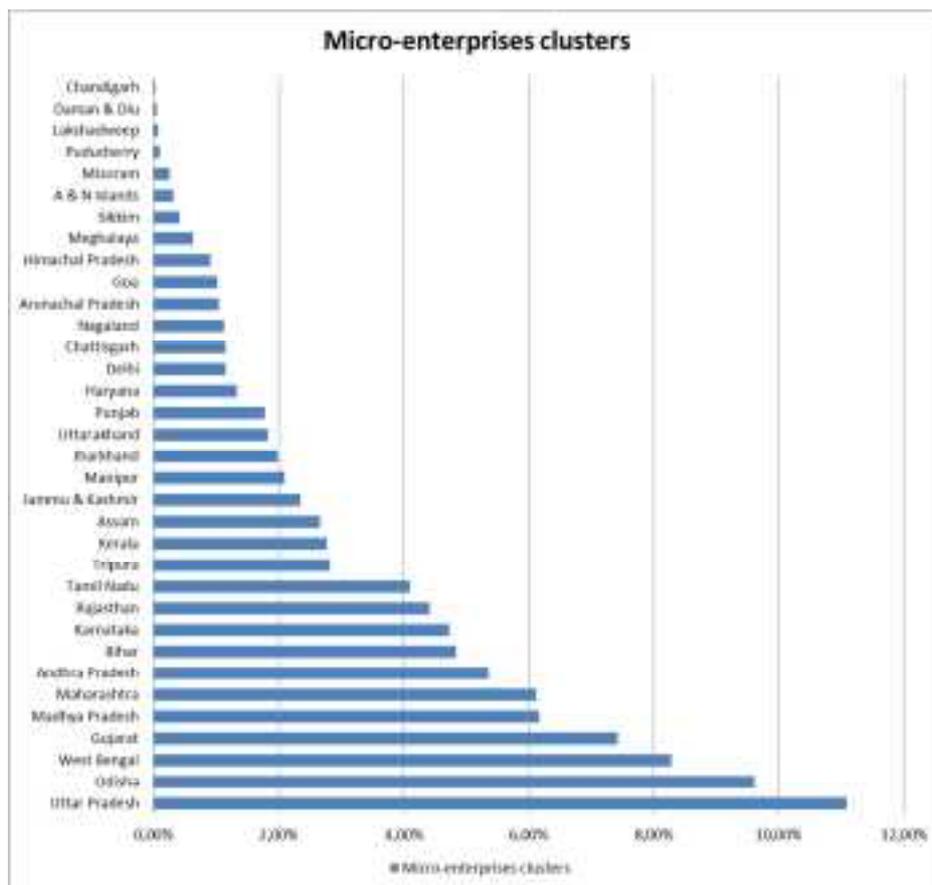


Figure 12 Micro-enterprises clusters by state. Source: Indian clusters observatory

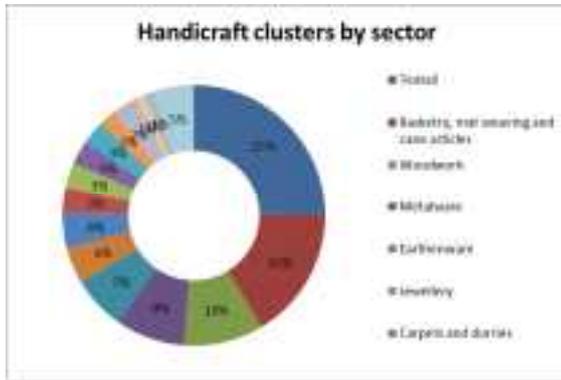


Figure 14 Cluster-mapping: from the right: states with the highest concentration of clusters; states with the highest cluster density per sq.km; maps of principal Indian clusters

Identifying the Indian states with the highest number of clusters could be useful in order to reconstruct the economic geography of Indian clusters but it could be at the same times misleading, as, obviously, states differ in geographical extension. Calculating the location quotient³⁵ could be a solution, but data needed for its assessment were not available. We try

to find a solution calculating a sort of *cluster density* for every Indian state, dividing the total number of clusters by the geographical extension measured by square kilometers. States with the highest cluster density are identified on the map below (Figure 13). We compared our map with another one, which was obtained through a detailed activity of cluster mapping and we found out some correspondences. For example in our previous states-ranking the National Capital Region³⁶ was not present, while calculating the “*cluster density index*” we found out that this is an area where clusters are very diffused.



Figure 13 Cluster-mapping: from the right: states with the highest concentration of clusters; states with the highest cluster density per sq.km; maps of principal Indian clusters

³⁵ This technique compares the local economy to a reference economy (for example the national one) in the process attempting to identify specializations in the local economy. The location quotient technique is based upon a calculated ratio between the local economy and the economy of some reference unit.

³⁶ The National Capital Region (NCR) in India is a name for the conurbation or metropolitan area which encompasses the entire Delhi as well as urban areas surrounding it in neighboring states of Punjab, Haryana, Uttarakhand, Uttar Pradesh, and Rajasthan.

3.6 Indian cluster development policy

Since 1997 the Indian ministry of Small Scale industry recommended to adopt a cluster development approach in order to sustain the small and medium enterprises, which, as we have seen before, are one of the pillars of the Indian economy. Subsequently Indian government have put a lot of emphasis on the adoption of a cluster approach as mean to increase the productivity and the competitiveness of Indian MSMEs. The Government of India announced on 10th August 2005 a policy package where cluster development was made the plank for making Indian SMEs globally competitive. Cluster development model is one of the prevailing tools of development adopted in India, as a consequence the great part of Indian development policies aim to sustain such an socio-economic pattern of growth. Hereunder part of the Finance ministry's speech of 2006-7 is reported.

“The Cluster Development model can be usefully adopted not only to promote manufacturing but also to renew industrial towns and build new industrial townships. The model is now being implemented, in one form or other, in nine sectors falling under different Ministries. The sectors include Khadi and village industries, handlooms, handicrafts, textiles, agricultural products and medicinal plants. It would be advantageous to empower a group to oversee cluster development and monitor progress. Hence, the Prime Minister had decided to constitute an ‘Empowered Group of Ministers’ to lay down a policy for cluster development and oversee the implementation.”

As it is clear from the words of here above, Indian cluster development policy consists in a comprehensive approach which goes beyond the manufacturing sector, including different socio-economic aspects and powering up a process of development which involves the entire town in which the industrial cluster is located. Since 2006-7 the

Empowered Group of Ministers (EGoM), under the chairmanship of the then External Affairs Minister, was constituted to lay down the comprehensive policy for cluster development and oversee its implementation by different ministries of the Government of India. Government of India defines the national cluster development policy and delegate Indian states to make the cluster development approach the means to support, develop and enhance productivity of SMEs and make them globally competitive. Specific cluster development measures are then adopted through the industrial policies of the Indian states. Indian cluster development policy is based on four main objectives:

1. To support the sustainability and growth of MSEs by addressing common issues such as improvement of technology, skills and quality, market access, access to capital, etc.
2. To build capacity of MSEs for common supportive action through formation of self-help groups, consortia, up-gradation of associations, etc.
3. To create/upgrade infrastructural facilities in the new/existing industrial areas/clusters of MSMEs.
4. To set up common facility centers (for testing, training center, raw material depot, effluent treatment, complementing production processes, ect)³⁷.

The cluster development policy in India is conceived and responds to the modern cluster approach, that is enhancing productivity through improving technology and innovation, providing finance resources for cluster development, starting up self-incrementing approaches in order to make clusters self-supporting, supporting clusters through strengthening existing networks and creation of new ones through a focused infrastructural policy, involving all the stakeholders of the cluster through the creation of institutions and agencies, which aim to ease team-works among clusters members. In order to make policy interventions as much effective as possible four main tools have been conceived by the ministry of Small scale Industry, that are diagnostic studies, soft intervention, setting up of Common Facility Centers (CFCs), and infrastructural development. Since the MSME Development Act 2006 came into effect on 2nd October 2006, both the Central and State Governments have taken effective steps towards its implementation. While a number of rules have been framed by the central government,

³⁷ For more details see <http://www.dcmsme.gov.in/MSE-CDProg.htm>

different state governments have concentrated their efforts in order to make concrete the central government instructions through the constitution of the Small and Medium Enterprises Facilitation Council in every state. One of the most important cornerstones of the policies pursued by the Government to support the MSME sector has been providing competitive edge to the units in the global environment. As the most part of the Small and Medium enterprises operate in the manufacturing sector, special attention has been given to policies supporting SMEs in the manufacturing sector. As a consequence the National Manufacturing Competitiveness Program (NMCP) have been implemented with a view to build the capacity of the Indian Small and Medium manufacturing enterprises for overcoming competition in the global market and facing challenges due to the entry of the multi-nationals in the Indian domestic market³⁸. The objective of the NMCP is to ensure healthy growth to the manufacturing SMEs, this is why a dedicated policy has been conceived with the aim to enhance the firm level of competitiveness adopting a *public-private-partnership* mode.

In many developing or emerging countries, in India as well, the government is often given help and support by international non-governmental organization which have the aim to create a sustainable growth-process. Since 1996, UNIDO, the United Nations Industrial Development Organization, has operated in the Indian Country aiming to support the MSME sector, as it could contributed to unleash a prosperous growth process. As the UNIDO's program has been giving a lot of support to the Indian Government and a great contribution to cluster development, we retain necessary to spend a few words about UNIDO's methodology for making clusters work. The program gives special attention to underachieving clusters, where lack of communication and skepticism towards common ventures characterize traditional business practices. Moreover, local firms in such clusters rarely make use of business development services (BDS) and are not accustomed to presenting articulated calls for action to the local policy makers³⁹, this is why local governments need support by external agents, which help them with their experience in this field, with the aim to make them self-supporting. Indeed, if left in their own such underachieving clusters

³⁸ Annual Report- MSMEs 2012-13. Government of India Ministry of Micro, Small and Medium Enterprises Udyog Bhavan, New Delhi

³⁹ Making clusters work- UNIDO Methodology. Foundation for MSME Clusters (2006)

would remain trapped in a vicious cycle of coat-throat competition, undermining the entire nation's development. The cluster development approach implemented in India by UNIDO sees the key problem of Indian MSMEs as one of relative isolation rather than size. Its aim is to help cluster actors to develop a consensus-based vision for the future and strengthen their capacity to act upon that vision. In order to achieve these two points the program aim to: first, strengthen linkages within the cluster, not only among MSMEs but also among them and other actors, such as banks, public institutions, schools, ect., implementing a public-private-partnership approach; second, assist cluster's stakeholders to develop a vision for the cluster as whole; third, help stakeholders to coordinate their action and to pool their resources towards the above mentioned vision for the cluster as a whole, and forth create an autonomous governance framework, in a step-by-step process that will sustain dynamism and change in the cluster after the withdrawal of the implementing agency. The implementing agency represent the external assistance, which give support to all the cluster's stakeholders, with special attention to the local administration, in the form of sensitization, trust building, conflict resolution, network creation, project implementation, etc. The cluster development approach is based on some basic principles, such as a need-based approach, in the sense that, in the medium term, only those activities that are endorsed by the stakeholders are implemented; flexibility in order to produce a customized action plan; finally intermediary-driven support, that is to give responsibility to intermediary institutions such as industry association, NGOs, institutionalized firm networks, service providers, etc.⁴⁰ The cluster development approach consists in different steps, starting with the selection of clusters based on their importance, promotability, viability, and sustainability with the aim of make the action as effective and wide-reaching as possible. Some diagnostic studies will follow in a very participatory manner, in order to build initial trust with cluster's stakeholders. The following steps are trust building among all the stakeholders; the expression of the action plan, that is the roadmap which will help foster relationships among the stakeholders while delivering visible results; the implementation of the action plan, during which the cluster's stakeholders are given even more responsibility; finally the monitoring and evaluation step follows, helping to

⁴⁰ For further details see Making clusters work- UNIDO Methodology, page 14. Foundation for MSME Clusters (2006)

disseminate best practices and strengthen trust among stakeholders. All these steps are part of a process, which is not a linear one, as the volume of activities is a positive function of the social capital of the cluster. In other words, as long as social capital is low, activities move very slowly; on the contrary, as confidence builds up and linkages increase, the activities pick up, which again increases confidence among the stakeholders. If mistrust occurs, the process will slow down again. The various stages of the cluster development approach are not mutually exclusive, they often overlap. In particular, the trust-building phase is a continuous one. In conclusion, the approach is a not linear one, with steps which overlap, making it a very dynamic approach (Figure 15).

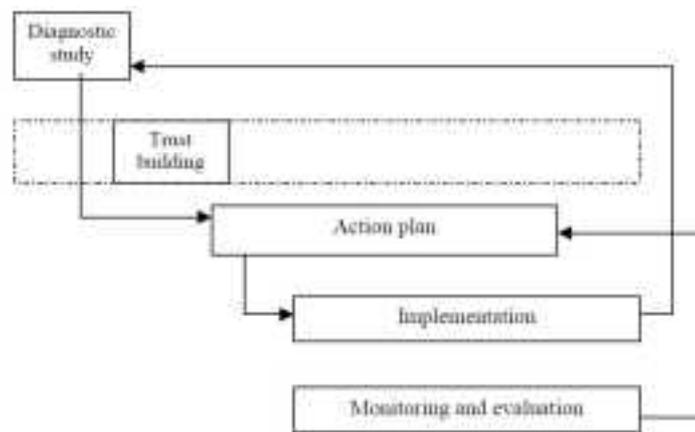


Figure 15 UNIDO's cluster development approach. Source: *Making clusters work- UNIDO Methodology*

3.5 Indian clusters: some qualitative features

In this paragraph a brief qualitative analysis of Indian industrial clusters will follow. To do that we will refer to the analytical framework by T. Brenner which have been discussed in chapter 1. This will be useful in order to identify relevant qualitative features of the industrial cluster system in India and to get some insights about the emergence and development of further industrial clusters.

First, as regards prerequisites for the emergence of industrial cluster in India some significant observations are:

- The presence of natural resources seems to be quite relevant, indeed one of the industrial sectors which hosts a great share of industrial clusters is the metal sector (13, 39%); if we consider natural resources in a broader way including, beyond the mineral resources, agriculture we can state that a great share of industrial clusters in India are tied to the presence of natural resources. As seen before the largest industrial sectors which host a number of industrial clusters are the Food products and the textile ones. Activities encompassed into these two sectors are based on the manufacturing of products, agricultural products, which are in some senses “raw material coming from the earth” and could be considered natural resources.
- As regards the type of region, industrial clusters in India are both in urban and rural areas. As we have seen before, a great share of MSM enterprises is located in rural areas (45%), as a consequence a great number of micro-enterprises clusters have emerged outside cities. Clusters which have developed in small villages are those which are more tied with tradition and handicraft, while those which have developed within big cities are the newest and the biggest ones. As for the emergence of new clusters, they are more likely to emerge in urban areas. It is important to keep in mind that the spatiality of clustering is not merely confined to the *place*, that is, say, rural or urban, but has a strong reference to the

level of regional development that determines the cluster's access to both social and economic infrastructure. The performance of a cluster, including its potential to move up in the value chain and be innovative, depends crucially upon the level of development of the region where it is located.⁴¹ As in all developing countries, the level of development is higher in urban areas, thus, there, existing industrial clusters have room for further development and the emergence of new ones is more probable. An example in India could be the National Capital Region, which consists in the area surrounding the capital Delhi. In this area a number of industrial clusters has emerged, providing ample evidence of industrial value chain, economic clusters and industrial agglomeration. The increasing specialization in NCR is leading to the development of strong industrial clusters with well-developed supply chains. Cities are more favorable environment for clusters emergence: cities offer a higher level of quality of life attracting, as a consequences, high-skilled workers; they offer more efficient transport infrastructures which permit actors in the clusters to be networked. In conclusion we can affirm that Indian clusters follows a common pattern, even if it's quite approximate: cities are expected to host new clusters which operate for a great part in the fast growing service sector, while in the rural area there are small handicraft clusters which are rooted in ancient tradition; big industrial clusters tied to natural resources are expected to be located in the proximity of the areas where those natural resources are extracted, as the high transection costs tied to the transportation of those raw materials (e.g. mineral sector)

- As for the prerequisite tied to the business- economic environment the following observation are made: India is characterized by a huge market, being the 12th economy in the world and the 4th in the Asian country⁴²; with 1.1 billion people living in the Indian country, Indian economy is drawn for a great part by a starved domestic demand. These two element have a great positive effect on the emergence of new clusters. Besides, others positive features are the inexpensive

⁴¹ Keshab Das. Indian industrial clusters (2005)

⁴² Competitive cities in the 21st Century. Cluster-based local economic development. Asian Development Bank

but very qualified Indian workers and an industry structure which is characterized by the predominance of small and medium enterprises.

- As regards political prerequisites, globalization and economic policy reforms introduced by the government in the early 1990s played a great role in Indian clusters development.
- Indian “Cultware” is one of the most important key of success for cluster development in India. We can state that in India there is a sort of cluster culture, as said before clusters aren’t a novelty for the Indian economy being in some way rooted in the traditional model of industrial organization. This have being paved the way for cluster development in India.

Second, in the matter of triggering events specific policy measures and the intervention of some international organizations, like UNIDO, played a significant role in the emergence and development of industrial clusters. Worth a mention are the following triggering events:

- The embracement by Indian government of the concept of clusters as development tool; the willingness to study the competitiveness of Indian cities; the adoption of a bottom-up process in the way of functioning of Indian local governments through Constitution (74th Amendment) Act (1992). Extremely important have been the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) which have led to significant improvement in urban policy and urban development.⁴³ Furthermore substantial have been the efforts of Indian government in order to develop infrastructures both in small and medium towns, and in rural areas (see “the Integrated Development of Small and Medium Towns Program” and “the Provision of Urban Amenities in Rural Areas Program”).
- Relevant as triggering event is without any doubt the historical momentum of growth and development that India is experiencing.

⁴³ For further details see “Competitive cities in the 21st Century. Cluster-based local economic development. Asian Development Bank” page 177.

Finally, as regard the self-augmenting processes there're substantial arguments to affirm that Indian industrial clusters have a lot of room for further development. Self-augmenting processes have to be assessed in every specific cluster as every cluster has its own way of functioning.

3.7 Case-study: Okhla Ready-made Garments industry cluster

The National Capital region is the leading Ready-made Garment industrial center in the Indian Country. Indeed, the 40 per cent of the total ready-made garments produced in India come from NCR industrial center, most of them are then exported. The greatest part of garment companies are located in Noida, in the Okhla industrial area, in the southeast part of the National Capital Region. As we have seen before, textile industry is one of the leading one in India, giving a contribution of about 17 per cent to India's export earnings. The export basket is made up of a wide range of products, such as cotton yarn and fabrics, man-made yarn and fabrics, wool and silk fabrics, made-ups, and a variety of garments⁴⁴. Most of the above-mentioned products are, including handloom and handcrafts, exported all over the world, to more than hundred countries. As the great significance of the textile industrial sectors for the Indian economy, and as the number of clusters operating in this industry, we chose to bring the ready-made garments industrial cluster in Noida as an example of Indian cluster. This is one of the best performing cluster in India, considering that Okhla produces roughly 19 per cent of the total output of ready-made garments of the registered sector and the 16 per cent of the output of the unregistered sector. Although the greatest part of the enterprises operating in the textile sector in Okhla are micro, small and medium size enterprises, mostly in the informal sector, they give a great contribution to the country's GDP. This is why we believe that the ready-made garments industry in Okhla is worth an analysis following a cluster approach.

The Porter's Diamond analysis of the Ready-made cluster in Noida will follow giving special attention to the role of the local government and the challenges for strengthening the Okhla RMG industry cluster.

⁴⁴KyeongAe Choe and Brian Roberts. Competitive Cities in the 21st Century Cluster-Based Local Economic Development. 2011 Asian Development Bank

The structure of the Okhla RMG cluster: analysis based on Porter's Diamond

The Ready-made cluster in Noida built up its competitiveness starting from the Mogul Period. In that period, the need for clothing, dress material, dresses etc. expressed by the kings and their family was the triggering events for the development of the garment industry in Okhla region. In the following years the industry developed its great ability in producing garments creating new designs and adding value to its product with gold and silver wire and artwork. Okhla products became famous in the country as well as abroad. In the British period cotton and silk fabrics maintained their commercial importance. After India's independence in 1947 the industry started flourishing and in the Okhla Industrial Area new units were developed in order to feed the increasing demand's hunger, resulting in the birth of one of the best performing industrial cluster in India.

Following the Porter's Diamond model framework, we will start with the analysis of the factor conditions, which includes the analysis of the factors in Noida area which let the cluster to develop. Among the factors conditions, the backward linkages of the RMG core industry are raw material suppliers, machinery tools suppliers, fabric processors, and packaging material suppliers. The vicinity of suppliers allows the MSMEs in the cluster to have easy and cost-effective access to factors of production. Among the factors conditions there are the availability of cheap labor provided by migrants from Bihar and Uttar Pradesh. Even if the cluster doesn't need highly skilled workers, a number of established education and ICT institutes have been developing in the near Central National Capital Region, acting as catalysts to enrich the human capital base of the cluster. Indeed, since the cluster is opening up towards new foreign markets, even the technology used for manufacturing RMGs is changing according to international standards. Going through the factors analysis, the cluster has access to railways, roads, and airports, including depots to the international market in the Okhla industrial area. Despite that roads and connectivity are in poor condition and so are internal public transport facilities, sewerage infrastructure and electricity supply in the Okhla industrial

area. Further development in the infrastructural field is needed in order to let the cluster further prosper. As regard the demand conditions analysis, the RMG cluster is very dependent on export orders, which represent one of the main source of its development. The challenge is to make the clusters less dependent from exports in order to diminish its vulnerability from external markets shocks. Some figures could render the whole sense: the cluster accounts for 16 per cent of the total apparel exports from India. There are about 50 large export houses in Okhla, which are responsible for most of the cluster's exports. The exports, which includes international brand, go primarily to the European Union Countries, Canada, and the United States. The garment are not high-priced, being positioned at the lowest side of the value-added chain. As regards Relating and supporting Industry, in Okhla area there are eight categories of supplementary industry and activities that support the RMG core cluster: (i) merchants, traders, and manufacturers of fabric, threads, buttons, fittings, etc.; (ii) processing units for cloth and fabric, which do bleaching, dyeing, enzyme work, etc.; (iii) buyers that procure direct export orders and then distribute them within the cluster for manufacturing; (iv) a group of exporters of RMGs that directly export to various countries; (v) garment fabricators that stitch the garments and send them back to the main units for further processing; (vi) machine embroiderers that add value to the main products; (vii) contractors taking garments from the main manufacturers and then distributing them in the nearby localities for embellishment; and (viii) suppliers of machines and tools, machinery repairers, and manufacturers and suppliers of packaging materials⁴⁵. Although the cluster is made up of several complementary and supportive industry there's sign of quality assurance problem within the supply chain networks, as the high rejection rates. This represent another big challenge to face in order to make the network more efficient. Finally, as for firm strategy, structure and rivalry, the manufacturing cluster is made up of mostly micro and small family owned enterprises, which often lack of business competences. The companies are mostly integrated horizontally, while vertical integration is rare because of the small scale of the operations. Product differentiation is still minimal and competition among firms is still based on price. With the globalization several enterprises are given access to new technologies and are experiencing

⁴⁵ Competitive cities in the 21st Century. Cluster-based local economic development. Asian Development Bank (2011). Page 206

economies of scale through enterprise-consortia. This will encourage non-price competition and product differentiation.

As far as the government intervention is concerned, support for the cluster is generally poor. To ensure a healthy growth of the trade in the RMG sector, several government interventions are needed, above all on the excise duty on fabric, the sales tax on local sales, and the high rate of interests on local loans. Several weaknesses have been recorded in business approval system and in the enforcement of business regulation, education and training, and R&D. In order to let the cluster maintain its competitiveness, government support for capacity building and measure for improving quality assurance are urgently needed. To conclude the five factors of Porter’s Diamond model have been represented on a graph (Figure 16), which shows the level of competitiveness of the Okhla RMGs cluster. None of the competitiveness factors in the cluster are good or excellent. This suggests that, to compete internationally, some improvements are necessary and local government should address its policy in order to increase the score of the competitiveness elements. For example improvement are necessary for an easier access to supplier services, education and training facilities, and product improvement services, and brand-building services. Government should act on increasing trust among cluster stakeholders and on creating awareness about inestimable value of the social capital that the adoption of cluster approach could generate.

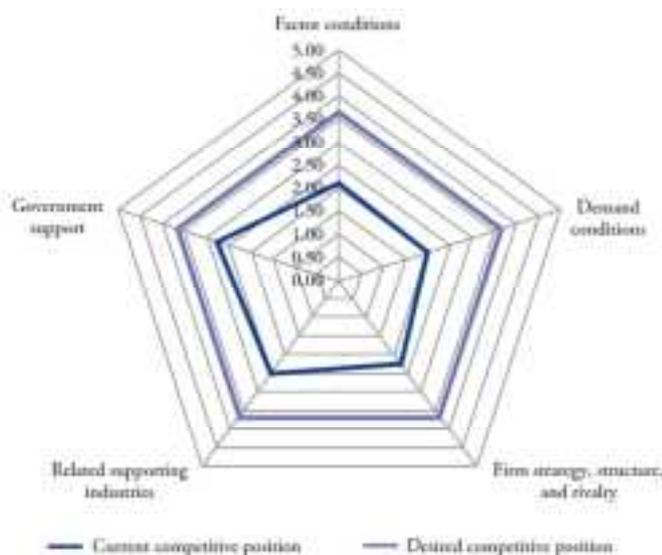


Figure 16 Analysis of the competitiveness of the Okhla Garments industry cluster. Source: “Competitive cities in the 21st Century. Cluster-based local economic development. Asian Development Bank”



Figure 17 *Diamond analysis of Okhla RMGs cluster. Source: Author*

Chapter 4

CHINESE INDUSTRIAL CLUSTERS

4.1 Introduction

In this chapter we will reconstruct the economic geography of industrial clusters in China. The method used to reach our purpose is the same used for the Indian case. So we will start from a brief description of the Chinese industrial environment and its performance in recent years. Then we will focus on the Chinese industrial structure in order to understand how enterprises and employed persons are distributed by Chinese provinces and industrial sectors. This will let us depict the economic geography of industrial activities in China. After that, being industrial cluster an industrial organization model made up for the relevant part of small and medium enterprises (SMEs), some data about small scale industry will be analyzed. Finally we will try to understand how industrial clusters are distributed all over the Chinese territory and which are the main sectors in which they operate. Being a statistical database for Chinese industrial clusters not available we first calculate an “enterprises density index” by region in order to see where industrial enterprises are agglomerated. After this “rough” reconstruction of the economic geography of industrial clusters in China, we will refer to several studies about Chinese industrial clusters in order to gather correspondences with our analysis and to provide further details. A qualitative analysis of the emergence of future industrial clusters in China based on the framework by Thomas Brenner will follow. Clusters development policy implications and future challenges will be also discussed. The chapter will be concluded providing a case-study about the Wenzhou footwear cluster.

4.2 Some data about the Chinese Industry

In the last two decades China has been industrializing at amazing speed, indeed, the most part of the enormous growth that China has experienced is tied to the Chinese industrial sector, and without any doubt to the manufacturing one. Industry gives the

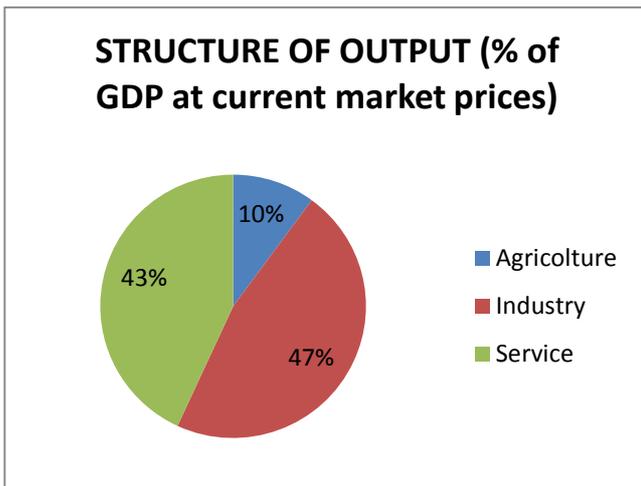


Figure 19 Structure of the output. Source: OECD

biggest contribution to the Chinese output structure (Figure 19), accounting for the 47% of the total output and is the sector with highest rate of growth in terms of output. In 2010 the industrial sector grew at an annual growth rate of 10,6 per cent, recording furthermore the highest percentage in terms of growth of the real value added, which accounted for 12 per cent. The growth rate is

higher than both those ones of the agriculture and the service sector, which grew at a slower pace in terms of output (respectively 4.5 and 8.9%). Observing the recent trend of growth of the value added by sector (Figure 4.2) we notice that industrial sectors had a recovery in respect to the service sector only in recent years. This could be explained with the recent efforts of China in establishing a position in international markets for high-value-added products even if at the moment there's still a long way to go. As it is well-known, China has made its-self known in the international environment as the "global fabric", exploited for its low-wage labor. Indeed, its explosive growth has been

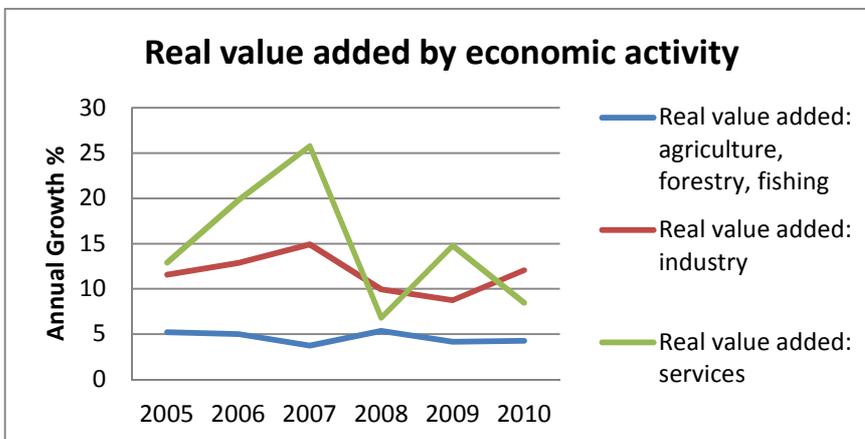


Figure 18 Real value-added by economic activity. Source: OECD

driven by the low-wage manufacture of consumer goods for export. Data about exports conveys the idea: the number of export

products account for the highest share in the world and already by 2005, China had become the leading global exporter in 774 items and was ranking among the top five exporting countries for 1,972 other items (Yang et al. 2006). However many Chinese factories have only supplied OEM (Original equipment manufacturing) products for “global buyers” (Gereffi, 1999) but have not yet establish a position in international markets for innovative and high-value added product. (Hamilton and Feenstra 2006; Hamilton and Petrovic 2006). Thus, one of the most urgent issues for the Chinese government is how to diminish Chinese reliance upon low value-added exports based on low-wage labor and low skill manufacturing. Clusters development could be a good solution for building an “innovative-oriented nation” through the transition from labor intensive and low value-added industries towards hi-tech and higher value-added industries. Clustering has been seen as setting new frontiers for industrial development planning by offering new opportunities pursue a ‘high road to development’ (Pyke and Sengenberger, 1992), in the sense that industrial districts not only enable clustering firms to exploit dynamic competitive advantages deriving from the existence of external economies and collective action (Marshall, 1920; Schmitz, 1999), but also to provide better working conditions and wage levels for labor.⁴⁶ One big obstacle ahead is the dependence of Chinese industry from Foreign Direct Investments (FDI) which have exploited its low-cost labor in the manufacture of consumer products for export. China efforts should be conveyed towards a shift in the way it attracts FDI, increasing its attractiveness for national innovation capabilities. At the time foreign companies investing in China should adopt a shared-value⁴⁷ approach creating both economic and social value.

⁴⁶ Jici Wang and Lixia Mei (2009) Dynamics of labour-intensive clusters in China: Relying on low labour costs or cultivating innovation? International Labour Organization (International Institute for Labour Studies)

⁴⁷ For more details about shared-value see Michael E. Porter and Mark R. Kramer. “Creating shared value- how to reinvent capitalism and unleash a wave of innovation and growth” Harvard Business Review. January-February 2011

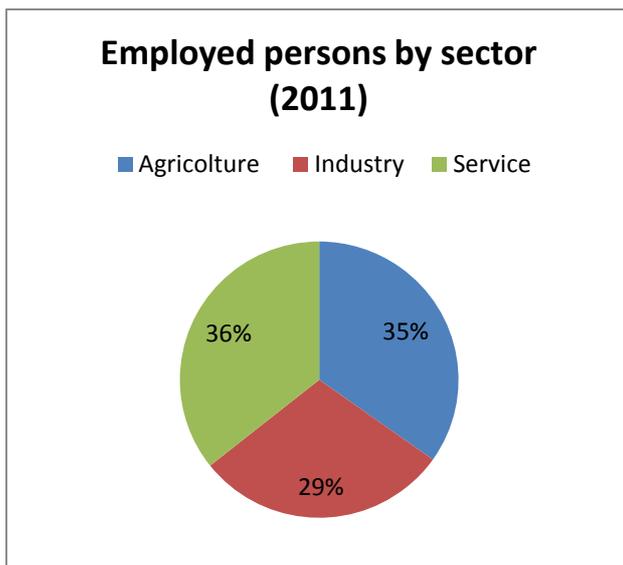


Figure 20 Chinese employment by sector source: BRICS Joint statistical publication 2013

Going ahead with the analysis of industrial data, which will let us reconstruct the economic geography of industrial agglomeration in China, we will analyze some figures about employment and business entities. As for Chinese employment a big share of the population is still employed in the agriculture sector, this is common to quite all the

developing countries, where there're still a lot of underdeveloped areas

whose economy is based primarily on agriculture. The industry sector seems to be that one with the lowest number of employed people recording a share of 29 per cent in comparison with the agriculture and the service sectors which respectively recorded a percentage of 35 and 36. In order to understand which are the industrial sectors where the most part of people are employed and the most part of business entities are concentrated we will analyze data by economic and industrial sector and by Chinese Province. Data are taken from the national Bureau of Statistics of China⁴⁸. The annual statistical survey conducted in China in 2010 reveals that the largest share of employed persons is concentrated in the manufacturing, underlying the vital importance of this sector for the Chinese economy. The manufacturing sector employs more than the 27 per cent of the total employed persons with a distance of more than 10 percentage point from the wholesales and retail trade sector which ranks second for number of persons employed. As we notice from the graph below (Figure 21) the sectors with the highest share of business entities are those which belong to the tertiary one. This data has to be read carefully: business entities operating in the service sector are for the greatest part very small (think about Accommodation and food service). Anyway the number of business entities is huge if compared with the primary and secondary sectors, with Wholesale and retail trade accounting alone for the 60 per cent of the total enterprise in the Chinese

⁴⁸ <http://www.stats.gov.cn/english/> database: <http://219.235.129.58/welcome.do#>

territory. Manufacturing, which ranks first for number of employed persons, ranks fifth for number of business entities after Wholesale & retail trade, Construction, accomodation & food services and Other services. The manufacturing sector ranks first in term of Gross Domestic Product, accounting for more than the 27 per cent in 2010, confirming its dominance in the chinese industry and in the whole chinese economy. On the basis of the analisys of the economic sector what comes to light is that the economic chinese policy should adress a lot of efforts towards a more sustainable development of the manufacturing sector, as it employs the greatest part of the population, is the sector where a number of chinese enterprises run their business and is the biggest sector in term of GDP.

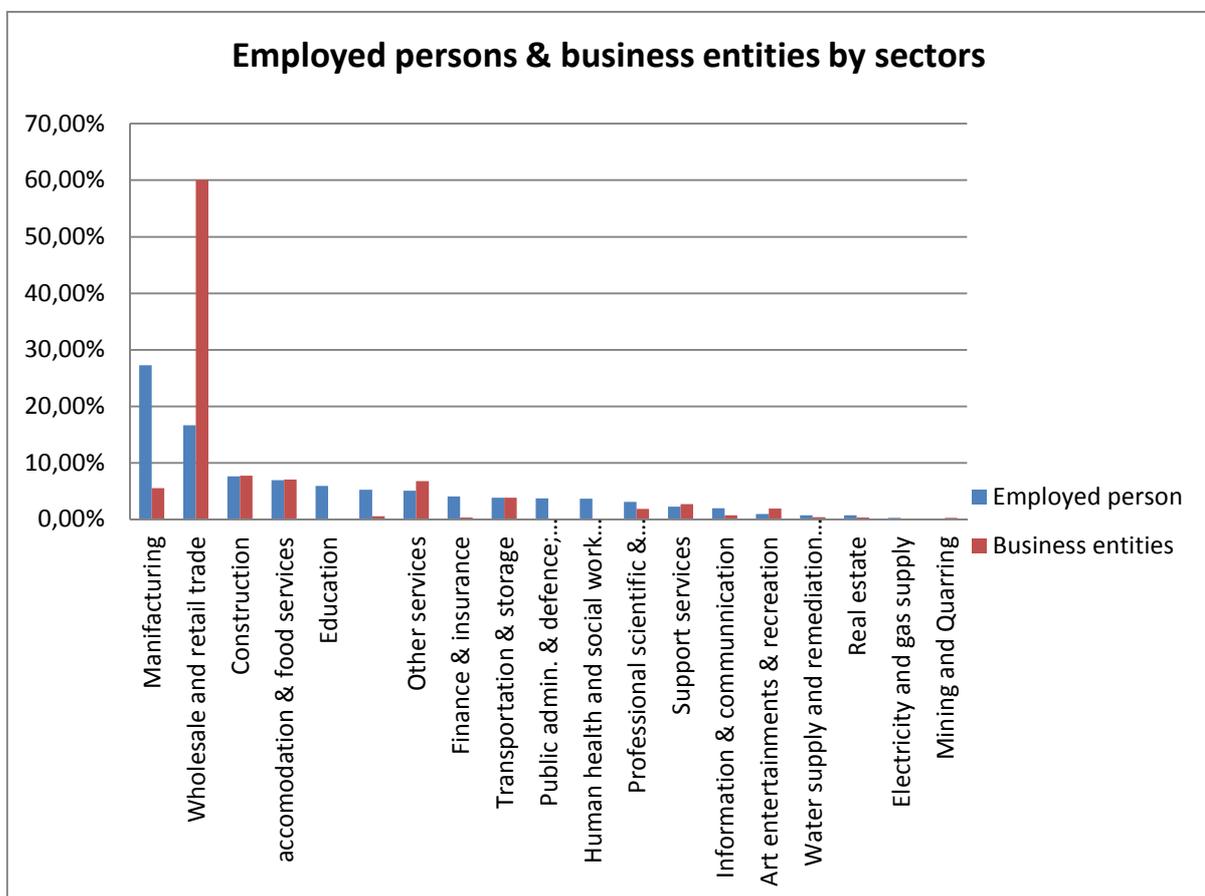


Figure 21 Employed persons and business entities by sector. Source: Statistical Yearbook of the Republic of China 2010

In order to reconstruct the economic geography of industrial clusters in China data about employment and enterprises concentration by region have been analyzed. What

has emerged from the analysis is that economic activities are agglomerated in the East side of the Country. Ten of the 31 province of the Republic of China account for more than 76 per cent of the total number of enterprises and for more than 73 per cent of the Chinese employed persons. Economic activities are very concentrated in few



Figure 22 Map of China: enterprises and employed persons concentration.

provinces. More than half of the total number of the enterprises and the employed persons are agglomerated in five Chinese province: Guangdong, Jiangsu, Shandong, Zhejiang, Henan. (Table 12- Figure 22)

Table 12 Employed persons and business entities by Province. Source: NBS China Statistical database

Main Indicators of Industrial Enterprises above Designated Size (by Region)2011

item	Number of Enterprises(Ge)	Annual Employed Persons (10,000 Persons)	Average Persons	% Enterprises	% annual average employed persons
1	Guangdong	38305	1451,14	11,76%	15,83%
2	Jiangsu	43368	1091,86	13,32%	11,91%
3	Shandong	35813	859,77	11,00%	9,38%
4	Zhejiang	34698	719,4	10,66%	7,85%
5	Henan	18328	547,1	5,63%	5,97%
6	Fujian	14116	403,82	4,34%	4,41%
7	Sichuan	12085	380,48	3,71%	4,15%
8	Liaoning	16914	368,92	5,19%	4,02%
9	Hebei	11570	356,03	3,55%	3,88%
10	Hunan	12477	289,67	3,83%	3,16%

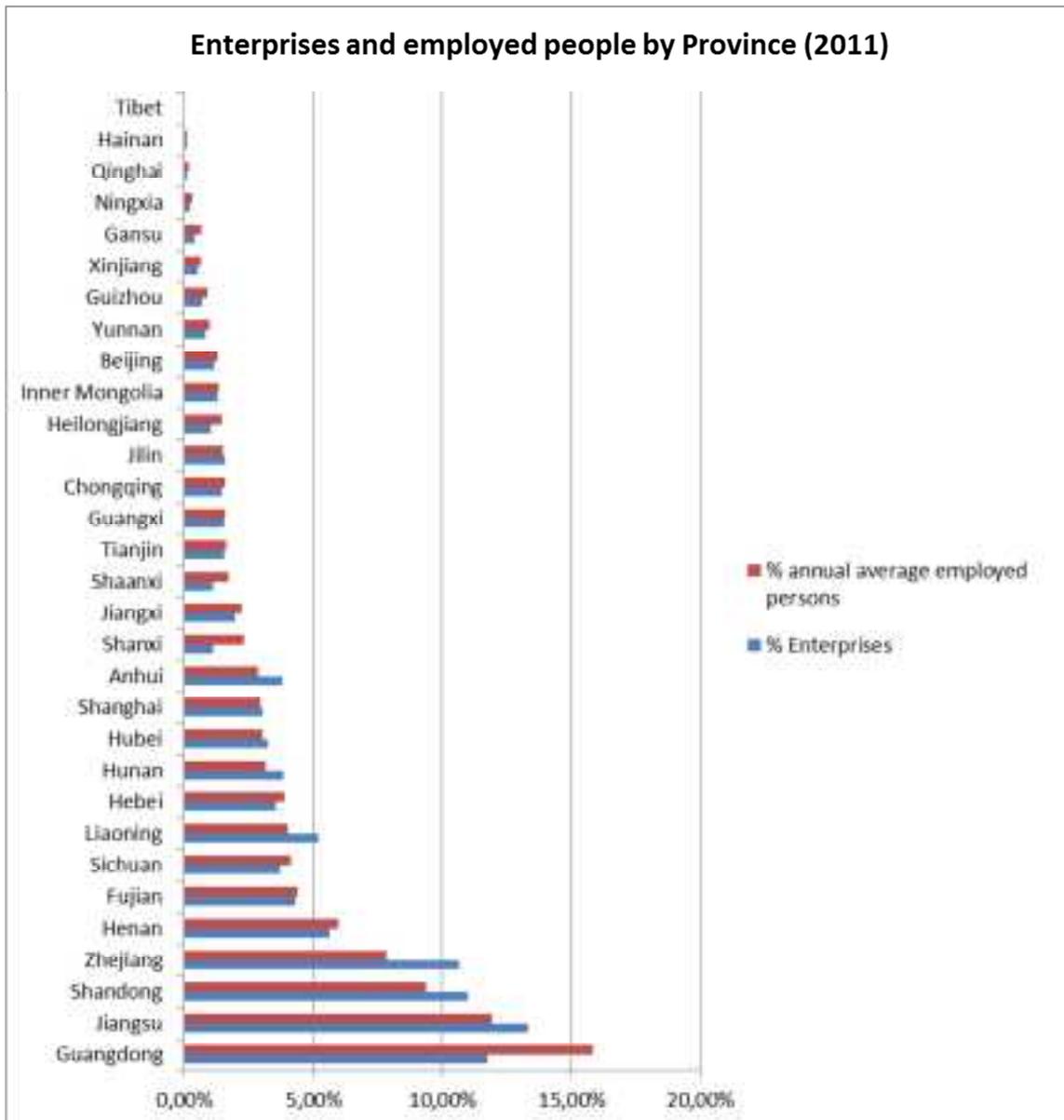


Figure 23 *Employed persons and business entities by Province. Source: NBS China Statistical database.*

4.2 Small and Medium enterprises in China

In the past two decade Small and Medium enterprises (SMEs) have played a great role for the Chinese economy giving a huge contribution to its development. Despite that they still suffer for weak linkages with external market, weak technological innovation, and limited financing, bringing to the fore the need for a SMEs sustainable development policy. Acting on SMEs development it could be possible to unleash a growth process from which the entire Chinese economy could benefit. The importance of SMEs for the Chinese economy emerged starting from the eighties when China opened up to market economy and the major State-owned enterprises (SOEs) changed into SMEs while more other new SMES sprouted, thanks to the adoption of a non-SOEs promotion policy by the Chinese government. Since then Chinese SMEs became vital for Chinese economic growth, considering that they account for the 99 per cent of the total enterprises, their output account for at least 60 per cent of the national GDP and generate more than 82 percent of employment opportunities in China⁴⁹. Following the framework used till now, data about Chinese SMEs by sector and by province will be analyzed.

The criteria for the definition of Chinese SMES are based on the number of employed persons, the total assets and the total revenue as the SME promotion law of China established in 2003. For example an industrial SME is defined as having up to 2000 employees: while a medium size enterprises employs from 301 to 2000 workers, a small one has less than 300 employees. In comparison with other country, Chinese SMEs may be quite large, anyway the vast bulk of SMEs, around 70 per cent, employ 5 people or less or are run by self-employed individuals.

Starting with the analysis of the SMEs distribution by economic sector data reveals that in 2010 more than 50 per cent of Chinese SMEs run their business in the Wholesale and

⁴⁹ Data source: LIU Xiangfeng (2007) SMEs development in China: a policy perspective on SMEs industrial clustering. Economic Research institute for ASEAN and East Asia

Retail Trade sector (51.77%). As we said before in this sector there're a lot of self-employed enterprises, that's why they account for such a great share. Manufacture ranks second accounting for the 10.42 per cent of all SMEs in China (figure 4.7).

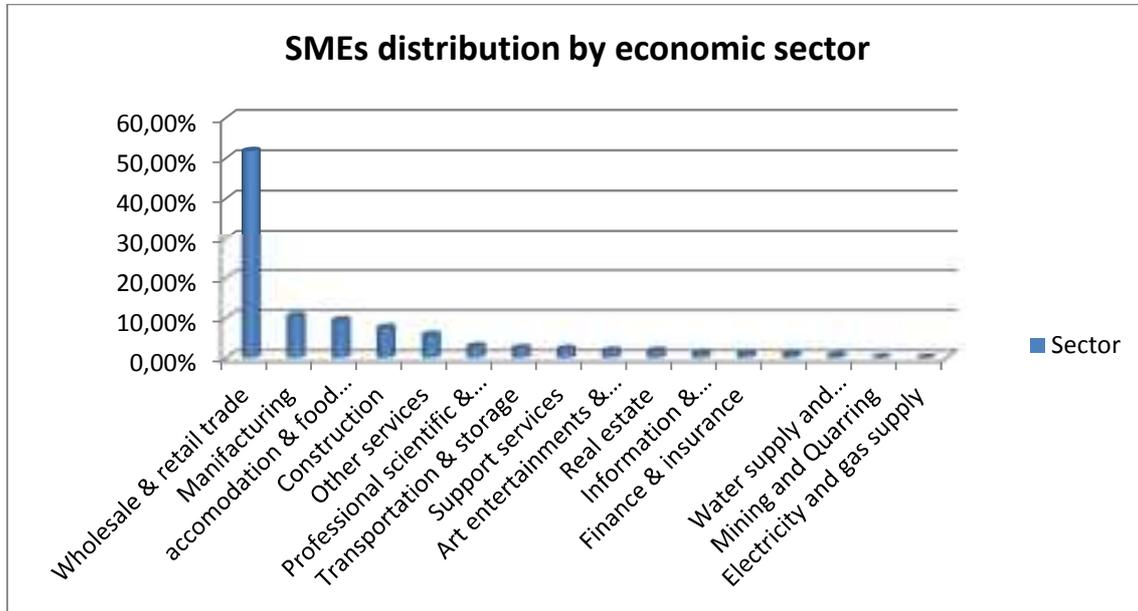


Figure 24 SMEs distribution by economic sector. Source: *Statistical Yearbook of the Republic of China 2010*

Data about regional distribution of SMEs was taken from the first national economic census published in 2005. The graph (Figure 25) below summarizes data about number of SMEs and number of employed persons by province. Although data dates back to 2005 the result of the analysis is almost the same of that one obtained for all the Chinese enterprises: enterprises are all concentrated in the Eastern side of the Country. From the analysis of SMEs in China we can conclude that they are a huge part of the Chinese enterprises and employ a vast bulk of the Chinese labor force, this is why economic policies should embrace actions which have the aim of promoting a sustainable development of the small scale industry. To this end cluster development represent a very powerful tool of economic development of SMEs as it could be a good remedy to some specific concern of the Chinese small scale industry such as the weak linkages with the external markets, weak technological innovation, lack of finance support.

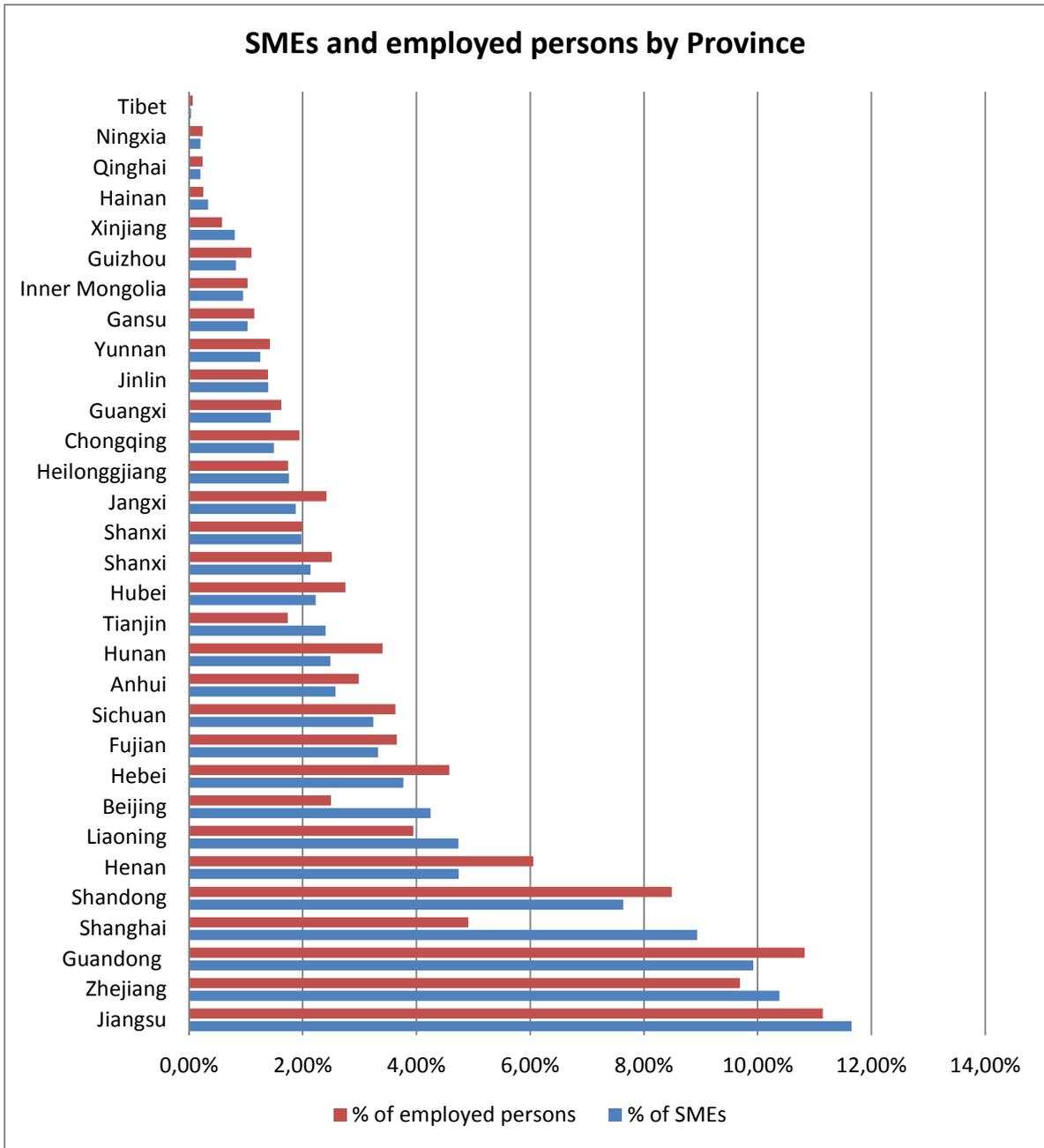


Figure 25 *SMEs and employed persons by Province. Source: SMEs development in China: a policy perspective on SME industrial clustering*

4.4 Economic Geography of Chinese Clusters

4.4.1 Introduction to Chinese clusters

“Buyers from New York to Tokyo want to be able to buy 500,000 pairs of socks all at once, or 300,000 neckties, 100,000 children’s jackets, or 50,000 size 36B bras. Increasingly, the places that best accommodate orders are China’s giant new specialty cities. . . . Each was built to specialize in making just one thing, including some of the most pedestrian of goods: cigarette lighters, badges, neckties, and fasteners. The clusters are one reason China’s shipments of socks to the U.S. have soared from 6 million pairs in 2000 to 670 million pairs last year [2004]”. (Wang 2009)

Chinese clusters have been analyzed by many researchers and scholars as they have been giving a huge contribution to recent impressive economic performance of China. Words in the here above extract, trying to explain the real story behind China’s supply-chain cities, described in the article as “niche cities”, gives an idea of the enormous bulk of items that Chinese manufacturing clusters crank out every day. Without any doubt, one of the reasons for China’s spectacular industrial dynamics in the past decades is the agglomeration of specialized enterprises that sprang up since the reforms in extremely varied forms and deeply affected the development of certain regions (Ganne and Lecler 2009). This industrial development model, characterized by agglomerations of enterprises make up a relevant part of the country competitive advantage, especially in the traditional industry, where China has become the world-leader for a lot of manufacturing products. Although in very recent years there is some evidence about technological intensive clusters growing up in certain areas of the Chinese country, the greatest part of industrial clusters operate in the labor-intensive manufacturing sectors, being the most important driver of China’s rapid export-led

growth. Since the magnitude of industrial clusters in china, it is impossible to examine all of them. In this paragraph an overview about their geographical and sectorial distribution, as well their formation, success factors, and challenges will be depicted. Before starting our analysis, whose aim is reconstructing the economic geography of industrial clusters in China, we want to spend a few words on the way the geography of economic activities has been shaped by the Chinese central and local government, which, since the reforms, created a number of Special Economic Zones (SEZs) on Chinese territory. Although SEZs go beyond our analysis we retain necessary to clarify what they are as it will be useful hereafter to understand the role of government in shaping the Chinese industrial geography and its influence on Chinese industrial clusters development. SEZs are defined as geographically limited areas, usually physically secured, having a single management or administration, and a separate custom area (duty-free benefits), and streamlined procedure (World Bank 2009)⁵⁰. The term SEZ covers a broad range of zones, such as free trade zones, export-processing zones, industrial parks, free ports, enterprise zones, and others. In China, *SEZ* normally refers to seven specific zones: Shenzhen, Zhuhai, Shantou, Xiamen, Hainan, Shanghai Pudong New Area, and Tianjin Binhai New Area. The difference between a SEZ and an industrial cluster is in the process of their formation: while SEZs are normally constructed through a “top-down” approach by government policies, most clusters are formed in an organic way through a “bottom-up” process. Chinese SEZs operate in more technology- and capital-intensive formal sectors and enjoy greater government support, more foreign direct investment (FDI), and stronger links to the global market. Clusters, in contrast, usually operate in the low-technology and labor-intensive sectors with less government support. Many of them are in informal sectors and consist of numerous small and medium enterprises, although some of them are gradually upgrading and moving up the value chains(Douglas Zhihua Zeng,2011). Having clarify the difference between a SEZ and an industrial cluster the analysis of the economic geography of Chinese industrial clusters will follow.

⁵⁰ Douglas Zhihua Zeng (March 2011) How Do Special Economic Zones and Industrial Clusters Drive China’s Rapid Development. The World Bank. Policy Research Working Paper 5583.

4.4.2 Reconstructing the economic geography of Chinese industrial clusters

In this paragraph the economic geography of industrial clusters will be analyzed starting from the calculation of an index which will let us understand where enterprises are concentrated all-over the Chinese territory. As it is well known clusters can't be defined as a mere agglomeration of enterprises operating in the same sectors. Despite that we found useful to understand which Chinese regions are characterized by the higher “*enterprises density index*”. As data about Chinese clusters are difficult to find and a comprehensive statistical database for Chinese clusters doesn't still exist, we believe that the calculation of such an index could be a good starting point in reconstructing the economic geography of Chinese clusters. The index has been calculated dividing the number of registered entities in 2011 by Chinese province by the corresponding sq. km area. As we said before Chinese SMEs account for more than the 99 per cent of the total



Figure 26 Enterprise density index by Province. Source: Author

enterprises, so using data about enterprises without making any scale differentiation was not a problem. We did that because data about registered enterprises existing was more updated than that one about SMEs which date back to 2004-05. Even if it could sound too simple and quite a “rough” tool of evaluation we found a lot of

correspondences with studies carried out on clusters in China. After having calculated the index, the fifteen first provinces by enterprises density were marked on a map of China. Results could be seen on the map. Observing the map some first useful insights come to light: first, economic activities are all agglomerated in the east and south-east coast, second they tend to be concentrated in the vicinity of big cities

(Shanghai, Beijing). (figure 26) Shanghai records the highest value of the index, followed by Tianjin, Jiangsu, Zhejiang, Shandong, Beijing, Guangdong, Fujian, Liaoning and Henan (table 4.2).

Table 13 *Enterprises density index. Source: Author*

Province	N of enterprises (2011)	Sq Km	Enterprises density index
Shanghai	9962	6341	1,571046
Tianjin	5013	11305	0,443432
Jiangsu	43368	102600	0,42269
Zhejiang	34698	102000	0,340176
Shandong	35813	153800	0,232854
Beijing	3746	16800	0,222976
Guangdong	38305	180000	0,212806
Fujian	14116	121300	0,116373
Liaoning	16914	145900	0,115929
Henan	18328	167000	0,109749
Anhui	12432	139700	0,088991
Hebei	11570	187700	0,061641
Hunan	12477	210000	0,059414
Chongqing	4778	82300	0,058056
Hubei	10633	185900	0,057197

In order to verify the correspondence with studies conducted on Chinese clusters, we made a comparison between our analysis and other ones. This let us make a more detailed description of the economic geography of Chinese clusters as, being data about Chinese clusters unavailable, it was not possible to make further statistical analysis about the geographical distribution of clusters. A study conducted by Jici Wang and Lixia Mei⁵¹ about labor-intensive clusters reveals that provinces with the highest number of labor-intensive clusters are Guangdong, Zhejiang, Jiangsu and Fujian and that most of Chinese clusters are located in east-south costal area of China. We believe that, even if this analysis is about labor-intensive clusters, it represents a good picture of Chinese industrial clusters, since they operate mainly in the labor-intensive manufacturing sectors, at the lower end of the global value-chain. This great spatial concentration of economic activities in China is due to its extreme diversity among

⁵¹ Jici Wang, Lixia Mei (2009) Dynamics of labour-intensive clusters in China: Relying on low labour costs or cultivating innovation? International Institute for Labour Studies Geneva

regions which adds a geographical dimension to the process of capability building (Rawski, 2005). Foreign investments, industrial exports, and expansion of manufacturing capability have concentrated in China's dynamics costal area creating numerous industrial clusters in the above-mentioned provinces. Labor intensive clusters were pinpointed through different methods, including quantitative methods such as Location Quotient, which is directly linked to industrial output and employment, or using a combination of qualitative and quantitative methods. Anyway the most significant features considered in order to localize Chinese clusters were geographical proximity and industrial linkages. Jici Wang and Lixia Mei found out that in 2006, 90 per cent of the Chinese labor-intensive industrial clusters were located in 15 provinces. Among the 536 industrial clusters pinpointed in these 15 provinces (Figure 27), the average scale per cluster included 923 enterprises, 5 billion Yuan sales revenues, and 51883 workers. As you can see from the graph (figure 27)

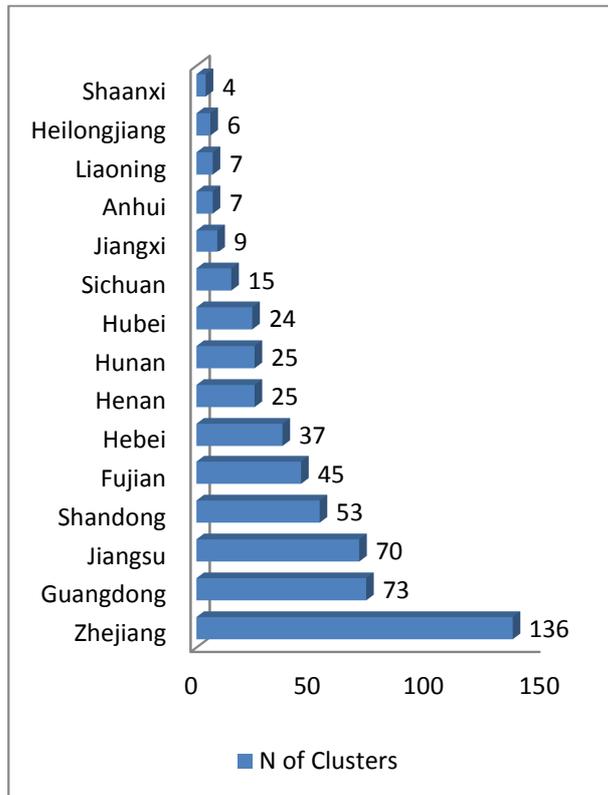


Figure 27 Labor-intensive clusters distribution in 15 Chinese Provinces. Source: *Dynamics of labor-intensive clusters in China: Relying on low labor costs or cultivating innovation?*

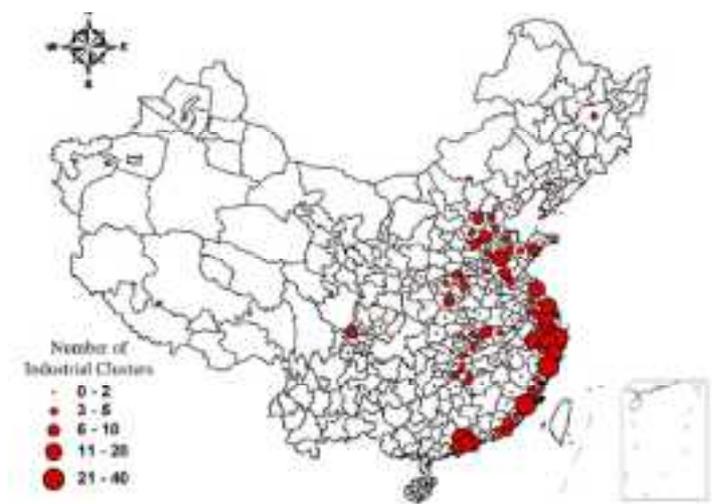


Figure 28 Geographical distribution of industrial clusters in China. Source: *Dynamics of labor-intensive clusters in China: Relying on low labor costs or cultivating innovation?*

labor-intensive clusters are unevenly distributed among the 15 selected Chinese provinces and remain concentrated in the province with higher GDP. The majority of the industrial clusters in China are concentrated in the coastal region, especially in Zhejiang, Guangdong, Fujian, and Jiangsu provinces. At the beginning of the 21st century, a quarter of the 404 administrative towns in the Pearl River Delta in Guangdong made up some 100 clusters of specialized activity. The province of Zhejiang, for example, possesses more than 300 clusters, which, in terms of production capacity, might have entered the world's top 10 in their sectors, respectively, with more than 100 others in second position (Ganne and Lecler 2009).⁵²Worth to notice is the gap in the number of clusters between coastal regions and inner ones, much poorer than those in the eastern and south-eastern side of the Country. Thus, demonstrating poor economic performance and lagging behind other provinces in term of reforms, inland provinces have only a few clusters. This resulted from our previous analysis too. Indeed looking at both maps, that one obtained from the analysis of the *enterprises density index* and that one obtain from the study conducted by Jici Wang and Lixia (figure 29), they are very similar.

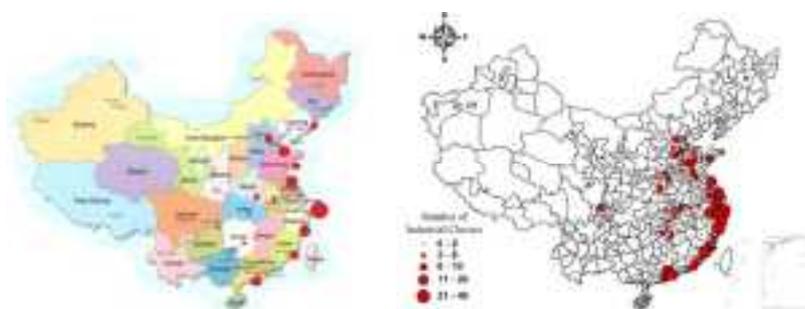


Figure 29 Economic geography of industrial cluster in China

As for clusters distribution by industrial sectors, studies have revealed that they are pervasive in sectors such as apparel, footwear, furniture, TV set, home electrical appliances, toys and motorcycles which are all labor-intensive sectors.

Because of the lack of data about industrial clusters in China, it is hard to make statistical analysis about both the geographical and sectorial distribution, and as a

⁵²Douglas Zhihua Zeng (March 2011) How Do Special Economic Zones and Industrial Clusters Drive China's Rapid Development. The World Bank. Policy Research Working Paper 5583.

consequence it is hard to quantify the overall contribution of clusters to economic development. Some example drawn by a World Bank's research provide us a bird's-eye views: In 2003, more than 20,000 companies in the footwear clusters in China produced some 6 billion pairs of shoes of various kinds, of which more than 3.87 billion pairs with a total value of US\$9.47 billion were exported. Sixty percent of the shoes made in China entered the international market, accounting for 25 percent of the total turnover of the shoe industry in the world. Currently, only Wenzhou's footwear products account for one-quarter of China's and one-eighth of the world's total, with more than 300,000 employees. Again, In the Dalang apparel cluster in Guangdong Province, nearly 2,000 woolen firms with more than 100,000 workers produce some 200 million sets of sweaters, which account for 30 percent of the domestic market. In the Datang socks cluster in Zhejiang Province, nearly 5,000 firms plus 1,600 shops employ about 90 percent of the residents of the town. Hangji, a town of 120 square kilometers and a population of 35,000 people in Jiangsu Province, produce 30 percent of the world's toothbrushes and 80 percent of China's (Wang 2009). In 2007, 228 clusters in Guangdong, with a GDP of RMB 765 billion, accounted for 25 percent of the total provincial GDP and about 8 percent of the total employment.⁵³ These examples give an idea of the importance of these clusters for the economy of the provinces which host them, becoming their main economic driver.

⁵³ Douglas Zhihua Zeng (March 2011) How Do Special Economic Zones and Industrial Clusters Drive China's Rapid Development (page 25-26). The World Bank. Policy Research Working Paper 5583.

4.6 Chinese cluster development policy

Despite the extraordinary success that Chinese industrial clusters have known in recent years there're a lot of challenges to sustain their success and to lead them towards a more sustainable development. Among the challenges that China will face in next years the most compelling are those ones concerning the moving up in the Global Value Chain, the sustainability of export-led growth, the environmental and social issue and challenges directly linked to the clusters structure. Go in order, as regards the moving up in the global value chain, as argued before, the most part of clusters in China still compete mainly on low-cost manufacturing at the low end of the global value chain. As a result many firms in China have to deal with a fierce price competition, the so called "racing to the bottom". This cutthroat competition lead to the diffusion of illegal means, such as using fake or cheap materials. In the long run, such a situation will adversely affect the future development of these clusters and could even cause them to simply wither away (Douglas Zhihua Zeng, 2011). Second, the challenge about the sustainability of export-led growth consists in making Chinese clusters less vulnerable to global market shocks due to china's heavy export orientation. Furthermore a growth model tightly tied to the volume of exports often makes China a target of antidumping and trade lawsuits. Thus, all these issues are creating urgency for a more sustainable export growth model in China. Third, the environmental issue is becoming an even more urgent challenge to face, since the China's growth model based on low technology and labor and resources-intensive manufacturing. The serious water, air, and land pollution and the huge amount of industrial waste, and at the same time the increasingly tough eco-standards set by industrial countries for products exported from developing countries, are calling Chinese government for particular attention. Simultaneously it is necessary to make such a resources-intensive industrial model more sustainable, as energy resources such as oil, water, and electricity have all become more expensive and limited. Another important challenge is the lagging social development as many

industrial clusters are still lagging behind providing commensurate social services. Many cluster locations in China do not have sufficient health and education services and lack of public transportation and infrastructures to host their rising population. Finally, directly linked to clusters structure are the challenges concerning fragmentation and lack of horizontal linkages inside the clusters and among them, due to the adoption of the model “one product per village and one sector per town”. How to integrate similar sectors throughout a city, a province, or a region into a larger value chain so that they can achieve greater economies of scale and have a deeper capacity for innovation is a real question (Douglas Zhihua Zeng, 2011). Finally another urgent issue that Chinese clusters are facing is the lack of skilled technical and managerial personnel that will constrain clusters growth and ability to upgrade.

Given these major challenges, China should address its industrial policy towards a more sustainable development of its industrial cluster system. The way China will achieve this goal is a very complicated issue. Anyway, some policy implications which could be useful in order to achieve a more sustainable competitive growth model of Chinese industrial clusters will follow:

First of all a policy which aims to gradually move towards a more knowledge and technology-based development model is extremely necessary in order to let Chinese industrial clusters maintain their competitive edge. This will let to achieve a higher level of the global value chain. Second, Chinese government should promote policies that incite industrial clusters to put more emphasis on domestic markets and consumption as a source of growth. This will let China to retain in the country part of the growth, which will be disseminated outside, if all Chinese clusters continue to give priority to external markets. With a middle class rapidly emerging, China might be able to increase the share of domestic consumption as source of growth. This will not only let China to become less vulnerable to international market shocks but also it will trigger a self-augmenting growth process generating progress and development for the large part of the Chinese population which is still living in poor conditions. Furthermore cluster development policies should be able to upgrade industrial clusters through technological innovation and learning. This will require a comprehensive approach which involves: strengthening intellectual property right protection, providing the right incentives or

pressures for enterprise-led innovation, improving SMEs innovation capacity supporting activities that have the characteristic of public good (human resources management, skills training and vocational education) through professional services organizations such as industrial associations on the basis of a private-public partnership. In this context policy promoting interaction between firms and universities and strengthening the financial sector, especially the ecosystem of the venture capital industry, are extremely important issues as well. Finally, in order to face the environmental challenge, development policies should act on implementing strict environmental standards. Adapting such an approach will not only improve the environment and focus on quality rather than quantity, but also will make Chinese firms more competitive and more willing in investing in environmental and energy related innovations.

4.5 Chinese cluster: main qualitative features

In this paragraph a brief qualitative analysis of Chinese industrial clusters will follow. To do that we will refer to the analytical framework by T. Brenner which have been discussed in chapter 1. This will be useful in order to identify relevant qualitative features of the industrial cluster system in China and to get some insights about the emergence and development of further industrial clusters.

First, as regards prerequisites for the emergence of industrial cluster in China some significant observations are:

- Starting with natural-environmental and geographical prerequisites, China, as the most part of the emerging countries, can count on an extremely reach natural resource endowment. Such factors are especially important for natural resource-based clusters, such as those in seafood processing, fruits, stone carving, aquaculture, ceramics, and furniture, among others, in Guangdong Province. If we considered labor force as a natural resources, this is the real comparative advantage of China, which is responsible for its supremacy in the global manufacturing market. One of the most important resources that clusters can leverage is the abundant low cost, but relative educated labor force. This is the main factors which has caused the extraordinary inflow of FDIs in the last decades.
- As regards the type of region another prerequisite is the proximity to major local markets and infrastructure. In general the greatest part of industrial clusters are located in the coastal region, close to international markets. Being located in the proximity of the coast permit furthermore to exploit natural transport infrastructures, which represent another prerequisite for the emergence of industrial clusters. So it's not surprising that the most part of economic activities in China are concentrated on the East, South-east areas of the country. In

addition, they are also generally based in a town or major city and are thus close to main roads, railways, highways, and ports. This location prerequisite is especially important for export-oriented clusters.

- As regards quality of life as a prerequisite for the emergence of industrial clusters, we know from the first chapter that it represent a prerequisite for the emergence of innovative and high-technological clusters, as highly skilled people prefer an environment which offer high quality of life standards. Although in the past this prerequisite was not the main cause of the emergence of Chinese cluster, for the most part of the high intensive labor and low-tech clusters, it is a prerequisite of great relevance for the emergence of further industrial clusters more innovative oriented and positioned on a higher level of the value-added chain. As for many developing countries, disparities between urban and rural areas still remain very marked. As a result, emergence of more upgraded industrial clusters will be more likely in the vicinity of urban areas where quality of life standard are higher.
- As for the prerequisites tied to the business environment the main features are: first Foreign Direct Investment have played a great role acting as a prerequisite for the emergence of industrial clusters, and consequently as an important self-augmenting process ensuring the continuous growth of export-oriented clusters. Clusters benefiting from FDI are concentrated mostly on the eastern side of the Pearl River Delta region, in the Dongguan, Huizhou, and Shenzhen areas. The economies of these clusters are driven mainly by overseas Chinese and foreign firms because of the region's proximity to Hong Kong, seat of many big foreign companies. Second, the market pull which have characterize the period when Chinese planned economic system was dismantled, acted as one of the most powerful prerequisite for the emergence of Chinese industrial clusters. When China was first opened up, there was a huge shortage of almost everything. As a consequence the desperate market needs provided a powerful reason for the existing of numerous clusters that sprang up in a short period of time (Douglas Zihua Zeng, 2011). Third, the fast growing middle class is arising new needs, which will translate in a growing demand for middle-class consuming product.

This will act as a prerequisite for the emergence of new industrial clusters and for the up-grading of existing one.

- In the matter of political prerequisites, the Open Door Policy and reforms of the last thirty years of the XX century played an essential role. They provided a macro-environment that allowed the private sector to flourish and foreign investment to enter China. Before the reforms, all private businesses were officially forbidden (Douglas Zhihua Zeng, 2011). This let Chinese economy to definitively change direction.
- Finally Chinese “*cultware*” prerequisites include: First, Chinese long history of production or business activities in a particular sector, since business activities in a given sector preceded many Chinese clusters. For example, the Wenzhou footwear cluster in Zhejiang Province has a long history of shoemaking, dating back to 422 AD, and has built up local production capacity over time; the textile industry in Xiqiao, in Guangdong Province, first prospered during the Tang Dynasty (618–907 AD) and peaked in the Ming Dynasty (1368–1644 AD) and thus had accumulated strong capacity in silk and yarn production before the reform; and the toothbrush industry in Hangji, Jiangsu Province, dates back to the Qing Dynasty (1644–1911 AD) (Wang 2009). Second, the long tradition and knowledge passed down from generation to generation through family and kinship ties have played important roles in cluster formation. To this category of prerequisites belong the entrepreneurial spirits typical of certain area of China. For example, the Wenzhou people are especially well known for their willingness to take risks and to learn through trial and error, which provided an essential ingredient to their success. Thus, we can state that tradition, culture and history have given great contribution in shaping the economic geography of China.

Second, among the main triggering events which let many Chinese industrial clusters to arise, the most significant are those tied with the numerous policy introduced in recent year for the development of industrial clusters. Great impact had the historical momentum characterize by the economic liberalization.

Third, clusters survive and succeed mainly because they are able to increase the diversity and sophistication of their business activities to achieve greater productivity and efficiency. In an export-led growth model, this ability is especially important (Douglas Zhihua Zeng, 2011). This ability refer to the self-augmenting processes, which could by summarized as follow:

- The high technically divisible of the production process which let to obtain high efficiency gains and lower barrier to entry. In Chinese clusters each small and medium enterprise (SME) tends to cover an individual phase of production and is connected by specialized transaction networks to coordinate inter-firm cooperation. As regards business interaction other important aspects consist in the knowledge network and forward and backward linkages establishing among firms in a cluster. In Chinese clusters many firms obtained help from their upstream enterprises. For example, many clusters benefited from state-owned enterprises (SOEs) and FDI, which provided important initial technology and a crucial impetus for the clusters' development. In addition, many clusters in the coastal region, especially those in the Pearl River Delta, were driven by FDI, especially from the diaspora in Hong Kong, Macao, and Taiwan (Douglas Zhihua Zeng, 2011).
- As for public-private interactions, political support is an extremely important factor which let Chinese clusters to experience a continuous growth. Their success is indeed inseparable from government's strong support and nurturing, which came in the middle or later stages when cluster has demonstrated its economic potential. The multifaceted government support has the primary objective of building a good business environment acting on the market failure and on externalities areas, such as infrastructure building; regulation, quality assurance and standards setting; technology, skills and innovation support; foreseeing of preferential policies and financial support in order to attract qualified enterprises to the cluster through the offer of certain incentives, including desirable land, tax reduction or exemption, and access to credits and loans. Other important interactions are those one existing with knowledge and educational institution which provide innovation and technology support to the clusters. In the case of Wenzhou, Wenzhou University has played an important

role in supporting technology innovation in the footwear and other clusters. Finally self-augmenting processes are generated through interaction with industrial associations and other intermediary organizations, even though this type of interaction is a recent phenomenon in China.

- To the other types of interaction belong those ones regarding social interaction. An important feature of China business environment is played by social networks which act as a self-augmenting process in cluster development. Indeed most SMEs prefer oral agreements which build their power on the fierce market competition and informal enforcement mechanisms such as community ties, reputation, opportunity cost of losing business, and so forth.

4.7 Case-study: Wenzhou footwear sector

The formation of the Wenzhou shoemaking industry in China dates back to 422AD, and over time has built highly networked local production and capabilities for innovation. It has known a fast pace growth since the reform and the opening up of China, which has led to a strong process of industrialization and to the formation of one of the biggest and best performing Chinese industrial cluster. The process of development could be divided into three phases: the “family workshop” stage, the clustering stage and the relocation and expansion stage⁵⁴. The first phase began with the opening up of China when local families with specialties in shoemaking, taking advantage of the reform and the new liberalization policy , started low-end businesses in the 1980s leading to the formation of a rural cluster in Wenzhou. Thanks to low costs and low risks many family workshops sprouted up in this areas. However some problems came along with the prosperity of the shoe manufacturing industry due to inferior shoes made by profiteers which led Wenzhou products to lose their reputation. In order to solve this problem some strict regulations were imposed and significant progress in improving the quality of the shoe manufactured in Wenzhou was made. The following phase was the clustering stage which began in the late 1980s and last up to the late 90s. At the beginning the clustering process was spontaneous with small family workshops relocating in or close to the town. This gathering processes led further shoemaking firms and cluster-support firms to locate in Wenzhou, generating the network of specialized family workshops, and later forming the rudimentary shoe manufacturing cluster. As the cluster was becoming bigger and bigger and even more important for the economy of Wenzhou, the involvement of the local government was necessary for guidance of quality standardization, a better infrastructure environment for scaling up production, more convenient transportation for reducing cost, and more advanced

⁵⁴ See Building engines for growth and competitiveness in China: Experience with special economic zones and industrial clusters. World bank publication p. 177

channel of communication. Since the 1990s, the local administration of Wenzhou has played an active role for the development of the shoe manufacturing cluster. The third phase is characterized by the outwards expansion, both domestically and overseas, of firms in the footwear manufacturing cluster. Several factors contributed to this relocation and expansion, namely, the tension among the supply of local industrial land, the increase in labor costs, and the investment attraction of other cities in China. Even if Wenzhou shoe manufacturing cluster is one of the most developed and highest performing cluster in China, its further development could be threatened by some endogenous problem, namely, the high cost of land in Wenzhou area and the shortage of skilled labor. Indeed the price of land is too high for small and medium enterprises, this is why they choose to locate in cheaper provinces; the other reason for firms relocation is the lack of specialized skills, as the high real estate prices and the low quality of research institution make Wenzhou less attractive for talents than other location, such as Shanghai, Guangzhou and Shenzhen. Solving these endogenous problems is the present main challenge of Wenzhou cluster in order to remain competitive.

The structure of the Wenzhou Footwear Clusters: analysis based on Porter's Diamond

Wenzhou is home to more than 4000 footwear manufacturing firms and is the largest footwear manufacturing city in China. Firms in the cluster have achieved an inter-organizational division of labor, cooperation, and intensive interconnections and have shared the rapid growth of the industry. In an illustration of their success, more than 30 firms in Wenzhou have an output of more than RMB 100 million per year; 70 per cent of the top 30 domestic high-selling footwear firms are from Wenzhou. The output of the footwear industry in Wenzhou in 2007 reached more than 890 million pairs, which accounted for approximately 25 per cent of domestic output in 2007. Nowadays, Wenzhou's footwear products account for one-fourth of China's and one-eighth of the

world footwear products, and the footwear sector is becoming a vibrant manufacturing cluster with more than 300000 employees(Jici Wang, 2011)⁵⁵.

Following the framework of the Porter's diamond model the structure and the competitiveness of Wenzhou industrial cluster will be analyzed. We will start from "Relating and supporting industry", consisting in the presence of capable, locally based suppliers and the presence of competitive related industry, which is one of the most relevant factor of Wenzhou competitiveness. Indeed, Wenzhou manufacturing firms benefit from the presence of specialized supplier markets, among which the most important is the Wenzhou shoe-material market, located in the town of Quxi, 7 kilometers from the Wenzhou freight train station. This market has specialized in leather trade since 1991 and now has 235 leather trading room and 60 stores with sufficient support facilities. As regards relating and supporting industry another important element for the competitiveness of Wenzhou cluster is the strong relationship of manufacturing firms with specialized market for wholesaling and retailing. On the basis of the personal connection of domestic and overseas Wenzhou entrepreneurs, the footwear industry in Wenzhou has built up a global sales network consisting in global buyers, export agencies, and retailers. The sales networks encourages firms in Wenzhou to cooperate with each other to expand into the mature market and enter new ones. Analyzing the context for firm strategy and rivalry the following features have emerged: firms in Wenzhou clusters, which are for the most part small and medium scale ones, tend to cover an individual phase of production thanks to the highly technically divisibility of the production process. Every firm in the cluster is connected by specialized transaction networks coordinated by more or less explicit forms of cooperation. This clear division of labor and close cooperation, defined by a Chinese economist as a "swarm effect", represent the key of success of Wenzhou manufacturing cluster, where a clear sectorial division of the production process in five key sectors could be observed. The five key sectors are the following: leather production, sole production, shoe adorning, last production, and shoemaking machinery. Other features about the context for firm strategy and rivalry is the high entrepreneurial spirits of

⁵⁵ Building engines for growth and competitiveness in China: Experience with special economic zones and industrial clusters. World bank publication p. 180

Wenzhou people which make Wenzhou business environment more competitive, and the attitude of Wenzhou business people of exporting through solid networks of domestic and foreign markets. As for the demand conditions, the main feature of Wenzhou cluster is the capacity of its business people and entrepreneurs to foresee changing markets of shoe products. The factor (input) conditions, that represent the fourth diamond point, is characterized by the presence of specialized urban and rural markets which supply the raw materials for shoe manufacturing. Analyzing the structure of the Wenzhou footwear clusters special attention is given to the cluster's supporting institutions and the industry associations, which have strengthened the competence of Wenzhou cluster in technology innovation, sales, and product quality control. In addition, university and research institutions play an important role in supporting technology innovation in footwear manufacturing in Wenzhou. Wenzhou association of footwear industry, created in 1988, has given all along a great impact on the development of Wenzhou cluster as it acts as the bridge between the government and its members, and enhances the reputation of the Wenzhou shoes products. In recent years, in order to solve the problem of shortage of skilled labor, Wenzhou University has put much effort into research on innovations in leather production and cooperated with several firms in the industry to set up the Leather Production Technology Research Center of Wenzhou. The center concentrated on green industrial production development and other high-tech research in leather production in order to face the global challenge. A key role in the cluster is played by the local government, which has formulated a strategic plan in order to upgrade the firms' capacity of management and technological innovation.

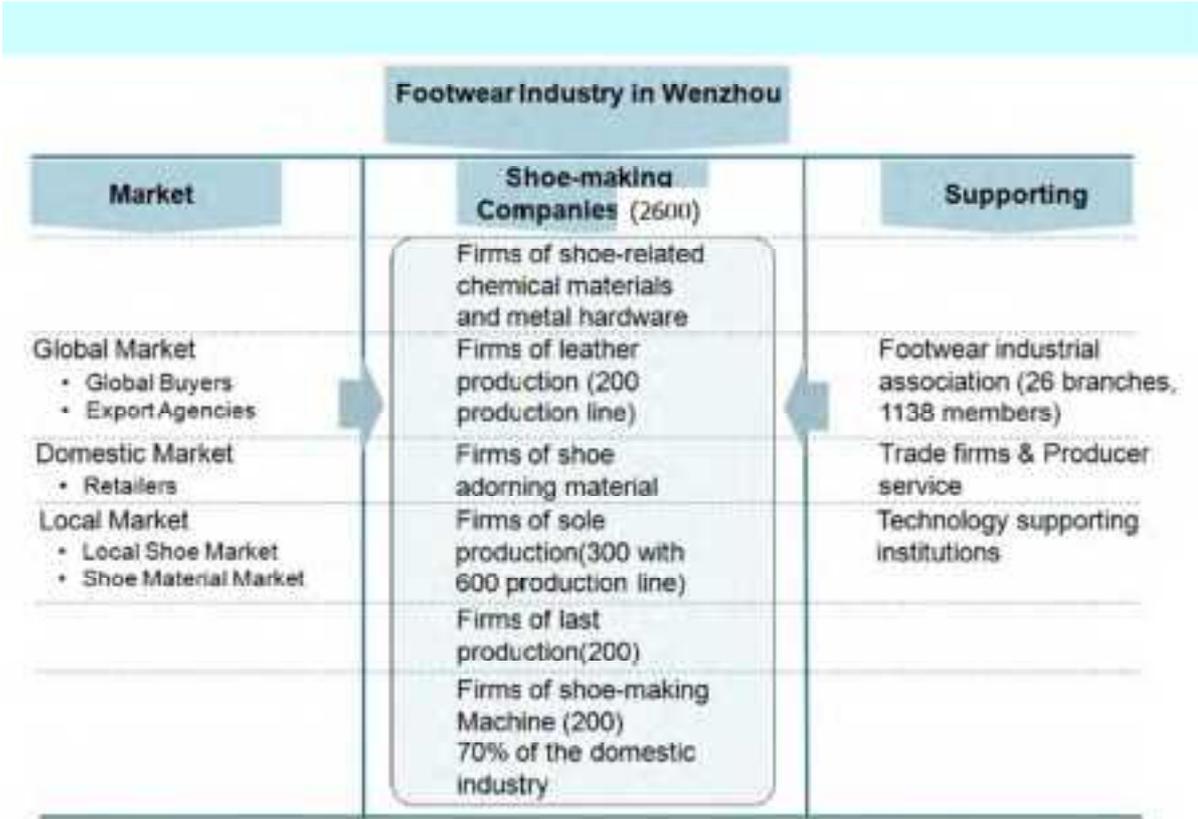


Figure 30 Structure of Wenzhou footwear cluster. Source: World bank

Diamond analysis of Wenzhou footwear cluster

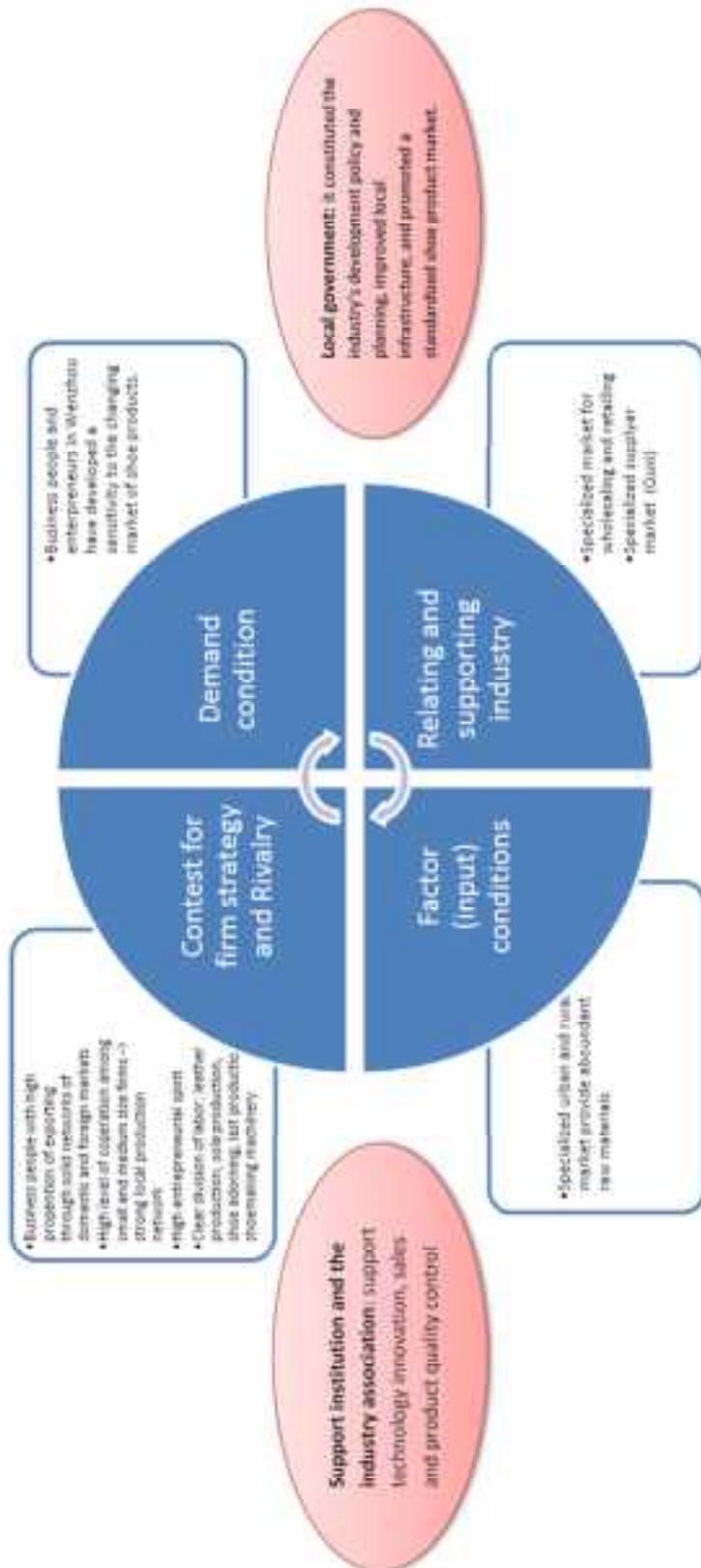


Figure 31 Diamond analysis of the Wenzhou footwear cluster. Source: Author

Chapter 5

BRAZILIAN INDUSTRIAL CLUSTERS

5.1 Introduction

In this chapter the economic geography of industrial clusters in Brazil will be analyzed. To do that we will start from the analysis of the Brazilian industrial structure and will go ahead with a focus on Brazilian clusters. First of all the main features of the current industrial scenario in Brazil will be described, in order to understand in which direction the future industrial policy measures will go. After that the Brazilian industrial structure will be analyzed: we will try to illustrate how employed persons and enterprises are distributed by economic sector and geographical area with a focus on the manufacturing sector. As clusters are industrial organizational models which involve the small scale industry, the Brazilian small scale sector will be analyzed. Then the crucial part of the chapter will follow with the analysis of industrial clusters in Brazil. Data about clusters will be observed in order to map them and to understand which further evolutions are more expected to take place. After that a paragraph on Brazilian policy for cluster supporting and development, and a qualitative analysis about industrial clusters on the basis of the analytical framework by T.Brenner will follow. The chapter will end with a case-study: the footwear cluster in Vale do Synos will be analyzed on the basis of the diamond model by M.E. Porter. The cluster was chosen because it is an example of how Brazil is trying to enhance its competitiveness and to upgrade in the Global-value-chain.

5.2 Some data about the Brazilian Industry

Brazilian industry is facing a great challenge in this moment, indeed, since the last year Brazilian government is adopting specific measures in order to convey its efforts towards a more sustainable development of Brazilian industry. In this way, its global competitiveness will be enhanced. In recent years the industrial sector has suffered a lot because of the global crisis, the overvalued exchange rate, the infrastructural shortage and the strong fiscal pressure. All these factors have undermined the once-flourishing industrial sector, as a consequence data about industrial performance are quite far to be brilliant with a growth rate of only 1.6 per cent in 2011. The drop of the Brazilian industrial pace asks for compelling action in order to overcome the obstacles mining Brazilian competitiveness. This is the reasons for the recent new Brazilian industrial policy which aim to foster innovation and industrial financing, facilitate investments, and renovate industrial property rights. Despite that, as Robson Braga de Andrade, CNI⁵⁶ president, said recently, there's still a lot to do ahead. The action of the CNI for building Brazilian global competitiveness is driven by the sustainable development aim: "industry should be strong and brave"⁵⁷ said Robson Braga de Andrade, it would be able to generate jobs and wealth for the Country, and to be competitive in the global market, where the new foreign competitors are even more aggressive. Before to analyze the Brazilian industrial structure, some data about its recent performance will be depicted. This will be useful in order to understand, afterwards, the role that industrial clusters could play for the Brazilian industrial development. Brazilian economy recorded a great drop in 2011: the annual internal growth (GDP) accounted for 2.7 per cent, in contrast with the 7.5 per cent recorded the previous year. This contrast is more evident for the industrial sector: the growth of the industry was lower than the Gross Domestic Product one, passing from a two-digit rate (10.4%) to a rate of less than 2 per cent! The major causes of this downturn are the drop of the family consumptions due to the adoption of policy measures aiming to contrast inflationary pressure, and the worsening

⁵⁶ CNI, National Confederation of Industry. <http://www.portaldaindustria.com.br/>

⁵⁷ RELATORIO ANUAL 2011, CONFEDERACAO NACIONAL DA INDUSTRIA – CNI

of the global crises that led to a loss of faith in the Brazilian industrial sector. (Figure 5.1)

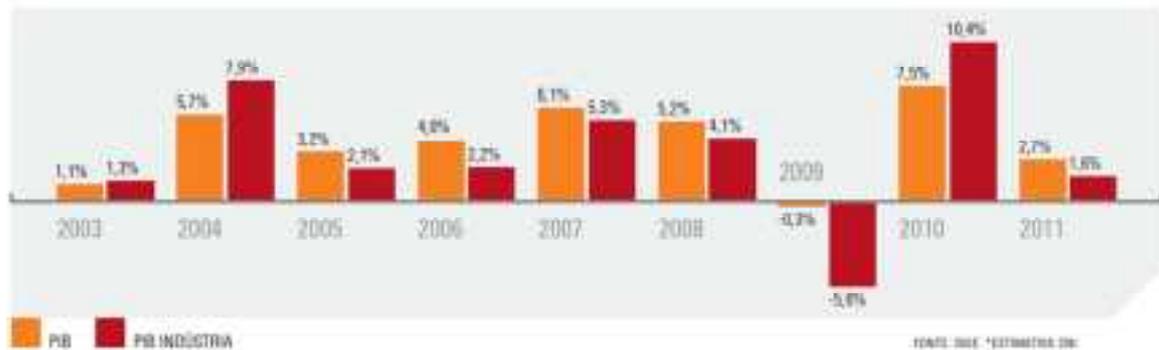


Figure 33 GDP and Industry GDP annual variation. Source: Relatório de atividades- 2011, CNI

The same conclusion could be drawn looking at data about the value added by the industrial sector as a percentage of the GDP with a small difference: since 2011, industrial sector have made a little progress changing the course of its action (Figure 5.2)

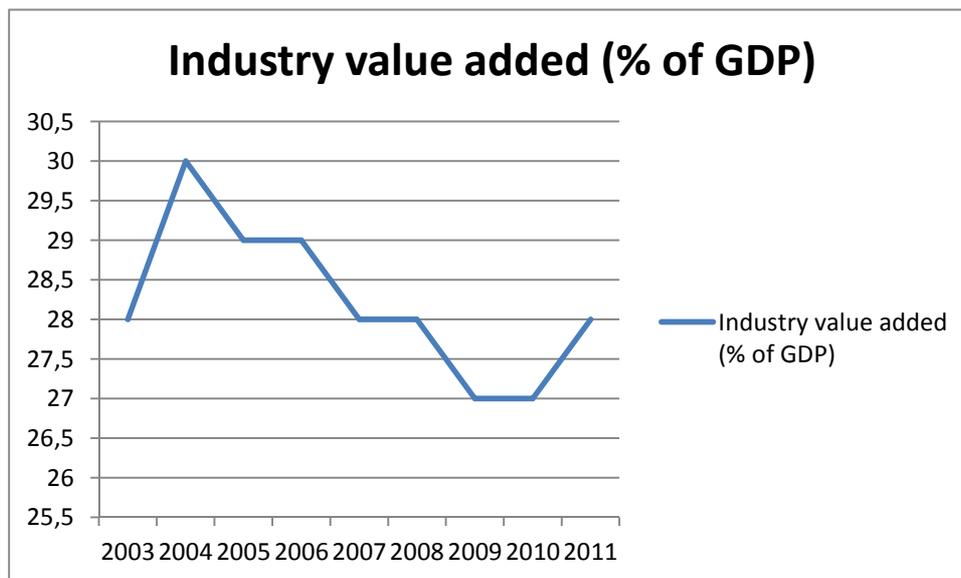


Figure 32 Industry value added (% of the GDP). Source: The World Bank database.

The industrial sector is, without any doubt, the most hard-hit by the adverse internal and external economic scenario. Exports have decreased and imports have increased due to the higher cost of production of certain manufacturing products despite those ones produced in less developed countries, incrementing the strong slowdown of the

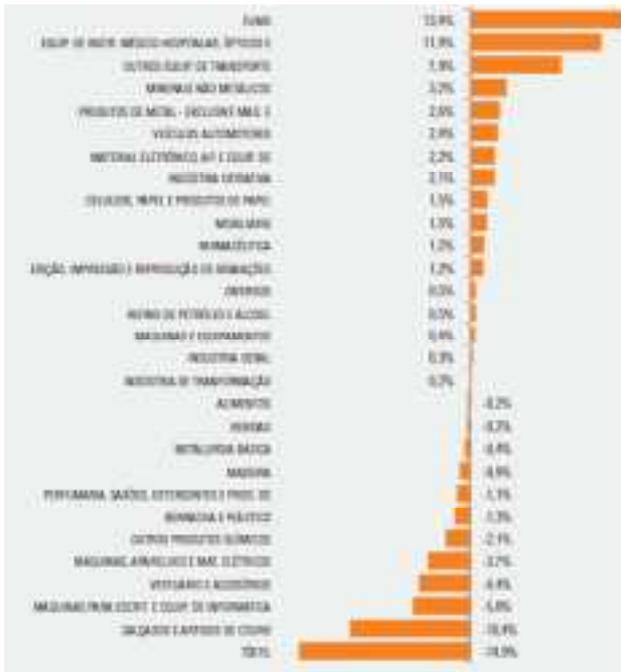


Figure 34 Sectorial data. Source: Relatório de atividades- 2011, CNI.

industrial activities. The worse scenario is that one faced by the Brazilian industrial sectors that suffered the competition of the new emerging markets, recording a drop of the industrial production. The increase of the imports of manufacturing products reflects the deficiency in the protection of Brazilian products in terms of patenting, certification and property rights in general. Nonetheless

Brazilian market have still a lot of way of development, and is still very

attractive for foreign investments. What is necessary is to find a new way of development, focusing on innovation rather than on price competition in manufacturing sectors. Even if the aggressive entry of some foreign manufacturing products in the Brazilian market is still a recent phenomenon, it requires an urgent intervention for let Brazil to remain as competitive as other growing economies in the world. Indeed,

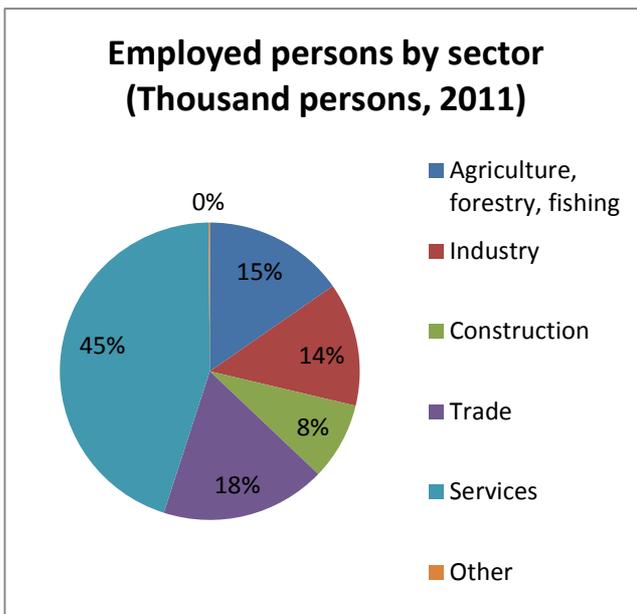


Figure 35 Employed persons by sector. Source: BRICS-Joint statistical publication 2013

Brazilian sectors which are suffering foreign competition are those ones producing final products, where the Asian competitiveness seems to be unbeatable. (Figure 5.3). Cluster development could be a good strategy for building Brazilian competitiveness.

In order to reconstruct the economic geography of industrial clusters in

Brazil, data about employment and

firms by sectors and region will be analyzed. We will start from the analysis of which are the sectors where the most part of the labor force is employed. The greatest part of the employed persons is in the service sector, as the common trend in all the emerging markets, where even if agriculture and industry maintain an important role for their economy, the service sector is growing at a fast pace. As shown by the graph (Figure 35) the tertiary sector is the leading one in term of employment, with a share of 63 per cent of employed persons. Agriculture, as we have seen in chapter 2, is still an important sector for the Brazilian economy accounting for about the 15 per cent of the employed persons. Industry ranks third with a percentage of 14 employed persons. Although employment data are very significant in order to understand the importance of the different sectors for the Brazilian economy, the analysis has to be broadened. Data

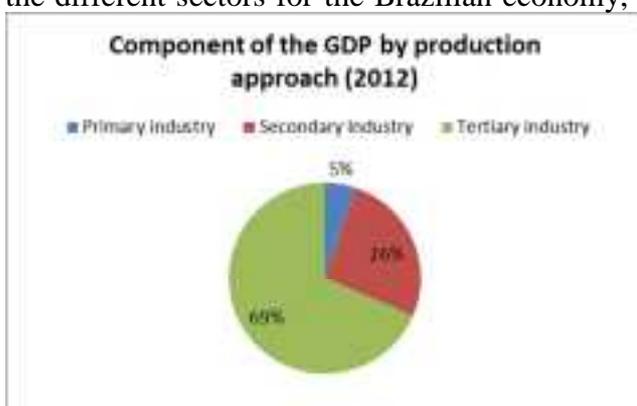


Figure 36 Component of the GDP. Source: BRICS-Joint statistical publication 2013

about Gross domestic product by type of activity has been analyzed: the tertiary sector remain still the leading one accounting for the 69 per cent of the GDP, the secondary sectors comes to the second position with a share of 26 per cent, while the weight of the primary sector in terms of GDP is decreasing, accounting for

a percentage of 5%, even if certain agricultural productions are vital for Brazilian economy. Data about the Gross value added by economic activity confirms the leading position of the tertiary sector with “Wholesale, retail trade, restaurant and hotels” accounting for a share of 18 per cent of the total gross value added. Nonetheless the secondary sectors give a great contribution for the creation of value added with “Mining, manufacturing, Utilities” and “Manufacturing” accounting respectively for 19 and 13 per cent of the Gross value-added in 2011. Observing the trend of the Gross value-added (figure 37) the secondary sector, that is Brazilian industry, shows its current fragility, recording a drop in the creation of value-added during the last years. This confirms what said before talking about the recent performance of the Brazilian industry.

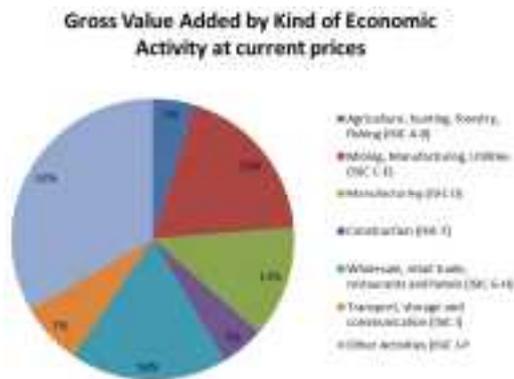


Figure 38 Gross value-added by economic activity.
Source: UNdata



Figure 37 Gross value-added by economic activity trend. Source: UNdata

How employees and firms are distributed among the different economic sectors will be analyzed in order to understand which sectors dominate Brazilian economy. Our analysis reveal that “Trade” is the sector with the greatest number of business entities (44.52%) and employed persons (22.15%). As we have said in the previous country-analysis, this data could be misleading as enterprises operating in the tertiary, and above all, in the trade sector are often very small, as a result a high number of enterprises was expected. What come to our eyes, and is of great importance for the aim of this analysis, are data about the manufacturing sector. As is well-known this is one of the prevailing sector for cluster development. In 2009 Brazilian manufacture employed more than 17 per cent of the employed persons ranking second in our chart. As for the share of enterprises operating in this sector, manufacturing enterprises rank still second accounting for nearly 9 per cent of the total. This data let us conclude that Brazil is a breeding ground for cluster development, as its industrial structure suggests that the adoption of an industrial organizational model based on clusters could be appropriate. Data about the manufacturing sector was then analyzed in order to find out in which activities it is specialized. Our survey reveal that the leading manufacturing sectors in terms of employed persons and business entities are Clothing and accessories, Food products and Metal products except machinery and equipment. Although they are the leading manufacturing sectors, they are those ones which have being suffered the most in recent years. As said before this sectors are those ones in which the Asian competition is the fiercer. Some suggestion for future industrial policy come to light. There’s a need for a new way of development of these sectors in order to maintain their competitiveness in respect to the Asian ones, as they are of vital importance for the

Brazilian economy. Industrial and cluster development policies will be discussed in further paragraphs.

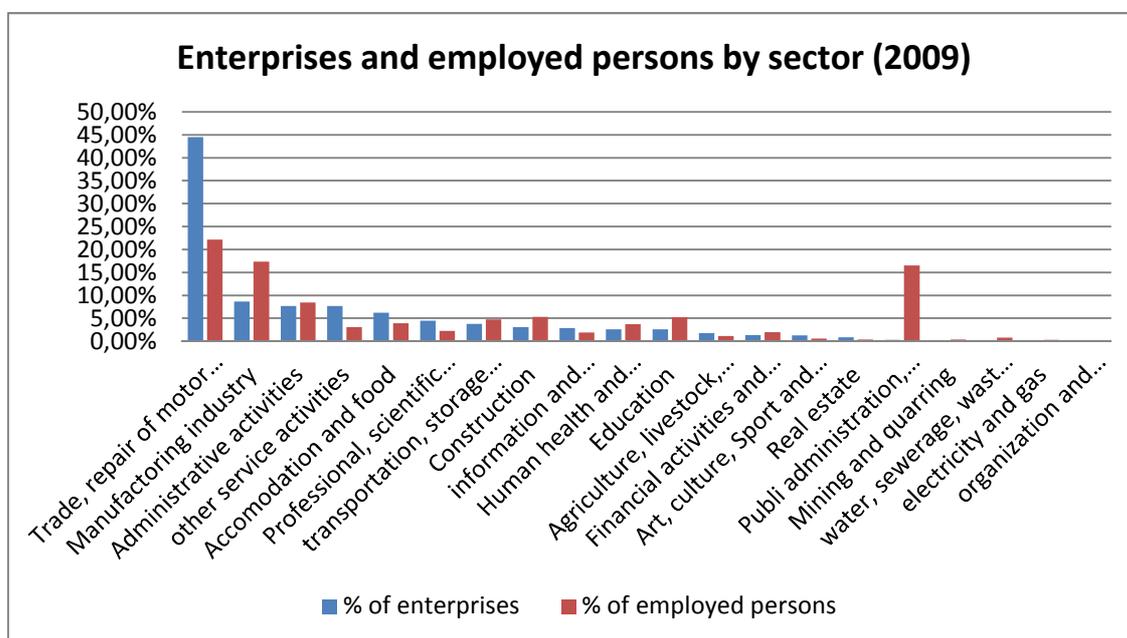


Figure 39 Enterprises and employed persons by sector. Source: IBGE

Table 14 Manufacturing sector: enterprises and workers. Source: IBGE

Manufacturing: enterprise and workers by sector

	Sector	% of enterprises	% of employed persons
1	Clothing and accessories	18,32%	9,71%
2	Food products	13,30%	19,65%
3	metal products, except machinery and equipment	10,94%	6,95%
4	Non-metallic mineral	6,90%	5,49%
5	Furniture	5,74%	3,40%
6	Printing	5,72%	1,90%
7	Wood products	5,27%	2,94%
8	Maintenance, repair and installation of machinery and equipment	5,10%	2,29%
9	leather and leather goods, travel items and footwear	4,48%	5,31%
10	Rubber and plastic	3,96%	5,03%

After having analyzed the sectorial distribution of economic activities, data about the geographical distribution of employed persons and business entities have been observed. What come to light is that economic activities seem to be agglomerated in certain areas of Brazilian territory. The first five Brazilian states in term of employed persons and business entities account for more than the 66 per cent of the total business entities and for nearly 63 per cent of the employed persons. (Figure 40) San Paolo del Brasil accounts alone for about 30 per cent of the business entities and employed persons. If you consider that its geographical extension is limited if compared with other Brazilian states you will realize how much economic activities are agglomerated.

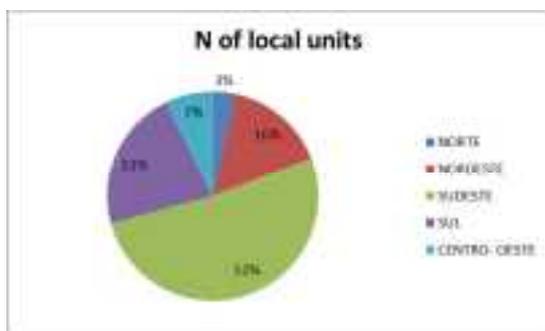


Figure 41 Business entities geographical distribution. Source: IBGE

Think that Brazil is made up of 27 states and nearly the 85 per cent of the business entities and the 81 per cent of all the employed Brazilian persons are agglomerated in ten of them! We can conclude that for some reasons economic

activities tend to agglomerate in certain regions, which are all situated in the south east of the country, where the 52 per cent of the total local units are concentrated.(Figure 41) It is no coincidence that all the major Brazilian cities are located exactly in the south-east

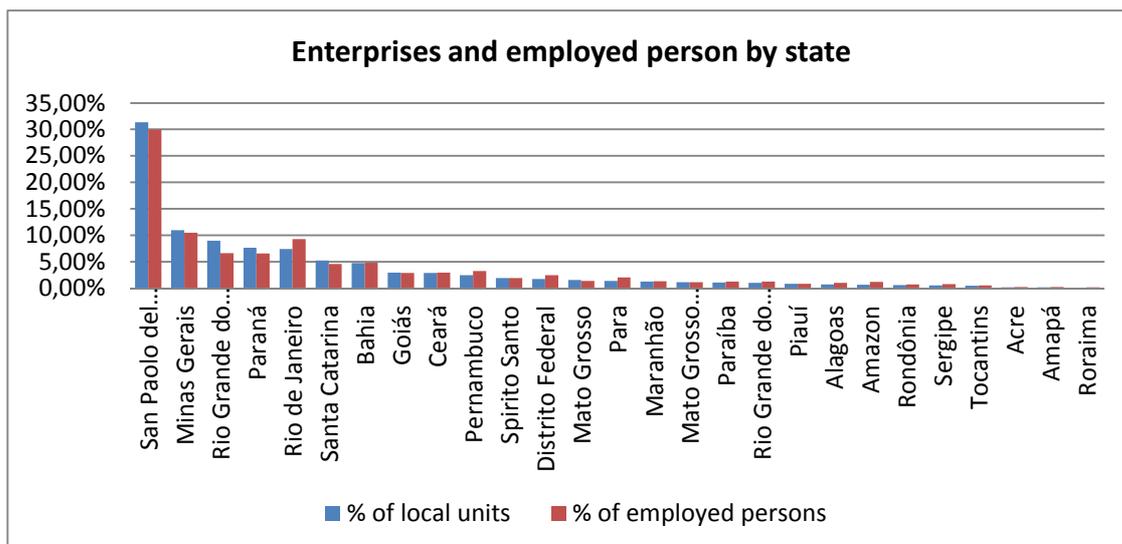


Figure 40 Enterprises and employed persons by State. Source: IBGE

5.3 Small and Medium enterprises in Brazil

In this paragraph Brazilian Small and medium enterprises current scenario and structure will be analyzed. We will focus on this type of enterprise as it could be defined as one of the main component of a cluster. Small and medium enterprises often tend to cooperate creating networks of firms, achieving in this way the economies of scale which otherwise could be achieved only by a large scale firm. SMEs in Brazil, as in other developing countries, have been gaining a lot of attention. They have proved to be a powerful tool for growth creation, becoming as a result the object of many national and regional policies, and international organizations' actions.

The criterion adopted for defining Small and Medium enterprises by the Brazilian Micro and Small Business Support service is the number of employees, while the SMEs statute consider the annual gross income. As a result a mix of the two criteria is adopted in order to define micro, small and medium enterprises.⁵⁸ The definition of parameters for distinguishing SMEs is very important as it enables firms that are classified within established limits to enjoy the benefits and incentives offered in legislation providing differential treatment to SME to meet specific policy goals such as employment and income generation, increasing innovation, reducing small business informality, exports

⁵⁸ Firm Size Classification

Firm Size	Annual gross income (US\$)	People employed
Micro	Up to US\$ 188 thousand*	Industry and Construction: 19 Commerce and Services: 9
Small	From US\$ 188 thousand to US\$ 1 million	Industry and Construction: 20 to 99 Commerce or Services: 10 to 49
Medium	From US\$ 1 million to US\$ 30 million	Industry and Construction: 100 to 499 Commerce or Services: 50 to 99

and others⁵⁹. Brazilian SMEs represent a milestone for the Brazilian economy considering that data provided by *Sebrae*⁶⁰ reveals that there are about 5.6 million formal SMEs, which account for a share of 99 per cent of the total formal enterprises, and about 10 million of informal ones. They represent the 56.1 per cent of the formal urban labor force, the 26 per cent of the wages/salaries, the 20 per cent of Brazilian GDP, the 13 per cent of the government procurement, the 2 per cent of the Brazilian export volume, and the 96 per cent of Brazilian exporters. These figures underline the extreme importance that Small scale industry has for Brazilian economy and its further development.

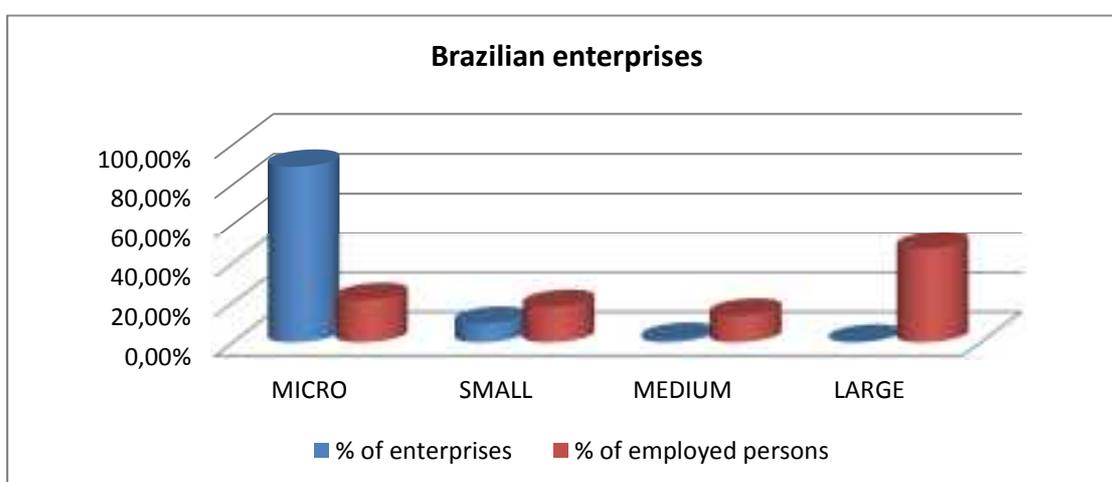


Figure 42 Brazilian enterprises by scale. Source: IBGE

Of the 5 million formal businesses in the country, 56% are engaged in commerce related activities, representing approximately 1.4 million units and employing 7 million people. Another 30% businesses are in the service sector, with 1.9 million establishments employing 8 million people. Industry comprises only 14% of the total small firms, including civil construction, with 630 thousand units that employ 3.7 million people.⁶¹ As SMEs represent nearly the totality of the Brazilian enterprises we

⁵⁹ Ana Carolina Machado Arroio (2009).The role of SME in the national innovation system of Brazil. RedeSist - Economics Institute, Federal University of Rio de Janeiro, Brazil

⁶⁰ SEBRAE, Servicio Brasileño de Apoyo a las Micro y Pequeñas Empresas. <http://www.sebrae.com.br/>

⁶¹ Ana Carolina Machado Arroio (2009).The role of SME in the national innovation system of Brazil. RedeSist - Economics Institute, Federal University of Rio de Janeiro, Brazil

refer to the previous paragraph for the analysis of the sectorial and regional distribution of firms.

As in other developing countries, Small and Medium Enterprise sector is afflicted by some rooted problems such as informality, financing, low technology. As regard informality, it characterizes the entire Brazilian economy and is broadly diffused in the SME sectors. With the recent global crisis the level of informality is increasing and getting larger. Some figures convey the idea perfectly: beyond official over five million formal Brazilian SMEs, there are an estimated 20 million small informal business units, involving around 60 million individuals (SEBRAE, 2005a). Half of these are informal urban business units, which have proliferated as a result of economic recession and high unemployment rate in the last decades. The informality issue represent a big obstacle which need to be overcome, in order to make policy measures more effective. Without certainty, developmental policies for the upgrading and growth of the SMEs sector could go in the wrong direction. Transparency is needed in order to develop the right measures for the growth of Brazilian SME sector. As for the financial issue, financial difficulties are the main reason given for firm closure, accounting for almost 60% of closures. SMEs are often crushed by the lack of capital, high rates and taxes, which in the 50 per cent of the cases lead the entrepreneur to end the operations within two years since the business has been started. Third, low-technology which characterized the most part of SMES in Brazil is another question which asks for specific measures. Indeed, the activities developed by a large majority of micro and small firms are low-technological based, with intense use of low-skilled labor, and operate in traditional industries, such as food and beverages, clothing and footwear, in which barriers to entry are low. Policy for the upgrading of SMEs are needed, in order to make them more competitive through developing innovation and high capabilities, which will let them add value on their outputs, and, as a result, create value for their development and consequently for the development of the entire society. SMEs represent one of the most powerful tools for sustainable economic growth of Brazil by the fact that micro, small and medium firms are consistently one of the main contributors to the economy, considering their dominance in the Brazilian economic environment and the huge bulk of the population employed in small and medium enterprises. One of the most promising tendencies of new policies for SME in Brazil from 2000 onwards is the collective treatment of small

and medium firms in Local Productive Systems - LPS. This involves the design of policies that support joint activities, foster knowledge flows and that mobilize local productive and innovative systems (A.C.Machado Arroio 2009). Brazilian Local Productive Systems will be discussed in depth in the next paragraphs.

5.4 Economic geography of Brazilian Clusters

5.4.1 Introduction to Brazilian Clusters

The Brazilian industrial structure, its predominance of small and medium enterprises have made and, still make, Brazil a breeding ground for the emergence of agglomeration of economic and related activities, letting clustering be a suitable model of economic growth. Clusters are not a novelty in Brazil, whose government has underlined its importance not only for industrial development, but also for job creation, increasing Brazilian competitiveness, improving the trade balance, and therefore for the development of the country in all its aspects. Clusters, therefore, have been used as tool of development in Brazil since some decades, and specific policies and measures are dedicated to the growth and support of this model of industrial organization. In Brazil Clusters are defined LOCAL PRODUCTION ARRANGEMENTS, which are nothing more than what we have identified as a cluster. RedeSist (Local Production & Innovation Systems Research Network), an interdisciplinary research network focusing on Local Productive and Innovative Systems⁶², gives the following definition:

“Local production arrangements are territorial agglomerations of economic, political and social agents focusing on a specific set of economic activities and with mutual connections, albeit incipient. They usually involve participation and interaction by firms ranging from producers of consumer goods and service providers to suppliers of raw materials and equipment, business consultants, marketers and customers, among others, with all their many forms of representation and association. They also include a range of other public and private institutions active in education and training (such as technical schools and universities), research and development, engineering, financing and policy making”.

⁶² For more details go to <http://www.redesist.ie.ufrj.br/Ev/home.php>

Thus, Local productive arrangements benefit from an extended network of relationships which is intertwined among the Small and Medium enterprises, that are the main responsible for production and creation of new work places, as said in the previous paragraph. These Local Productive Arrangements are experiencing a great development in recent years: in 2004 there were 472 LPAs, while in 2007 the number rose to 957, an increase of 102 per cent in 3 years only.

Brazil is experiencing a fast process of “clusterization” through the blossom of a number of Local productive Arrangements, whose origins date back to the 50es, when the first APL projects was conceived. Although quite hesitant in the first phase of development, in the 70es clusters began to grow prosperously throughout Brazilian states. While at the beginning APLs were projected with the sole aim of foster local competitiveness, then they became an efficient tools for spreading industrialization all over the country, arising prosperity and social value. After the initial phase, when some thriving sectorial economic agglomeration arise in the area of Sao Paolo, Minas Gerais and Rio, and with a slower pace in Paraná and Rio Grande do Sul, the greatest part of the LPAs developed during the 80es and became a milestone of the Brazilian economy during the last decades of the XX century. Some of the cutting-edge Brazilian clusters, such as the aeronautics cluster in São José do Rio Preto, electric-electronic cluster in Santa Rita de Sapucaí, ABC automotive cluster, the oil supply cluster in Rio de Janeiro get their nourishment thanks to the support of big companies and by the partnership with excellent educational (Embraer in São José dos Campos) and technical (CENPES in Rio) institutions. In the Brazilian clusters scenario we can discern three main cluster categories: innovative clusters, consistent with the features identified by Porter, industrial clusters, which are quite the totality of the Brazilian local productive arrangements, and “embryonic” or primitive clusters, prevailing in the primary sector. While innovative clusters in the service sector haven’t reach a high level of development yet (they are around 10 per cent of the total number of Brazilian clusters), the greatest part of Brazilian clusters operates in the industrial sector producing consumer goods such as clothing, footwear, furnishing and house appliance, while a new trend is establishing in the tourism sector with a number of clusters arising in some of the beautiful Brazilian touristic destinations. One of the main weaknesses of the greatest part of the Brazilian industrial clusters is their low technological level, due to

the lack of financial resources for the Micro and Small enterprises which form the clusters. Often the management skills are very weak, and the markets reached are regional, sometimes national, while international markets are reached only by the most developed clusters. Finally a big share of Brazilian clusters are “embryonic” clusters made up of truck farms with primitive technological skills. Examples are honey producers in some states in the North-east, handicrafts clusters, primitive clusters born in the fishing and mining sectors. There are reasons to affirm that LPAs development represent a structural phenomenon of the process of Brazilian economic development. During the past half century the combination of some events favors the blossom of such an industrial organizational model. Indeed, the public sector crisis combined with the drop of Brazilian exports and the crisis of the Fordism functioned as triggering events making clusters growing faster. Nowadays, with a public sector stronger than in the past, the abandon of the protectionist policies based on a weak currency, and a national competitiveness built on a huge agricultural, mineral and oil reserve, Brazil needs a policy which address clusters development towards this new direction. Given the enormous importance that this industrial organizational model has for Brazilian economy the following paragraph, after having clarify how to identify a Local Productive arrangement, will be dedicated to the reconstruction of the economic geography of industrial clusters all over the country, and to the main traits of the policy for the development of APLs in Brazil as well their main challenges.

5.4.2 Local Productive Arrangements: main features

In Brazil the term Local productive arrangement was chosen as term to identify clusters as it was already used for recognize sectorial economic agglomerations. While at the beginning the term simply identified geographical industrial agglomerations, it has been evolving in a more sophisticated way of conceiving a LPA. Nowadays, a LPA is far to be a simple geographical concentration of industrial activities, involving other concepts, such as the territory, local cultural specialization, cooperation among Micro Small and Medium Enterprises and between the latters and institutional organizations and different levels of government, collective learning, innovation, and presence of local suppliers. In order to identified LPAs some general terms have been set by the Brazilian government. Thus, a LPA identifies the phenomenon characterized by a substantial number of firms and individuals which are part of a productive process cooperating and establishing governance mechanisms among each-others. This definition, although very general and without the setting of any parameters or limits, let to the wide selection of Brazilian clusters to be involved in the LPA definition. This wide definition is used in order to promote the growth of further clusters among SMEs. The need for parameters which let to identified clusters throughout Brazilian territories ask for the set of some variables. These variables were set by the Brazilian government to be used as guide line in the identification of Local productive arrangements in Brazil, but they weren't conceived as to be complete and they do not exclude further potential agglomerations of small and medium enterprises. An agglomeration of enterprises could be defined a Local Productive Arrangements when it is characterize by the variables as follow:

- Sectorial agglomeration of enterprises in a given territory: the enterprises concentration is conceived as the number of small and medium enterprises considered relevant for the local economic context. The inferior limit of economic entities which form the clusters must vary on the basis of the sectorial and of the territorial characteristics. The territorial extension of the cluster

should not be broader than the micro-regional dimension and could differ from the administrative division of the territory.

- Concentration of individuals operating in related sectors: this variable consist in the number of employed persons in the relevant region of the LPA. Specific sectorial and territorial characteristic will be considered.
- The level of cooperation among the firms and between firms and other cluster agents: cooperation is conceived as partnerships among different actors with a common aim linked to the sustainable development of the LPA. Partnerships could be established among firms or among firms and other actors, such as professional associations, networks of firms, research and educational institutions, NGO, and trade and labor associations.
- Existence of governance mechanisms: governance is conceived as a tool for guiding the LPA's actors towards the achievement of a common aim. Governance has the aim to create a vision for the cluster. Second, governance acts as tool of coordination among the different actors, and thus, third, local decision making at the LPA level. Finally governance promotes processes of knowledge creation and diffusion.

Brazilian local productive arrangements are part of a wider strategy adopted by the Brazilian government to enhance its competitiveness, which is guided by the principle that policies for support the small and medium enterprises are more effective if they are addressed to an agglomeration of firms rather than a unique entity. In this perspective the firm scale become an irrelevant detail, because the competitiveness of the firm, which is an essential part of the clusters, is not linked to economies of scale, but to the advantages of the cooperation among the actors which form the cluster. Adopting this kind of approach, cooperation, learning by doing, innovation capacity of firms and institutions become focal points as well as local concept such as how inter-linkages work for enhancing local sustainable competitiveness, and how to reinforce local governance. APLs are sources of competitive advantages, even more so when they arise from a rooted local capacity and when they are able to create social capital through firms cooperation. Since the huge number of work places generated by micro, small and medium enterprises, adopting a policy with the aim of promoting and supporting local productive arrangements, Brazil is directly revamping local and national economic

development, generating new job opportunities and growth, as well as reducing social and regional disparities. Brazilian cluster development policies will be discussed in more details in next paragraphs.

5.4.3 Reconstructing the economic geography of Brazilian Clusters

Reconstructing the economic geography of industrial clusters in Brazil is a hard challenge, since the lack of detailed data about the number, and the geographical and sectorial distribution of Brazilian clusters. As we have done for India and China, the first step was understanding which Brazilian states record the highest concentration of enterprises. We have seen in previous paragraph that one of the variable which permit to identified a Local Productive Arrangement is the number of firms in a given territory. This is why we have calculated the “*enterprises density index*”, which is the ratio between the number of enterprises in a given states and the its area expressed in sq kilometers. As we said before, the index is very simple and quite “rough”, anyway we believe that it could represent a good starting point for mapping Brazilian clusters. We could have calculated other indexes, such as the Location Quotient or the Gini Index of local agglomeration, which are, without any doubt, more precise, but once again data were not available. The calculation of the *enterprises density index* let us to have some first insights about how economic activities are geographical distributed. As we have said before firms are concentrated in the South and South-East of Brazil, as it can be easily seen observing the map (Figure 43). Distrito Federal, which is located inside the state of Goiás, is the state with the highest value of the index. The index expresses a great concentration of enterprises in this area recording a value which is almost twofold (15.41) the value recorded by the second state (Rio de Janeiro) in the rank (table 15). There are 13 states of the total 27 in which there are at least one enterprises per sq Km, which are all in the Southern and South-eastern part of the country. We can observe that



Figure 43 Enterprises density index by State. Source: Author

the state with the highest level of the enterprises density are those ones where the main Brazilian cities are located: Brasilia, Rio de Janeiro, Sao Paulo. This let us suppose that clusters are more likely to arise in proximity of big cities. If we compare this analysis with those ones we carried out for investigating Brazilian industrial structure, some differences

emerge: without considering territorial extension, the enterprises agglomeration

chart is almost different, with Distrito Federal, which in the current analysis ranks number 1, ranking 12th. Despite that some states, such as Sao Paulo, Rio de Janeiro, Santa Catarina, Rio Grande do Sul and Paraná confirm to be states with a high density of economic activities.

Table 15 Enterprises density index by state. Source: Author

	State	N of enterprises 2009	Sq KM	enterprises density index	Norm index
1	Distrito Federal	89703	5822,1	15,40733	1
2	Rio de Janeiro	386853	43696,1	8,853262	0,574032
3	San Paolo del Brasile	1644018	248209,4	6,623512	0,429114
4	Santa Catarina	275949	95346,2	2,894179	0,186733
5	Spirito Santo	100547	46077,50	2,182128	0,140455
6	Paraná	399987	199314,9	2,006809	0,129061
7	Rio Grande do Sul	470987	281748,5	1,671658	0,107278
8	Alagoas	37492	27767,7	1,350202	0,086386
9	Sergipe	29225	21910,3	1,333848	0,085323
10	Pernambuco	130491	98311,6	1,32732	0,084899
11	Rio Grande do Norte	54720	52796,8	1,036426	0,065993
12	Paraíba	57477	56439,8	1,018377	0,064819
13	Ceará	150244	148825,6	1,009531	0,064245
14	Minas Gerais	575911	586528,3	0,981898	0,062449
15	Goiás	155626	340086,7	0,457607	0,028373

Further quantitative analysis was not possible because of the lack of a statistical database about clusters in Brazil. For this reason we will refer to other studies and research in order to fulfill our ambition, that is reconstructing the economic geography of Brazilian clusters. Since the huge importance that local productive arrangements have for Brazilian economy and its further development, the government of Brazil established a permanent work-team for LPAs (APL GTP) which has the aim to support Brazilian local clusters in all the states enhancing their competitiveness and coordinating the action of the federal government and partner-institutions. In 2004, in order to make its efforts more effective, the APL GTP conducted a survey on the Local productive arrangements in Brazil to which 460 clusters responded. One year later a new survey was made and the number of clusters rose to 957! Thanks to the hard work carried out by the permanent team work a map of LPAs in Brazil could be completed. In



Figure 44 *Brazilian clusters* . Source: IPEA

2007 the updating of the LPAs survey began with the aim to standardize data about clusters by sectors and social indicators. The survey aim to gather data about population, HDI, GDP, number of enterprises by scale, number of employed persons, and production. Up to now data about 267 Brazilian clusters have been gather,

the challenge for the future is to do the same for all the 957 Local productive arrangements, what a big dare! As for our analysis, a comparison between the GTP-APL map and that one obtained through the analysis of the enterprises density index is made: we can observe that the map of Brazilian clusters is different from what we expected. There's a great number of APLs where a very low level of enterprises density index was recorded. In the northern part of the country, as well as in the western the

absence of clusters was expected. On the contrary a lot of the green zones (see Figure 44) are exactly where they were not expected to be. This could be linked to the fact that a lot of Local productive arrangements in Brazil were created through developmental policies in the primary sector. Regions will be analyzed now in more detail.

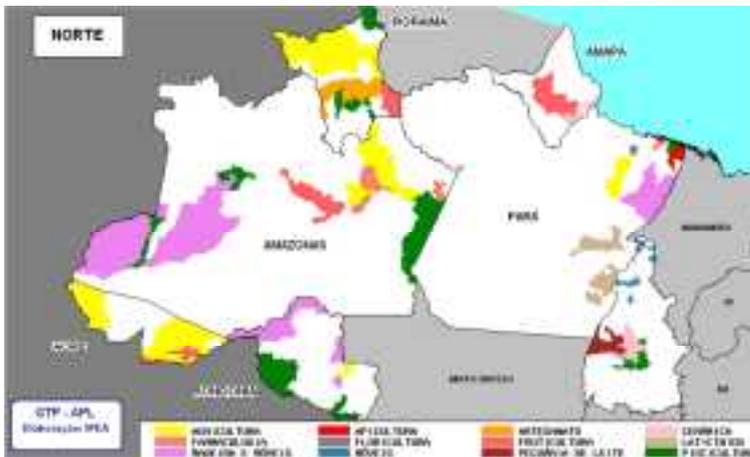


Figure 45 APLs in the North Region . Source: IPEA

In northern regions the most part of the clusters operates in the primary sectors, with a great diffusion of Local Productive arrangements in the fishing and agriculture sector. A great number of clusters are in the wood and

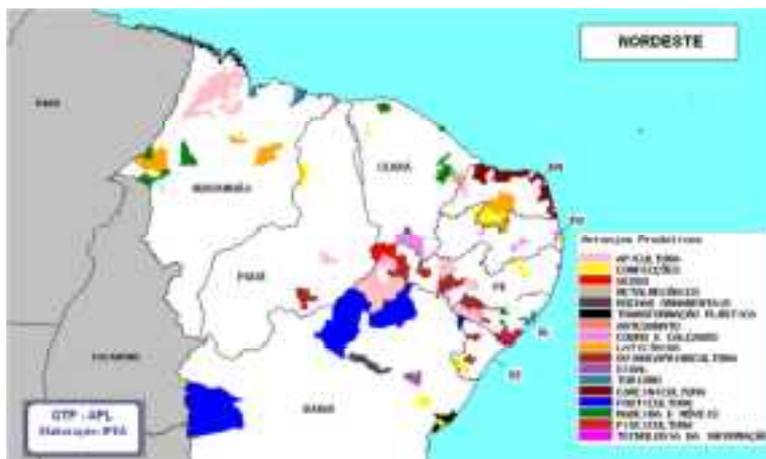


Figure 46 APLs in the North-East Region . Source: IPEA

furniture sector.

As for the northern part of the country, in the north-eastern area the greatest part of the clusters operates in the primary sectors as well (honey production, fruit

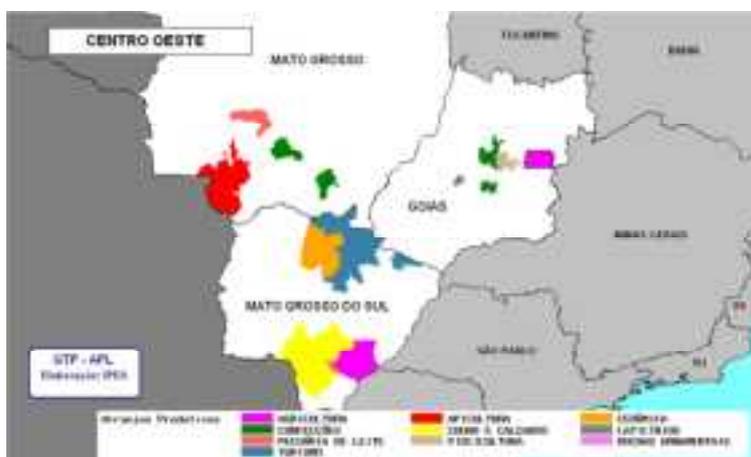


Figure 47 APLs in the Central -West Region . Source: IPEA

farming, aquaculture, and dairy products).

As regards Brazilian regions in the central and western part of the country, clusters are various in term of economic sectors. In these regions clusters have

emerged in the primary sector (honey production, agriculture) and in the secondary (footwear and ceramics) and tertiary sector, with a number of local productive arrangements emerged in the tourism sector. This latter represents a novelty as regards clusters in developing countries.

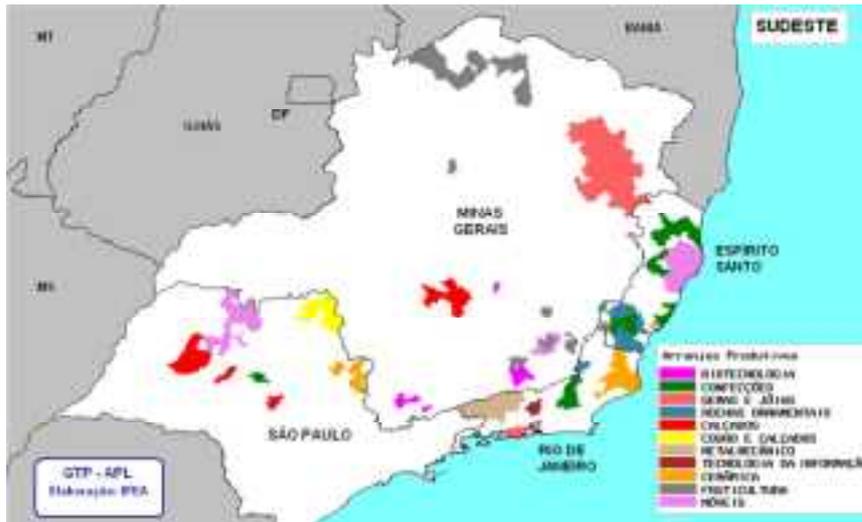


Figure 48 APLs in the South-East Region . Source: IPEA

Clusters in the South-east regions are dominated by the secondary sector and above all by manufacturing sectors with well-developed clusters producing jewelry, wood products, ceramics, footwear.

In this part of the country there is evidence of emergence of some innovative high-technology clusters in the biotechnology and IT sectors.

In this part of the

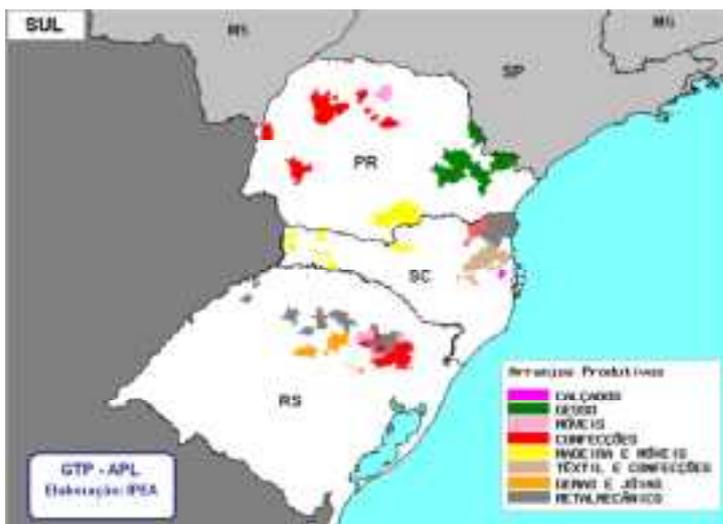


Figure 49 APLs in the South Region . Source: IPEA

Finally in the southern states clusters dominate once again the secondary and manufacturing sector with a number of Local productive arrangements operating in sectors such as mining, jewelry, wood products and furniture, textile and metal products.

After having analyzed the economic geography of clusters

in Brazil, we can conclude that what have been derived by the first analysis of the *enterprises density index* was not totally wrong. Indeed, the states with the highest density of enterprises were those ones on the southern and on the south-eastern areas of the country, which are exactly where clusters operating in the secondary sector are located. Our analysis involves mainly the secondary sectors, as its aim is the reconstruction of the economic geography of industrial clusters. We also know from our previous analysis that the most part of the registered enterprises operates in the secondary and tertiary sectors, and that they are almost all located in the southern and south-eastern states. So, if clusters operating in the primary sector was excluded from the map provided by GTP-APL, we would find out that industrial clusters are almost all located in the southern and south-eastern states of Brazil, with exception for some manufacturing clusters emerged in the wood sectors which are located in the north. As a result our analysis based on the enterprises density index provided us with some useful first insights for the reconstruction of the geography of the Brazilian cluster system.

5.5 Brazilian cluster developmental policy

The Local Productive Arrangements approach was developed at the end of the 90es and it spread at a fast pace all over the Brazilian country, replacing all the existing initiatives. Thenceforth governmental efforts for strengthening and supporting LPAs have been greater and greater, activating a deep process of learning by doing, where knowledge diffusion has become one of the fundamental point. The extraordinary and fast diffusion of the term LPA leads clusters development to be one of the priority of the federal government, formalized in the long-term plans for national development, such as the National plan for science, technology and innovation 2007-2010, and the productive developmental policy 2008-2013. The national policy for local productive arrangements foresaw the creation of a permanent team work for clusters development, GTP APL (Grupo de Trabalho Permanente para APLs), which have been playing a fundamental role in sustaining cluster initiatives throughout the country. The permanent team work is coordinated by the ministry of development, industry and foreign trade and consist of a public-private partnership in which 33 public and private institutions are involved. The great diffusion of the LPAs and the great efforts of the national government for further cluster development have been translated in a more detailed and rooted cluster developmental policy at the regional level with the creation of state-agencies for giving support to LPAs in every Brazilian states, a lot of new public-private partnerships, and the intervention of international organizations. Since the key role that the GTP APL has been playing since its establishment, we will spend a few words about its role and functions. After that the Brazilian vision for cluster development, that is the main aims, the guidelines, the governmental strategy, the national action plan will be discussed.

5.6.1 Grupo de Trabalho Permanente para Arranjos Produtivos Locais

In 2004 the permanent team work for Local productive arrangements was created in order to coordinate governmental actions for supporting cluster development involving at the beginning 23 public and private actors, whose number rose up to 33 actors one year later. Besides supporting local productive arrangements, the GTP APL formulates and suggests the general guidelines for the integrated public action in supporting clusters development. Other tasks are taking part to national and international events about clusters, organizing conferences on the theme, gathering data about Brazilian clusters among others. At the beginning its efforts were concentrated on 11 clusters distributed in five Brazilian regions with the aim of testing the integrated operational methodology. One year later 957 clusters were identified through a survey supervised by the permanent team-work, this made cluster developmental policy an even more pressing priorities among Brazilian industrial and developmental policies and underlined the fundamental role of the GTP APL for the coordination of such an immense number of cluster initiatives. The leading threat of the supporting action of the permanent group consists in coordinating the actions of the various agents who are involved in cluster development such as entrepreneurs, trade unions, associations, educational institutions, banks and credit institutions, technology and innovation institutions, etc., in order to formulate an action plan of development which has to be as comprehensive as possible permitting to integrate the actions of all the actors involved. The common action plan is implemented through building an infrastructural developmental plans on the regional and local level, common dialogs among the various actors through permanent conferences, knowledge diffusion, common channels of communication.

5.5.2 Brazilian cluster developmental policy: objective, guide-lines and action plan.

The aim of the integrated developmental policy for Brazilian local productive arrangements is to enhance local sustainable competitiveness through local developmental processes. Through the development of local productive arrangements Brazilian government intends to achieve some broader developmental aims such as economic development, reduction of regional and social disparities, technological innovation, widening and upgrading of production capacity, creation of job opportunities and incomes, diminishing SMEs' death rate, enhancing education and training, increasing firms' productivity and competitiveness, boosting exports. Brazil is a great example for explaining how clusters development could be used as a powerful tool for achieving higher rate of local and, as a result, national development. The Brazilian government has understood that for ensuring a rooted and long-lasting development in its country, it has to convey its efforts for building its competitiveness, which have to be sustainable. Toward clusters development, that is support to local productive arrangements, Brazil is going through the right way for achieving sustainable global competitiveness. To do that it has foreseen a vision for the future outlining some short-run guidelines, which will lead to achieve what has been planned in the vision. In the developmental policy for sustaining local productive arrangements, whose terms were first defined in 2004 with the creation of the permanent team-work, the Brazilian government has underlined that, in order to achieve the above listed objectives, is necessary to formulate and then follow some guidelines which will lead to build a strategy for future sustainable local competitiveness. The main guidelines to follow in order to build an integrated action plan for cluster development are the following: first public action should be conceived as a tool for local capacity building, this means that every action should activate a self-augmenting process through the identification of local leaders, and the organization of educational programs in order to involve local actors in the developmental process; second, actions should encourage inclusiveness of all the actors in order to let firms get access to market, education, technology, credit, training, and other public goods and services. Third, increasing

social capital through cooperation among local actors , trust building, learning-by-doing processes, partnerships and cooperatives. Fourth enhancing innovation, fifth integration of the actions at various administrative levels (national, state, and local), sixth actions should be market oriented, and sustainable (seventh) and environmentally friendly (eighth). Finally there are two more objectives, that are the reduction of regional and social disparities, and strengthening the labor market through the creation of work places which should offer decent job conditions in the respect of fundamental labor rights. Besides the definition of the guide-lines, that let clusters developmental policy to be part of a broader vision of development for all the Brazilian country, the government has defined an operational strategy, which let those objectives and guide-lines to be implemented. The operational strategy has been conceived to tackle the main problems which afflict Brazilian clusters involving the following topics: finance, market access, technological innovation, management capacity and qualified manufacturing labor. Two main phases of intervention have been identified: the first one consists in the identification of local productive arrangements which are worth an intervention, the second one consists in the implementation of the integrated action which has been conceived respecting local specificities. While the first phase foresees the elaboration of a developmental plan which has to be conceived in a broader vision for the future and involves all the actors both public and private, the second one will follow only if the developmental plan elaborated in the first phase will be worth to be implemented. Then a phase of monitoring and evaluation will follow. After having outlined the main traits of Brazilian policy for clusters development one can state that Brazil has been making great progress in this field, recognizing how much clusters could be powerful tools for enhancing the level of development in its states. It has been recognizing the enormous value, both economic and social, that clusters have for the country, which ensure the sustainability of the developmental process.

5.6 Brazilian Clusters: main qualitative features

In this paragraph a brief qualitative analysis of industrial clusters in Brazil will follow. To do that we will refer to the analytical framework by T. Brenner, as discussed in chapter one. Identifying prerequisites, triggering events and self-augmenting processes which have acted and will act in the future for the emergence of existing and new clusters will let us have a more comprehensive view about Brazilian industrial clusters.

- Starting from the analysis of the prerequisites that have acted as factors of emergence of local productive arrangements in recent years, and that will represent the basis for the emergence of new ones, one of the main factors is without any doubt the enormous endowments in terms of natural resources available in Brazil. Thanks to its huge fertile land, many clusters arose in the agro-industrial sector, with a number of clusters emerged in the wine production, and in the food production in general. As we have seen in the previous paragraph, clusters operating in this area are almost all in the northern and north-western part of the country, where the enormous immaculate virgin lands let the country to be the first producer of coffee, soybeans, sugar cane, iron ore, and crude oil. This could be a very powerful prerequisite for the emergence of new clusters in the manufacturing of these food products. In many emerging or less developed countries the manufacturing process of products of the primary sector often takes place elsewhere, “stealing” the added-value generated by the manufacturing processes which could otherwise be hold where the products come from. Creating clusters where the agricultural production takes place could generate new work places, growth and social capital. Another natural resources which have been fundamental for the emergence of clusters in Brazil is its huge availability of wood resources. A number of manufacturing clusters in Brazil operates in the wood and furniture sector which are located for the most part in

the North, where the immense Brazilian forests are located. Another environmental and geographical prerequisite that played a role is the presence of big cities. The most part of the industrial clusters operating in the manufacturing sectors are located in the states where the main Brazilian cities (Rio de Janeiro, Sao Paulo, Santa Catarina, etc.) are situated, that is in the South-eastern part of the country. Cities are for the most part port cities. This could act as factor for the emergence of industrial clusters, as firms could benefit from the closeness of natural transport infrastructure. Furthermore cities are skilled labor pool, this could be a powerful prerequisite for the emergence of new innovative and high-technological clusters. Thus, there are reasons to believe that new industrial clusters are expected to arise in proximity of the big vibrant Brazilian cities.

- As for business-economic prerequisites the Brazilian market size will act without any doubt as factor for the emergence of new industrial clusters. Consider that Brazil rank 10th in term of market size for the Global Competitive Report 2010-2011⁶³ and that is one of the countries with the biggest labor pool in the world. At moment the 27.9 per cent of the Brazilian population is in the age group of 0-14 years, this means that Brazil will have one of the biggest labor-force pool in the world in the very next years. Clusters could be a good solution in order to employ this huge labor force, generating as a consequence growth and development. Furthermore the Brazilian low-wage labor force, could attract foreign investments for the creation of new industrial clusters. This have been one of the factors that have drawn Brazilian industrial development in the past years, but it can't be one of the main competitive advantage anymore. It could represent an attractive factor but not the only one. Brazil, indeed, as said before, is suffering the competition of the new emerging markets which offer bigger cost-advantages than those ones offered by the Brazilian economy. This is why Brazil has to focus on other competitive advantages, concentrating on building its advantages on innovation and capacity rather than on advantages linked to low-wage labor. Among the business-economic prerequisites for the emergence of industrial clusters, the industrial structure has had a great clout. As we have seen analyzing Brazilian industrial structure, it lend its-self to an industrial

⁶³ See chapter 2 “Demography, Social conditions and conclusion” page 51.

organization made up of localized agglomeration of economic actors. Moreover Brazilian industry have experienced a process of decentralization in the period 1970-2000, with the emergence of a number of Local Productive Arrangements. Another feature about Brazilian industry which is important for the emergence of industrial clusters is the dominance that Micro, Small and Medium enterprises have on Brazilian economy.

- As regards the political prerequisites Brazilian industrial policy played a great role as prerequisite for the emergence of local productive arrangements. Indeed, before the adoption of the policies for the support and promotion of Brazilian APLs, the industrial policy was already based on an industrial structure made up of local centers of production. The problem was the lack of consistency at the national level.
- Finally another important prerequisites consists in the *cultware*, that is the natural attitude and historical traditions and culture which lead to the formation of clusters of firms. Small and medium enterprises in Brazil have a natural attitude to cooperate and build trust among them. Many Brazilian existing clusters are based on trust and social capital that the cluster's actors have built over the years. The natural attitude to cooperate have played a great role for emergence of Local Productive Arrangements, and is still a relevant factors for the creation of new ones in the future.

Going on with the analysis of the triggering events we will start with the action of specific actors:

- Some specific actors played a great role in triggering the emergence of clusters in Brazil, among others the ministry of commerce and industrial development, the permanent team-work on Local Productive Arrangements, Sebrae (Serviço Brasileiro de Apoio às Micro e Pequenas Empresa), RedeSist, the National clusters observatory, the institute for applied economic research (IPEA).
- Among the policy measures which have had the greatest influence in the creation of local productive arrangements there are those ones which were introduced at the beginning of the 2000 which foresaw the creation of a number of Local Productive Arrangements, and above all the policy measure which lead

to the establishment of the permanent team-work for the APLs which have played a fundamental role in supporting and promoting clusters development in Brazil.

- Among the historical events that trigger the emergence of clusters, there is the massive economic transformation that Brazil, like India and China, have known starting from the latter half of the 20th century. Recently the global crisis is playing a role in triggering the further development of Brazilian clusters which should foster Brazilian competitive advantage in the global economy, as the recent pressure made by the new emerging markets.

Finally the self-augmenting processes will be analyzed:

- As regards the business interactions, the creation of Local Productive Arrangements all over Brazilian country have fostered and triggered a self-augmenting process of interaction and cooperation among business actors, supported by the natural attitude to cooperate of Brazilian firms. Brazil is aiming to improve its capital market, supporting and promoting linkages between firms and banks and credit institutions. One of the main focus is to solve the big problem of the lack of financial resources which afflict the SMEs sectors.
- As for the private-public interactions, Brazil is doing a lot of work on governance building. The first step was done with the creation of the GTP APL on 2004, which let to coordinate the public and the private actions with the aim of create a solid governance based on a bottom-up approach, and which will foster linkages among cluster's agents.

5.7 Case-study: the footwear cluster in Vale do Synos

The footwear industry is one of the most important Brazilian industrial sector, being as well one of the centerpieces of the economic and social structure of the country. In 2010 Brazil was the third footwear producer in the entire world with more than 800 million pairs of shoes produced every year, and the eighth major shoe-exporter. The footwear manufacturing sector accounts for more than eight thousand producing units and employs almost 330 million Brazilian workers.⁶⁴ In terms of export value, Brazilian shoe manufacturing industry is extremely important for the trade balance of the country, accounting for almost one billion of US dollars per year. Despite that the shoe manufacturing is now experiencing hard times because of the Asian competition, the world financial crises and the higher appreciation of the Brazilian fashion products which have led to a drop of the production. Figures about the year 2010 showed this slowdown: Brazilian shoe exports suffered a drop of 12.8 per cent in terms of value and 21 per cent in term of volume. This is the worst performance since the 90es, when the shoe manufacturing exported on average 150 million pairs of shoes per year. Besides the worries about the drop of the export volumes, Brazil is very worried about the increasing imports of shoes from the Asian countries. This is a real problem for the entire Brazilian industry, which, as regards the shoe sector, has all the technological and production capabilities for serving its internal market, but is suffering the fierce price competition of the Asian shoe-producers. An increase of the imports could have significant consequences for the Brazilian industry, powering up a process of deindustrialization with heavy economic and social repercussions. In order to stabilize the volume of the imports, Brazil adopted some anti-dumping measures against China, the largest source of imported shoes in Brazil in 2009. Despite that, in 2011 imports recorded an increase of 40.4 per cent in terms of value, and 18.5 per cent in terms of volume from China's neighbors. An obvious trick of the anti-dumping measures

⁶⁴ Industria de Calçados do Brasil 2012. Brazilian footwear, Abicalçados, Apex Brazil.

adopted by Brazilian country! Consider that in the period 2002-2011 imports recorded an tremendous increase of 850.8 per cent in terms of value, and 566.8 per cent in terms of volume.⁶⁵ An industrial intervention by Brazilian government is necessary. Cluster policies are acting in this direction, aiming to enhance Brazilian competitiveness through higher-valued products.

Footwear production in Brazil is divided in three main region, the Northeast, the Southeast, and the South Region, where the cluster of Synos Valley is located. While the Northeast Region, which includes the producing states of Cearà, Bahia and Paraíba, is the largest producer accounting for 45 per cent of production and 71 per cent of

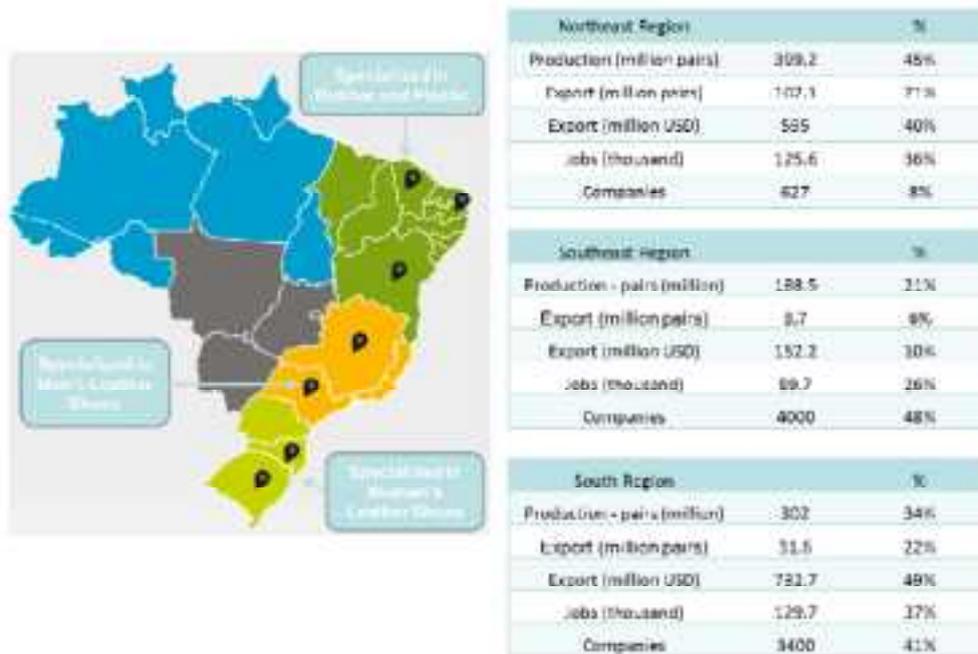


Figure 50 Geographical distribution of footwear clusters in Brazil. Source: *Abicalçados*

⁶⁵ Industria de Calçados do Brasil 2012. Brazilian footwear, Abicalçados, Apex Brazil.

exports, the South Region is responsible for 34 per cent of the Brazilian footwear production and for almost half (49%) of its export value. Furthermore the South Region has an industrial organization which goes well with the industrial cluster model: the production is very localized, concentrating almost all in the State of Rio Grande do Sul, and the woven fabrics are all small or medium enterprises, employing on average 38 people.

The Brazilian state of Rio Grande do Sul has a long history in the footwear industry, which dates back to the XIX century, when the first Germans and Italians migrated from Europe. They started small business activities in the state and diffused the knowledge about industry and crafting techniques, including techniques about leather tanning and processing as well as the leather footwear, garments and accessories craft. The Synos Valley footwear cluster in Rio Grande do Sul had its origin during the war against Paraguay (1864-1870), during which the emergent German leather craft shops gained momentum with the high demand of leather equipment of horse-riding which led to the establishment of tanning plants and machine manufacturers around the Synos Valley region. The history of the footwear cluster in Rio Grande do Sul could be divided in four main phases: the Import substitution phase (pre-1969), marked by the formation of around 400 shoe industries in the region, which produced footwear for the domestic market. In this phase the Brazilian Government activated a protectionist policy reserving the domestic market exclusively for Brazilian enterprises. This let the small and medium fabrics to establish backwards and forwards linkages among them, incentivizing the establishment of specialized suppliers. The second phase (1969-1985) was characterized by a rapid export growth. In this phase fundamental was the action of a group of business men who activated some commercial flows from Brazil to the US and thereafter to the European continent as well. The actions of that group were significant in obtaining subsidies and export incentives. Once the first connections were in place, Rio Grande do Sul rapidly grew to become a lead supplier of leather shoes to the US and European markets, with the level of export growing 25 per cent per year (Licks, Holand et al., 2012), leading to a growth in terms of size of the enterprises which were part of the cluster. Huber Schmitz described this phase as follows: “ *For most of the 1970 and 1980s there was mainly quantitative growth, that is, expansion of capacity to make low-priced, wage sensitive shoes. The cluster only changed gear and moved into*

*qualitative growth when it was pushed from outside to do so*⁶⁶. In order to achieve economies of scales firms shift from small to large scale, imitating the Fordist model and distancing them-selves by the concept of cluster. Furthermore, often market research efforts in foreign markets, design, innovation, technical assistance were left to the export agents, compromising the innovation capacity of the Brazilian firms and limiting their strategic options in the future. The following phase (1986-2000) was, indeed, characterize by a period of recession. Disruption in the cluster's export driven mass-production model came during the mid-80es from increased competition from China's lower-priced leather shoe manufacturers (Licks, Holand et al., 2012). With the entry of the Chinese firms in the global market a price competition for Brazilian shoes producers was not bearable any more, this is why many of them tried to focus on higher value niches. This change of strategy led to the export oriented mass-production model to be unviable, and firms started to downsized and turn towards a more flexible production model. Finally the fourth phase started from the 2000 with a worsening of the economic environment for the firms in the Synos Valley cluster. The increasing appreciation of the local currency with the even fiercer Chinese competition led to a further decreasing of the export volume. On the other hand, starting from 2002, domestic demand coming from a growing middle class became essential for the cluster vitality. With its larger income, the Brazilian middle class constantly increased its shoes consumption, and make the firms of the cluster change its strategy, redirecting its productive resources and capabilities to the domestic market. As a consequence of the volatility of the domestic market, a flexible industrial structure was needed, leading to the permanence of the small scale enterprises in the cluster, and to the migration towards the North Region of some large scale fabrics. Such migration was motivated mainly by the search of lower-waged labor and lower taxes in order to remain competitive vis-à-vis Chinese shoes-producers. The Synos Valley cluster is aiming to focus on higher-valued products and could be brought as example of how to retain value in the place where it has its origin, creating in this way value which is at the same time economic and social.

⁶⁶ Schmitz, 1995

After having described the origin and the evolution of the Synos Valley cluster in Rio Grande do Sul, the structure of cluster and its networks and inter-linkages will be analyzed following the Diamond Model framework of competitive analysis by M.E. Porter.

The main key factor on which the footwear cluster in Rio Grande do Sul has been building its competitiveness since its origin is the presence of a dense network of small and medium enterprises distributed across the value chain (Figure 51). As you can see from figure 51, the cluster is structured as a thick network of relationships among firms and other agents, such as input components and materials such as leather, tanning and chemicals, supporting services such as trade agents, fashion and design, advertising agencies and specialized magazines building a geographical agglomeration of interwoven firms and cluster actors, which make easier the diffusion of innovation and information. The leather footwear cluster in Synos Valley has gained a level of development which let it to establish networks and share resources with other related clusters in the state, such as the leather accessories and clothing and the plastic/rubber footwear cluster.

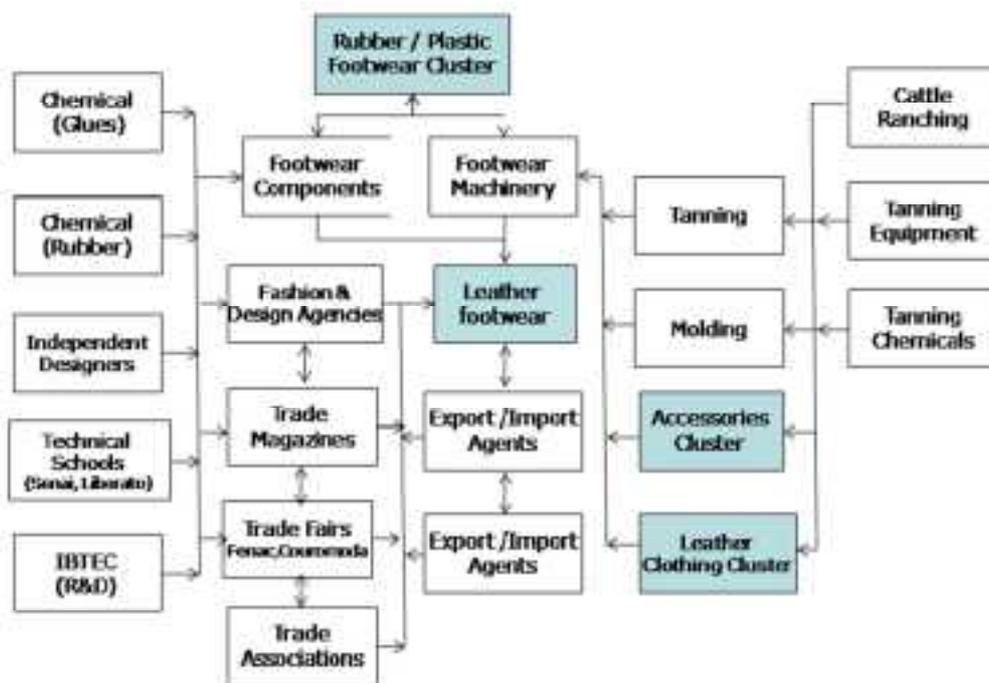


Figure 51 Footwear cluster map. Source: Nadvi,1995

Following the Diamond model we have analyzed the key of success of the Synos Valley cluster as follow: starting from the factor conditions we have identifying the origin of the tanning industry in Rio Grande do Sul in the great availability of crude leather, which has become the modern tanning industry, an essential component of the cluster. Among the factor conditions we includes the important technical school (e.g. Senai and Fundacao Liberato) specialized in the tanning industry, automation, mechanics, and fashion design that represent a pool of specialized labor force that brings high productivity rates and quality to the cluster. Of great importance for the cluster upgrading was the establishment of the R&D center (The *Centro Tecnológico do Couro, Calçados e Afins (CTCCA)*, and the *Instituto Brasileiro de Tecnologia do Couro, Calçado e Artefatos (IBTEC)*) by the private sector. It was instrumental for the acquisition of the technical expertise and know-how necessary to open out to the global market. As regards *Related and supporting industry*, the Synos Valley cluster benefit from a thick presence of related firms, whom origins date back to the intense period of specialization during the rapid export growth phase. In that period the intensive specialization let a significant number of component suppliers arise. A key role was played by the number of export agents who let the cluster to broaden its trade horizons. As for *Demand Conditions*, what comes to our eyes is the extraordinary growth of the domestic demand, which, thanks to the recent poverty reduction, is driving the current economic performance of the footwear cluster. As a result of economic growth, in the period 2003-2011, 36 million Brazilians moved out of poverty and another 10 million moved to upper classes. This trend is expected to continue in the future, being the vital nourishment for those industries which produce consuming goods, such as the footwear industry. The poverty reduction, indeed, lead the domestic demand to increase and become more sophisticated through the emergence of new needs. Consider that in the last decades, consumption in the domestic market increased at an average of 6.4 per cent, larger than the increase in the domestic production. Per capita consumption rose up to almost 14 per cent, reaching an average of 4.1 pairs per inhabitant (Licks, Holand et al., 2012). According to research carried out by some companies operating in the footwear industry, the footwear and the apparel are the sectors that show the larger potential increase among all the consumer good.⁶⁷ Finally we have analyzed the

⁶⁷ See Arezzo 2011

Context for firms strategy and rivalry: to better understand the significance of the context in Rio Grande do Sul for the economic performance of firms operating in the footwear clusters, it is useful to observe some data about Brazilian footwear exports. If we compare the average price of exports we will realize that Synos Valley cluster occupies a top position in terms of competitiveness. Consider that the average price for Brazilian shoes in the external market is US\$ 10, while the average price of Rio Grande do Sul is US\$22 (Figure 5.19). More than twofold! This difference in the export price lead the Synos Valley cluster to have different competitors compared with the other footwear Brazilian cluster which compete with countries like India and Indonesia. As a result, the footwear industry in Rio Grande do Sul suffers less the price competition of the Asian shoe producer, positioning on a higher-level category of product and competing with countries in the developed world, such as Germany and Spain. The strategy which has taken shape in the last decades is clear: with an export price that in 2009 was more than 100 per cent superior than the average export price in 2000, footwear cluster in Rio Grande do Sul is focusing on product with a higher added-value. This strategy seems to be very effective: although Rio Grande do Sul has left its position as the largest exporter in volume terms to Cearà, it still ranks first in term of value. As for the rivalry context, the Synos Valley clusters benefit of a structure which let the firms in the cluster to be very competitive among them. Indeed, the cluster is based on a large number of small firms, which create an intense rivalry. From 2002 until

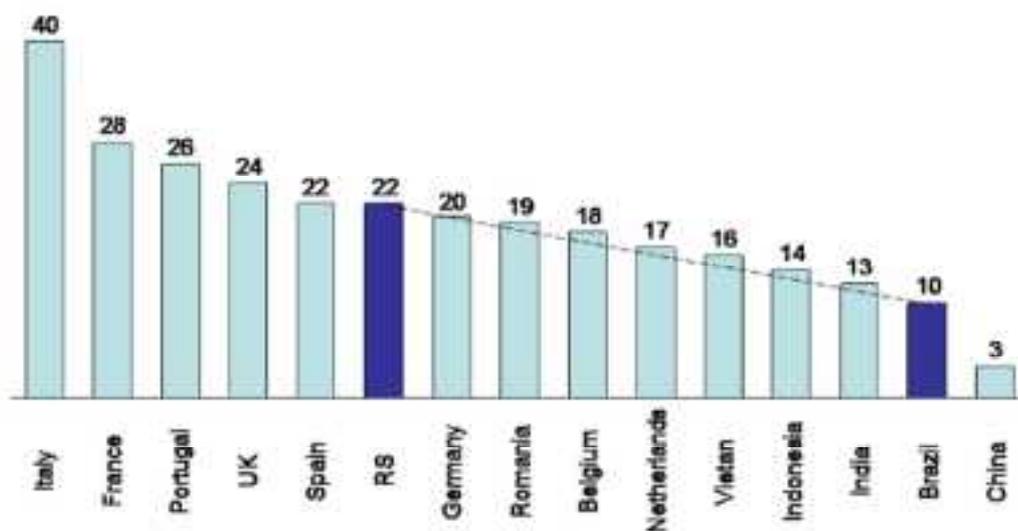


Figure 52 Average export price (US\$) among top world exporters (2010). Source: World Footwear Yearbook (2011)

2010, the number of firms increased 18 per cent, and among the almost 3,000 firms, the

number of those considered medium and large was reduced. The footwear cluster in Rio Grande do Sul adopt a methods of production based on a network of small firm with less than 50 employees, that let it be more flexible and focused on fashion- driven design. As for the role of local government, the main actions and policy are formulated and activated by some sectorial institutions such as AICSUL (Associação Das Indústrias De Curtumes Do Rio Grande Do Sul), ABRAMEQ (Associação Brasileira De Máquinas Para Couro, Calçados E Afins), ASSINTECAL (Associação Brasileira Das Empresas De Componentes Para Couro, Calçados E Afins), ABICALÇADOS (Associação Brasileira Das Indústrias De Calçados), and more generals ones such as SEBRAE/RS which deals with small and medium enterprises, ACI/NH/CB/EV a trade, industrial and services institution, etc.⁶⁸

⁶⁸ For further information about the institution involved in the APL of Synos Valley see MAICO FABIANO FERNANDES, 2008, o Arranjo Produtivo Local de calçados do Vale do Sinos: um estudo sobre a atuação dos principais atores locais na cadeia produtiva de calçado. Novo Hamburgo, 2008.

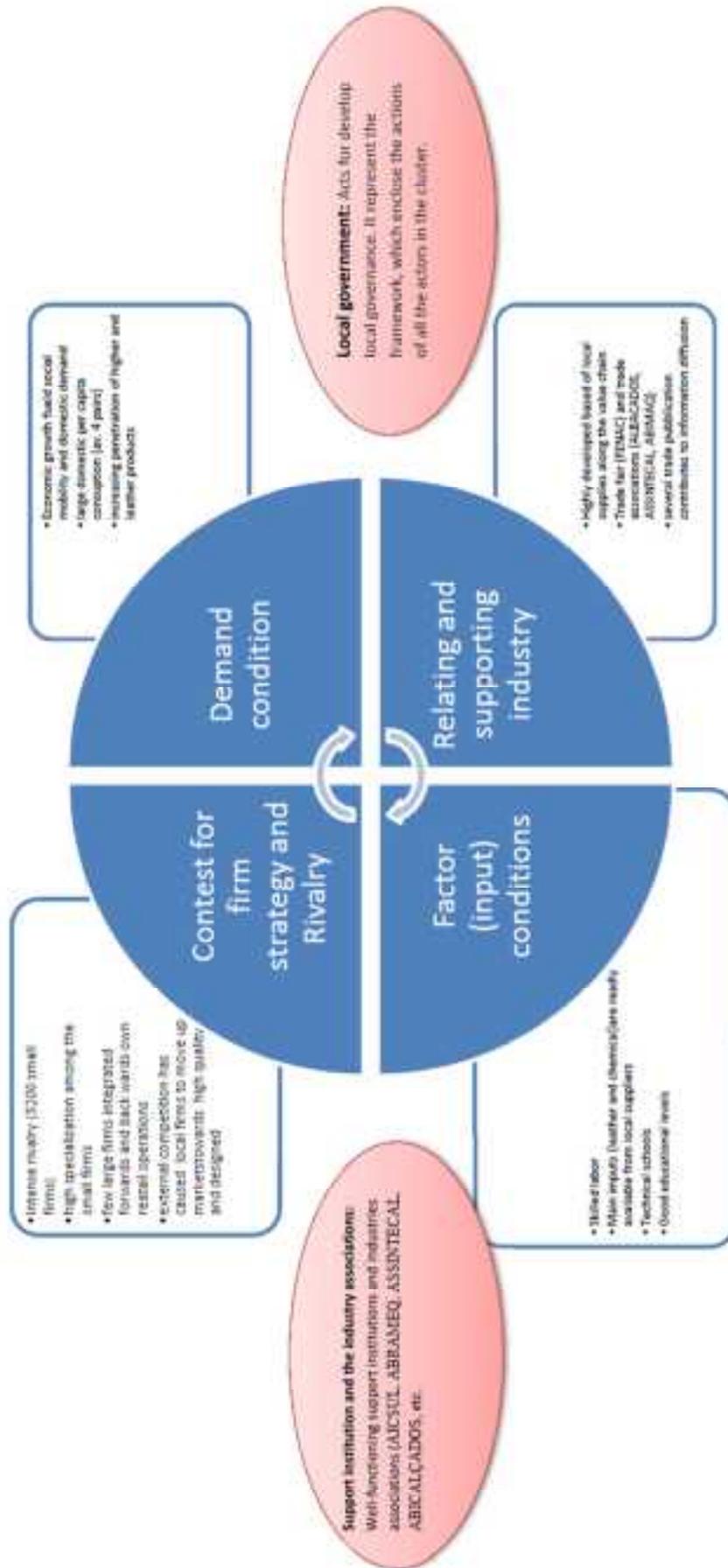


Figure 53 Diamond analysis of Synos Valley footwear cluster. Source: re-elaborated version of "Rio Grande do Sul footwear cluster diamond" by Lick, Holanda et al., 2012

Chapter 6

RUSSIAN INDUSTRIAL CLUSTERS

5.1 Introduction

In this chapter we will try to reconstruct the economic geography of industrial clusters in Russia. We will first have a look to the Russian industrial structure, focusing on its uniqueness, and underlying its differences with that one in the other BRIC countries. Then we will analyze the small scale industry highlighting its weaknesses. The analysis of the Russian SMEs will let us to shift the attention on Russian industrial clusters. In particular analyzing the small scale industry we will get the first insights about why industrial clusters are not so much diffused as in the countries analyzed before. The paragraph about Russian clusters is different from those ones in previous chapters, as we won't reconstruct the economic geography of industrial clusters in Russia, but we will investigate why they are not diffused throughout Russian territories. We conclude trying to answer the question "Will industrial clusters in Russia reach the same level of diffusion as it is in the other BRIC country?"

6.2. Russian industrial structure

Following the same scheme of analysis used in the previous chapters we will first analyze the main features of the Russian industrial structure with some reference to the most recent economic performances. Although Russia has a lot in common with the other countries which together form the BRIC giant, if we consider its industrial structure some differences come to light, we will discuss them later. The main factors that have shaped Russian economy in recent years are its solid growth thanks to firms consumption, which led to an economic expansion that was faster than in Brazil, South Korea and Turkey, something that was unthinkable only two years ago⁶⁹. In the last few years some important achievements have been made, among others the large surplus created in the trade balance which let the current account to be stronger, the decrease in the capital outflows, the restrained public debt⁷⁰, and the creation of a solid labor market, with some relevant consequences for the industrial structure, and the price stability, which together let Russia fight one of its biggest problems, that is poverty: the number of poor people in Russia declined to 16.4 million in the third quarter of 2012, which was almost two million less than a year ago⁷¹. But if we have a closer look, we will realize that “Not all that glitters is gold”! “Pumped” oil prices account for a great part of the recent economic achievement. Oil rules Russian economy and has a great influences on its industrial structure as well. It represent one of the biggest source of wealth determining the reliance of Russian economy on oil. How could be solid an economy which depends on the price fluctuations of a commodity? Russia should maybe try to diversify its economy and industrial structure, adopting some sustainable model of development. Cluster development could be a good solution, even if this industrial model is not very diffused, as we will see later. We will try to understand if

⁶⁹ The World Bank in Russia, Russian Economic Report1, Spring 2013 N°29

⁷⁰ Russian public debt is no more than 10 per cent of the GDP.

⁷¹ The World Bank in Russia, Russian Economic Report1, Spring 2013 N°29

this model is suitable for a country like Russia which differ for many aspects from the countries analyzed before. If cluster development is a suitable solution or not, what has to be put as one of the most urgent issues in the economic agenda of the Russian government is the decrease of its reliance on oil. Although black gold brings huge incomes into the country, rarely represents real growth and being dependent on it is very far to be sustainable. The economic performance in the first half of the 2013 has revealed how weak could be an economy based on commodities. With oil prices less “pumped” than the last years, industrial output has declined in early 2013 and the brilliant momentum that Russian economy experienced just a couple of years ago seems already to be dead away. This has led Russia to stagnate in the global economic rankings: in terms of economic size, Russia gained 10 positions (from 18th to 8th position) in the period between 2000 and 2008 , but no more progress has been made until now, and the World Bank has recently estimated that, by 2014 growth in Russia will be lower again than in Brazil, South Korea and Turkey. A new macroeconomic policy is needed, and some important issues about Russian industrial structure have to be tackled. After this brief introduction about the recent general economic scenario we will now describe the main traits of Russian industrial structure and its latest performance.

6.1.1 Russian industry sector: evolution and structure

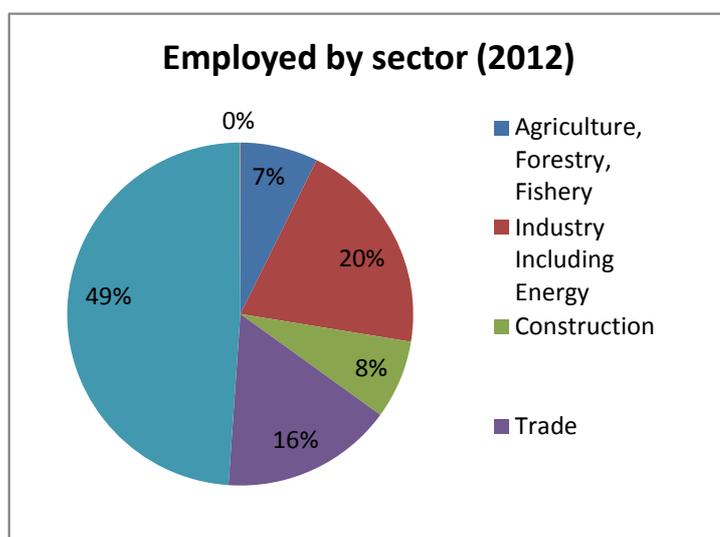


Figure 54 Employed people by sector. Source: Rosstat

As done in the analysis of the other BRIC countries, some general economic and industrial data will be discussed: as regards employed persons by sector in 2012, the sectors which recorded the largest share is the service one, as we have

seen in the other countries which have been analyzed although the share is less predominant. The graph below shows that the industry sector still employs a relevant share of the population accounting for the 20 per cent of the total, of which the manufacturing sector accounts for about 15 per cent.⁷² As for the contribution of the three groups of economic activities in terms of the GDP, the greatest contribution is given by the service sector which accounted for the 60 per cent of the total GDP in 2012, while the secondary one accounted for about 36 per cent. The contribution of the industry sector could be greater than it appears if we consider, as we will see later, that Russia has still a lot of empty space to fill in in the global value chain. (Figure 6.2)

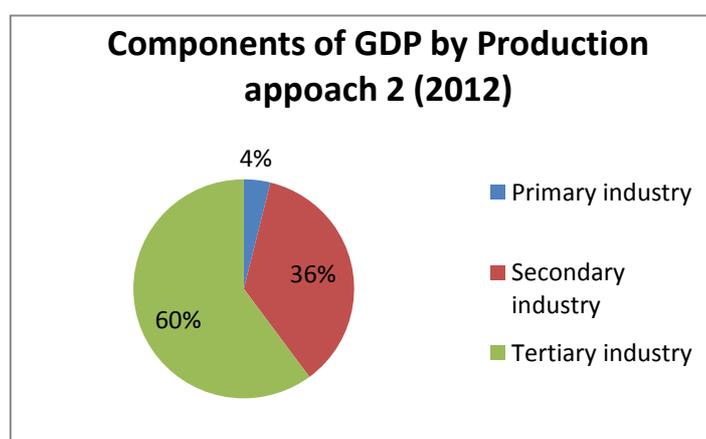


Figure 55 Components of GDP by Production Approach. Source: BRICS joint statistical publication 2013

As for the enterprise distribution by industrial sector, the largest share is held by the manufacturing sector which accounts for more than the 80 per cent of the total acting organizations, followed by electricity and mining and quarrying (see figure 56).

⁷² Rosstat

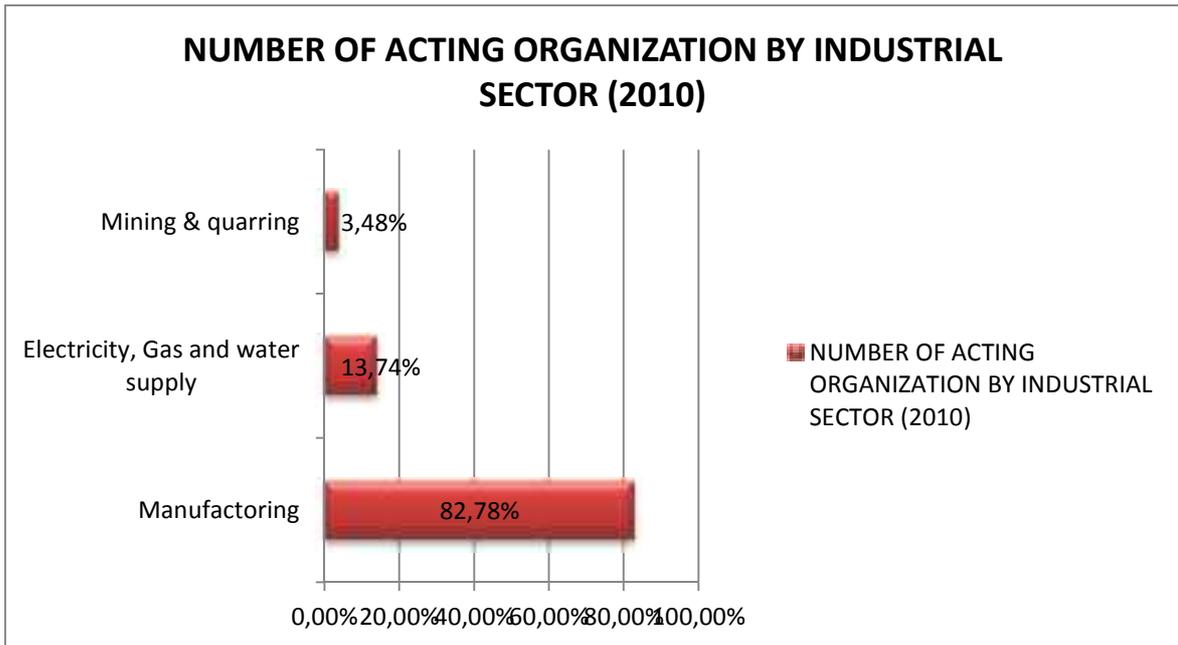


Figure 56 Acting Organization by Sector. Source: Rosstat

In order to reconstruct the economic geography of industrial clusters in Russia, and first of all to understand how likely is this model of industrial organization to get diffused in Russia, some words about the specialties of Russian economic geography are needed. The biggest factor that explains the allocation of economic activities in Russia today is the legacy of the Soviet system. The unique geographical distribution of Russian

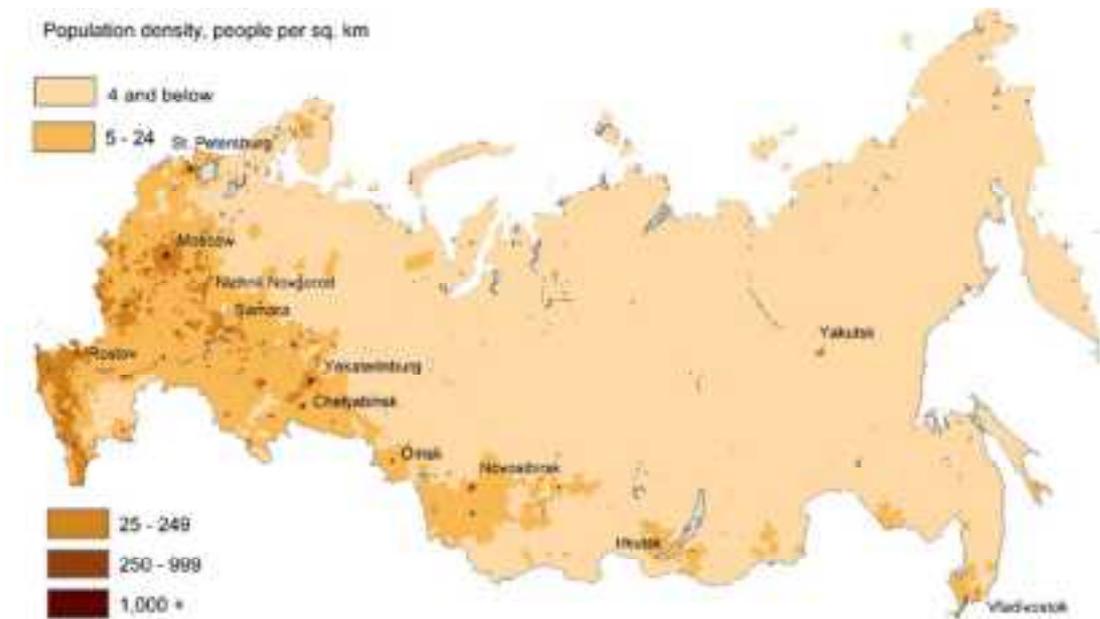


Figure 57 Russian Population density. Source: Andrei Markevich and Tatiana Mikhailova (2012) Economic Geography of Russia

industrial activities is due primarily by three main reasons: its physical geography, the state intervention, and its national history. Going in order, the strict physical geography makes Russia uninhabited (65%) for the majority of its vast land area and causes big accessibility problems. As a result what we aspect is a high rate of demographic concentration, and consequently a high rate of concentration of the economic activities. Physical geography presents, indeed, natural constraints to the distribution of economic activities over the territory. Given such climate and land endowment, it is not surprising that Russian population is concentrated in the areas with relatively favorable natural conditions.⁷³ The most part of the Russian population live in less than 20 per cent of the total land endowment, that is the eastern part of the country and a narrow strip along the Ural mountains. Despite that, if compared with other countries, Russia has a modest rate of concentration. Physical conditions are maybe the factors which had the highest influence on shaping Russian economic geography. As the enormous value that

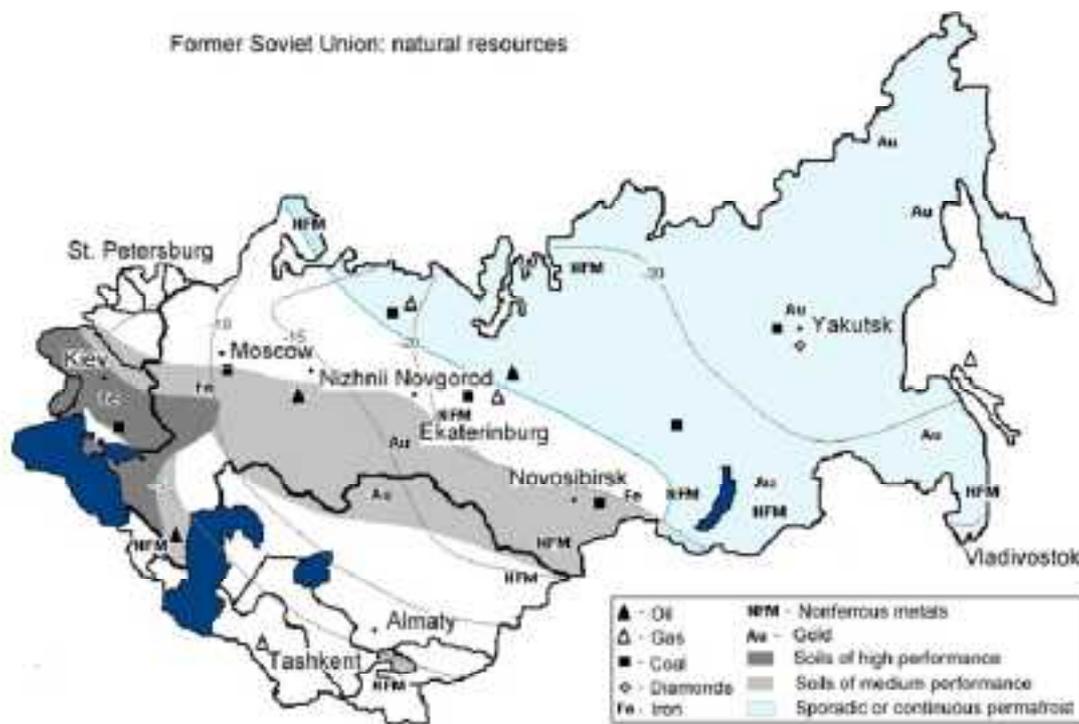


Figure 58 Russian natural Resources. Source: Andrei Markevich and Tatiana Mikhailova (2012) *Economic Geography of Russia*

⁷³ Andrei Markevich and Tatiana Mikhailova (2012) *Economic Geography of Russia*. New Economic School, Moscow.

natural resources had and still have for Russian economy, they have been part of the most important economic decisions since centuries ago. The desire to exploit the natural resource in Siberia and in the Far East caused the spatial expansion of the Russian Empire and has been always an essential determinant of the state policy. The majority of Russian natural resources are located in very hostile territories and therefore, their exploitation is expensive. Despite that Russian governments had always believed that it was a cost worth to shoulder with big consequences in the current economic geography of Russia. The other aspect that had a huge influence on shaping Russian spatial structure was the Soviet Union's central planning. Hill and Gaddy (2003)⁷⁴ studied the inconsistency of Russian economic geography: a great share of population located in a very hostile area, far from the major world markets. This is the result of the Soviet Union policies, which put enormous resources into moving millions of people to Siberia, the North, and the Far East, where permanent settlements were developed. Overall, the result of the 70 years of the Soviet rule was a major shift of population, infrastructure, and capital to the eastern parts of the country. That was not the only fact that contributed to shape such a bizarre economic geography, other resources allocation policies had great influence. Those policies were implemented by the Soviet union on the basis of "the growth-oriented" and "equality-oriented" principles. While the first ones had to ensure an efficient exploitation of natural resources, the latter would have led to achieve a geographically balanced growth. The implementation of this planned economy did not have homogeneous consequences: it led to concentration of economic activities in the East part of the country and, at the same time, actuated a process of scattering of the population.⁷⁵ The effects of this strict economic planning still persist and the change towards a market oriented economy through a process of spontaneous allocation of economic resources (natural, labor, etc.) still suffer the meddling of the public sector. Spatial structure of the economy is slow to change, especially in Russia, where, as we know from the evidence of the last 20 years, mobility of population is still

⁷⁴ Andrei Markevich and Tatiana Mikhailova (2012) *Economic Geography of Russia*. New Economic School, Moscow.

⁷⁵ For more details see Andrei Markevich and Tatiana Mikhailova (2012) *Economic Geography of Russia*. New Economic School, Moscow.

rather limited. What will be the location dynamics of Russian industries is still an open question. Another set of questions has to do with regional policy. One of the features of Russia's spatial economy is its demographic and economic scattering. There are too few people spread over too much territory. Studies on Russian economic geography predict that, as a part of the global trend, and as a reversal of the Soviet misallocations, we should expect further concentration of economic activity in favorably located agglomerations in Russia. But this means that some territories would be losing population and stagnating, creating what Dienes⁷⁶ (2002) describes as “Archipelago Russia”, which consists in some vibrant cities surrounded by underdeveloped dead-space.

6.1.2 Exploring performance at the industry level

Taking a closer look at the industrial structure, three groups of industrial sectors could be determined: basic, supporting and infrastructure.⁷⁷ While basics sectors are agriculture, mining, manufacturing, and software development, supporting sectors are those market sectors that either facilitate the distribution of goods, support production, or produce goods and services that can be traded only locally⁷⁸ (construction, real estate, hospitality, etc.). Finally infrastructure sectors comprises those “supportive” sectors, that are functional sectors to the previous ones such as government services, educational and health, utilities, transport, and communication. For the aim of this thesis we will look with more interest at the basic sectors, as we will investigate how much industrial clusters are diffused and how likely is this industrial model to get diffused on Russian territory. So that the structure, the performance and the weaknesses of the basic sectors

⁷⁶ Andrei Markevich and Tatiana Mikhailova (2012) *Economic Geography of Russia*. New Economic School, Moscow.

⁷⁷ Individuated by the World Economic Forum. See Margareta Drzeniek Hanouz, World Economic Forum “the Russia competitiveness report 2011- Laying the Foundation for Sustainable Prosperity”

⁷⁸ See Margareta Drzeniek Hanouz, World Economic Forum “the Russia competitiveness report 2011- Laying the Foundation for Sustainable Prosperity

will be analyzed, without overlooking the other ones. As is well known clusters are models of industrial organization which include all the activities which are complementary to the core industrial activity, so that the analysis includes all the activities and services which are linked to the basic sectors.

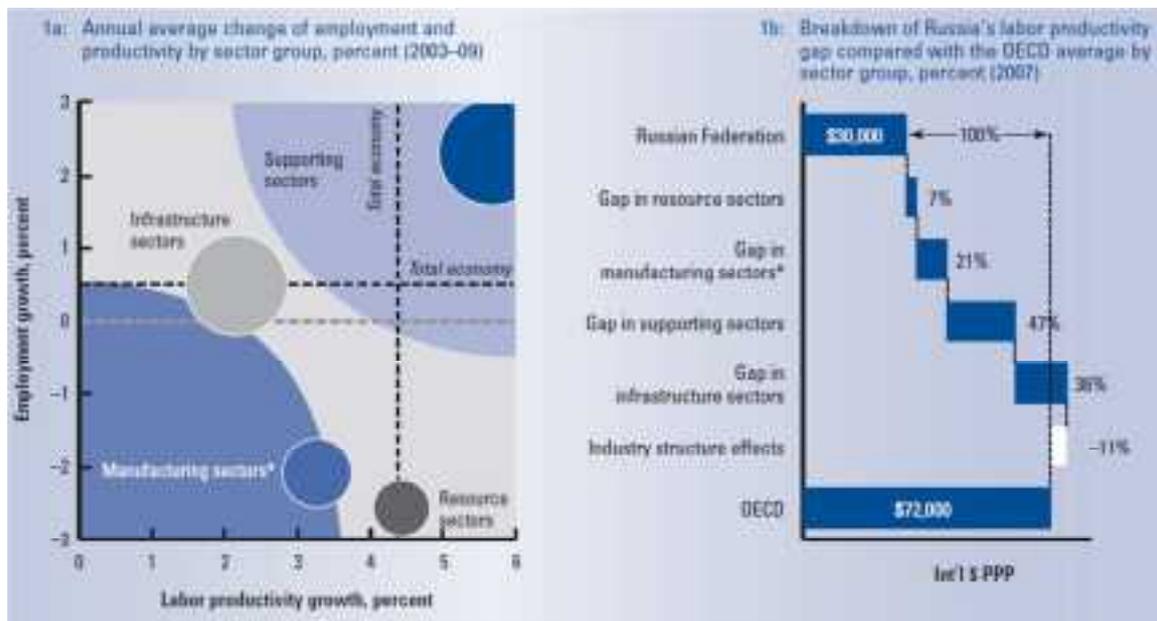


Figure 59 Russian employment by sector and productivity. Source: *The Russian competitiveness Report (2011)* WEF

In terms of growth, which in this case is measured by the rate of employment and labor productivity growth (see figure 59), the best performing sectors are those ones belonging to the supporting sectors, where the intensity of competition is higher. Many basic sectors suffer the government “intrusion”, being often the public sector the main proponent or owner. The infrastructure sector lives the worst situation, where there’s no space for private companies and the government is the only owner. Interesting to notice is that the manufacturing and the resources sectors, which are both included in the basic category, experienced between 2003 and 2009 a growth in term of labor productivity but a decrease in term of employment growth, due to the process of automation. Infrastructure sectors did not grow in employment, while productivity grew slowly. Overall, infrastructure productivity in Russia was three times lower than it was in OECD countries⁷⁹, which could be solved with a less predominant presence of the

⁷⁹ See Margareta Drzeniek Hanouz, World Economic Forum “the Russia competitiveness report 2011- Laying the Foundation for Sustainable Prosperity

government. Structural transformation is not occurring in any infrastructure sector, and such fundamental change is essential for further development of these sectors, and of the industrial sector as a whole.

Supporting sectors were fast growing in both productivity and employment, with finance leading the growth, following the path of development of most part of the developing countries where the service sectors are “booming” (as we have seen for the countries analyzed in previous chapters). This sector has been, and is still, emerging and its growth fills an “empty space” .The productivity gap in supporting sectors remains large (47 percent of the total gap. See figure 57) and further rapid growth is necessary for productivity improvements. More than half of this gap is determined by low productivity in the labor-intensive construction and real estate sectors. Productivity is gradually improving there but many problems still persist.⁸⁰ A more detailed analysis of the basic sector will follow:

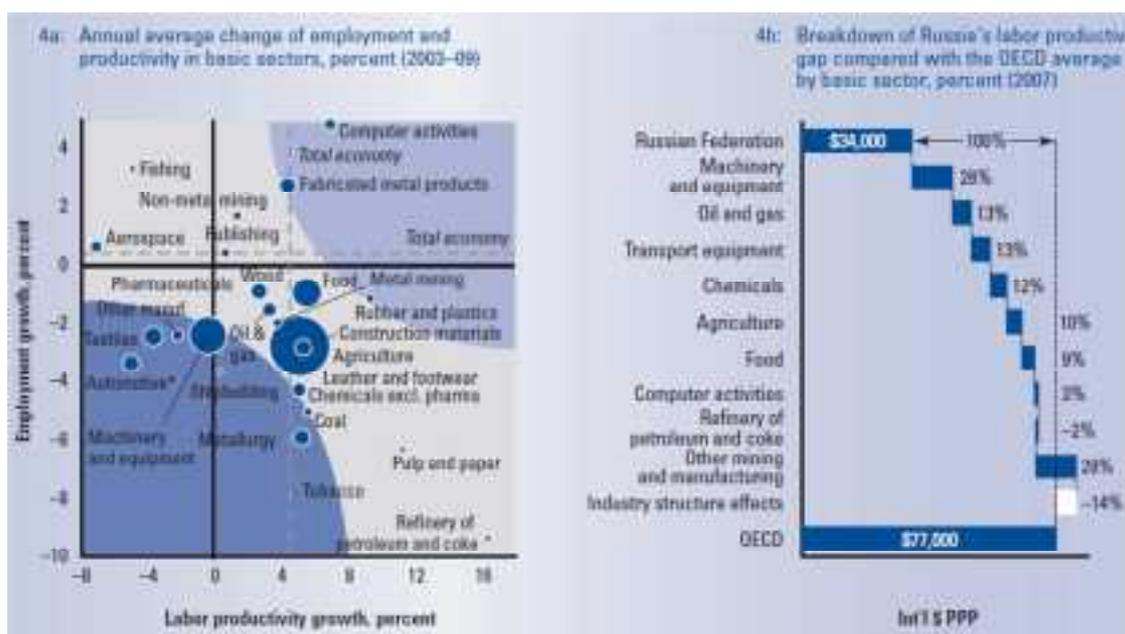


Figure 60 Russian employment and productivity (basic sector). Source: The Russian competitiveness Report (2011) WEF

⁸⁰ See Margareta Drzeniek Hanouz, World Economic Forum “the Russia competitiveness report 2011- Laying the Foundation for Sustainable Prosperity” page 7.

Resource sectors, which represent one of the biggest source of wealth for the country, raise productivity but do not create net new jobs. This is why these sectors could be defined as the less sustainable as often results of the growth don't involve the whole society but remain confined in a few layers of the society. As for the manufacturing (including software) sectors, the best performing were computer activities, and those activities which deal with the resource sectors as fabricated metal products, and rubber and plastic. Productivity also grew rapidly in oil and gas refinery, metallurgy, coal mining, food processing, chemicals (except pharmaceuticals), tobacco, and pulp and paper. Most of these sectors are characterized by intensive market competition, and are those sectors where the presence of the government is less predominant. These results suggest a change in the role of the Russian government in the economy. The same conclusion could be drawn looking at data about machinery, equipment, and transport equipment. In these sectors both employment and productivity decreased. They are indeed the most seriously affected by the economic crisis of 2008–09, and the government is the most important player in these industries. As regards labor productivity, machinery and equipment and transport equipment account for 40 percent of the total productivity gap between basic sectors in Russia and those of the OECD countries. Another 40 percent is the result of lower productivity in the oil and gas, mining and refinery, chemicals, and agriculture and food sectors. This data could lead to formulate different scenarios of development: someone proposes to abandon manufacturing because of its weak productivity and to exploit Russian resource endowments through renting them, and at the same time developing more sophisticated market services, giving as a result more importance to the development of the third economy. On the contrary others insist that industry development, especially manufacturing, should be the highest priority. Statistics and cross country analysis, however, show that the truth is somewhere in the middle: manufacturing still matters for economic development, while new jobs could be created in competence-driven manufacturing.⁸¹ This could be explained referring to the process of development experienced by the most part of the countries: employment share in industry tends to decrease after some critical point and employment declined is compensated by

⁸¹ See Margareta Drzeniek Hanouz, World Economic Forum “the Russia competitiveness report 2011- Laying the Foundation for Sustainable Prosperity” page 9.

productivity gains. This is exactly what Russian industry has been experiencing in the last decade. These gains should include both an increase in labor productivity and the shift towards higher level of the value chain, which consist in focusing on sectors that depend less on natural resources and are more knowledge-based. One of the reason of the drop of the Russian global competitiveness of the last few years was its inadequate capacity in the creation of new jobs, something that, on the contrary, some of its nearest countries have done with success (most notably the Czech Republic, Slovakia, Hungary, and Poland). To conclude, Russian government should focus on industrial policies which could make more “sustainable” those manufacturing sectors which are dependent on natural resources, and on industrial policies which aim to create new jobs in those sectors, linked to the manufacturing ones, which could let Russia goes one step further in the global value chain.

To conclude this first part, the main features of Russian industrial structure could be summed up as follow:

- Great influence of the Soviet Union Planned economy on the current industrial structure;
- Great urban concentration;
- High dominance of the heavy industry due to the dependency of the country on natural resources;
- Industrial allocation in proximity of natural resources, located in very hostile territory;
- Demographic concentration in areas of the country which are different from the industrial allocation;
- Although concentrated nearby natural resource, Russian industry tends to be more equally distributed than in other countries⁸²;

⁸² Ellison and Glaeser (1997) calculated Ellison-Glaeser indices (indices of spatial concentration which has the advantage to remain invariant to the country land area and population size) for 2-digit SIC industries in Soviet Russia in 1985 which was compared with the same indices for the USA (calculated by (Rosenthal and Strange 2001)). The benchmark was the population distribution, i.e., if we distribute

- Only a few of the industries are more concentrated than in the US: wood, paper, machinery, primary metal.
- Some manufacturing sectors are dominated by few industrial plants, for this reason they present a high rate of industrial concentration;
- The equality oriented policy of the Soviet Union led manufacturing in consumer goods (apparel, leather, furniture and tobacco) to be very dispersed losing effect of horizontal spillovers.

We will use this considerations to understand how much clusters are diffused all-over Russian territory, how likely could be the development of such an industrial model, and what could be the positive effects linked to its development. Before trying to answer these questions, in the next paragraph we will briefly describe the current situation of Russian Small and Medium enterprises, as done in the previous analysis.

industrial establishments across regions randomly, with the probability density equal to the regional population share, the expectation of the Ellison-Glaeser index for such an industry would be zero.

6.3 Russian Small and Medium Enterprises

“The Russian business climate for SMEs looks unattractive when compared to the rest of the world. Russia lies in the latter half of the rankings in a majority of factors, and in some cases is close to the very bottom.”⁸³ (Figure 6.)

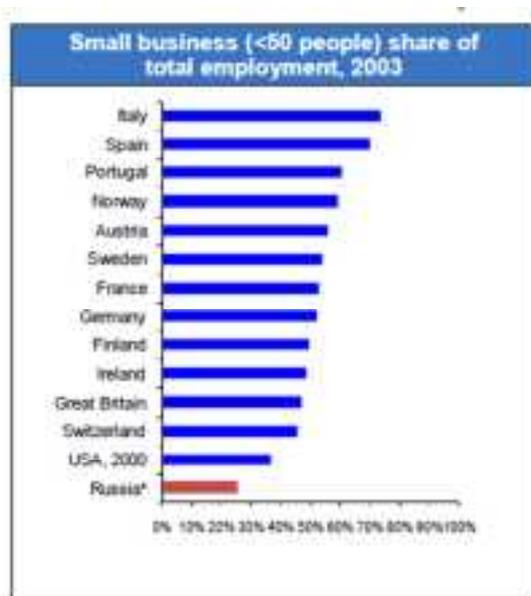


Figure 61 *Small business share of total employment. Source: Bauman innovation*

This is what OPORA , an association which deals with SMEs development in Russia said in one of its latest survey. The biggest problems afflicting Russian SMEs are lack of financing, skilled workers , above all of qualified managers, and innovativeness. This is what came to light in “OPORA INDEX 2010-2011”, the latest report by OPORA RUSSIA regarding the business climate throughout Russian regions. The report highlighted that Russian SMEs have to deal with some other problems, besides the above mentioned one, which regard purchasing power and infrastructures, that even if less urgent than lack of finance, knowledge and innovativeness, need to be solved in a

⁸³ Alexey Prazdnichnikh. VI Knowledge Economy Forum. Ancona, Italy, June17-19 2008

short time in order to guarantee a solid development for Russian SMEs. Finally, Russia looks relatively good in three of nine rankings, which together form the global index. These are: labor costs, administrative regulations, and changing the organizational structure of a company. In this case too, data have to be read carefully, the relatively high evaluations provided by Russian companies in the last two factors might simply be a result of the lack of experience in these areas of Russian SMEs. The report highlighted what are the big weaknesses of this sector in Russia, legacies of the planned industrial structure dictated by the Soviet Union. Government and public sector are looking at small scale enterprises with interest only since recently. Prevailing opinion among companies indeed is that regional authorities do not pay sufficient attention to SME development issues. From this first part of the analysis of the SMEs environment in Russia big disparities with the countries analyzed before are perceived. India and Brazil consider small scale industry as a wealthy heritage and as a source of development. Small enterprises are an essential part of the industrial structure in China as well. Russian industrial structure have been shaped, as we seen in the previous chapter, by the strict industrial measures of the Soviet Union which favor the development of an economy based on heavy industry where oligarchy dominated the entire Russian industrial apparatus. Although a phase of metamorphosis has been undertaken, certain features of the inherited soviet industry still remain and unlikely they will be changed in the future, despite that this doesn't mean that further development for Russian SME sector is excluded.

Data about the number of Russian SMEs and their sectorial distribution highlight the differences with the countries analyzed in previous chapters (India, China, and Brazil), and show the lower level of development of the Russian SMEs. In 2011 the Russian State Statistics Service (Rosstat)conducted the first SME census, including individual entrepreneurs, micro-, small and medium sized companies highlighting, for the first time, which of them are actually operating SMEs, showing, as a result, the real significance of the phenomenon.

Table 16 Russian SME. Source: OPORA RUSSIA

Individual	Micro	- Small	Medium	SMEs,
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	entrepreneurs	enterprises (legal entities)	enterprises (legal entities)	enterprises (legal entities)	total
Number of officially registered SMEs	2.9 mln.	1.4 mln.	229 thousand	25.7 thousand	4.6 mln.
Number of operating SMEs	1.9 mln.	1 mln.	227 thousand	25.7 thousand	3.2 mln.
Employment, persons	5.3 mln.	3.9 mln.	7.2 mln.	2.6 mln.	19 mln.*
Sales revenue, trillion RUR. (1 trillion = 1012)	4.5 (111.9 bln. euro)	5.7 (141.7 bln. euro)	13.3 (330.7 bln. euro)	7.3 (181.5 bln. euro)	30.8 (765.9 bln. euro)

**For reference: 19 mln. people is 13.3% of total population in Russia. www.gks.ru*

Russian small and medium enterprises have an average size of 4 employees for a micro-enterprises, which represent the overwhelming majority of the operating small enterprises (85.9 %), 32 employees for a small enterprise, and 101 for a medium one. As for the structure of Russian SMEs by sector, traditionally the largest share of SMEs operated in trade, car and other repair services (38%), operations in real estate and other services (21%), construction (11%), following the same trend observed in the analysis of the SMES sector in the other BRIC countries. Quite large is the SME share in mining, manufacturing, production and distribution of electricity, gas and water (11%).

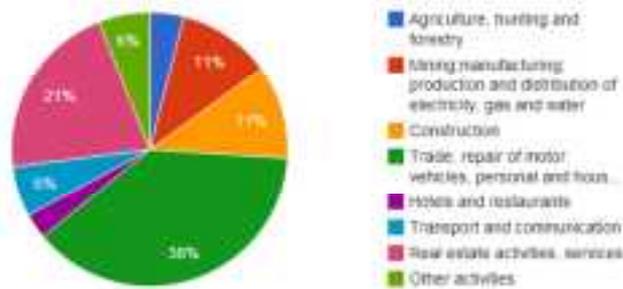


Figure 62 Russian SMEs by industrial sector. Sources: Rosstat 2011

In order to understand which part of the Russian territory offers the best business climate for SMEs development we will refer to the above mentioned OPORA’s report. An analysis of the distribution of small scale industry throughout Russian territory was not possible, as data were not available. Obviously we can get a sense on their geography referring to demographic distribution: SMEs are likely to be located in the populated areas of the country, that are eastern Russia and the narrow belt of the Ural mountains. OPORA classified 40 Russian region by the index of SME development environment (Figure 62), which is build through five main variables, that are (1)Real estate and infrastructure, (2)availability of human resources, (3)availability of financial resources, (4)administrative climate and security, (5)System of suppliers. We used this ranking as tool to understand which regions are more likely to be a suitable environment for cluster development. The variables considered for the evaluation of the OPORA index are indeed factors which cause the formation of localized industrial clusters. We suppose, as a result, that regions with high values of the index of SME development environment could be a breeding ground for clusters development. In figure 63 we can see Russian regions with the rank for business climate for SMEs development: every region is labeled with one of the “traffic-light” color, with each color showing one of the three possible positions of a region: green means that the region is one of the ten leading ones, red means that the region is one of the ten worst ones, and yellow means that the region is between the leading and the lagging ones. The first position in the ranking is occupied by Moscow region. Analysis of each variables proves that it is an absolute leader in the quality of the environment that it offer for SMEs development.

The region offers the best in terms of four of the five variable considered in the index: “Real estate and infrastructure”, Human resources”, Financial Resources”, “System of suppliers”; on the contrary “administrative climate and security” looks relatively weak. What let Moscow region achieve the top step of the podium is its closeness to important business resources, in Moscow region there are better opportunities for choosing skilled workers, in addition to that salaries in the region are significantly lower than in Moscow itself, which decrease the cost of doing business. Another important factor is the vicinity to Moscow financial resources, supplier, transport and logistics infrastructure of the city. The second place is occupied by Krasnodar Krai. Overall this region outpaces the others thanks to high availability of financial resources and to the regional economic policy, which has been oriented towards creating favorable environment for SMEs (thanks to the absence of large-scale industries in this area! Otherwise efforts would probably concentrated on them). Chelyabinsk region occupies the third place, although there is a big gap between it and the two leading regions. The region achieves the third place thanks to its good position in term of System of supplier and availability of human resources. Despite some diversities, these three leading regions have a lot in common: they all have a large population, a fairly stable economic situation, and relatively well-developed infrastructure. Although these factors could be considered as basic factors for the development of a vibrant business environment, many other regions with similar characteristics (large population, advanced economy and high quality infrastructures) have not merely failed to reach leadership position, but actually ended up near the bottom of the ranking. Examples are both Khabarovsk Krai and Rostov region that have the potential for good SMEs development, but have failed to act on that potential so far, and are below the national average in all areas. Moreover, leading position in any individual basic factor does not directly mean high quality for SMEs development, what is needed is a calibrated mix of all factors: no one basic factor, such as regional and capital city population, quality of infrastructure, proximity to ports or hubs, good level of economic development, presence of financial clusters guaranteed a high ranking.

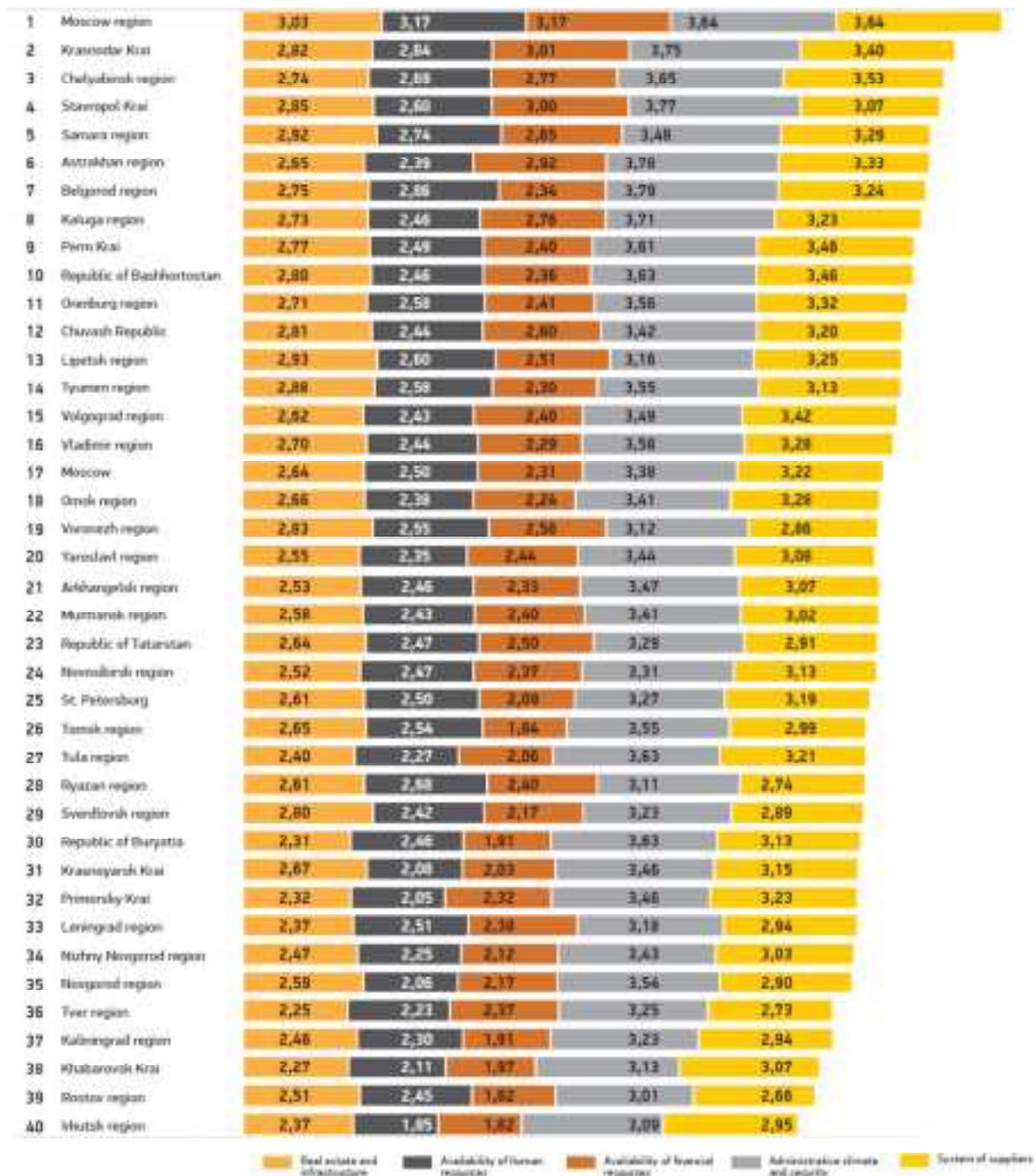


Figure 63 Ranking of the 40 regions by the sme development environment index. Source: OPORA INDEX 2011

On the basis of this survey we retain that the regions which offer the best environment for SMEs development, and as a result, for SMEs clusters development are the leading ones in the OPORA index. We indicated these regions on a map in order to get an idea on how they are geographically distributed throughout the country.



Figure 64 Best Russian regions for SMEs development. Source: Author

The map shows that regions which offer the best conditions for SMEs development are those ones where Russian population is concentrated. We can add that areas in proximity to big cities are favorable environment for SMEs development, as well as areas with high level of accessibilities (ports, or logistical facilities, etc.).

As for policies, Russia seems to lag far behind in developing focused and effective measures for supporting SME sector. 22 per cent of the enterprises surveyed by OPORA state that regional administration does not pay any attention to SME development, the 31 per cent consider the attention to be scarce; the 26 per cent state that there is some attention, but is not always sufficient; only 5% of the companies feel that SME development in the region is a priority for regional administration. Russian government has recently predisposed tools for SMEs development, which have been implemented through the Federal Law (N 209-FZ) “On developing Small and Medium Entrepreneurship in the Russian Federation”. On the basis of this law the main methods of supporting SME development is “availability of small and medium business support infrastructure for small and medium business entities”. The survey reveals that very few companies are utilizing or even aware of this infrastructure. Besides the support infrastructure there are business incubator, industrial park, SMEs guarantee funds, and

property catalogues⁸⁴ for SMEs support. Worthy of note is that in this law there's no trace of clusters as tool of SMEs development. This makes us think about the awareness on cluster as tool of development, that seems to be totally absent in Russia. *Entrepreneurial activity, SMEs and cluster development are three important interrelated "ingredients" of Russian economy diversification and regional development.*

⁸⁴ SME property catalogues were created in order to address the difficulty that SMEs have in obtaining facilities and land, and are intended to provide properties to eligible SMEs on favorable terms.

6.4 Why do industrial clusters have a low level of diffusion in Russia?

Cluster development, as seen in previous chapters, is now attracting attention in many countries, especially in emerging and transition economies, where special attention is given to their economic and social potential. The impressive development of some industries in the BRIC giant is often attributed to cluster policies conducted by government and international organization. While industrial clusters seem to be well diffused in three of the BRIC countries, that are India, China and Brazil, the same thing could not be said for Russia, where clusters seem not to have the same level of diffusion. Still, not all the economies are equally successful in pushing cluster initiatives for enhancing their global competitiveness. “In particular, Russia so far has failed to get the effect from collaborative networking of local organizations, in contrast to China and India”⁸⁵. The low level of innovation in the overwhelming majority of Russian firms could be explained with the weak diffusion of clusters initiative. In 2007 only the 8.6 per cent of the Russian firms were involved in innovation activities (HSE Publishing, 2009, p. 459). Pursuant Rosstat report (2012) Russian SMEs are innovating less than the average of the total number of Russian firms: in 2009 only 3.1 percent of all SMEs. In order to understand how much clusters are diffused throughout the Russian territory some comparisons with the other BRIC countries (analyzed in previous chapters) will follow. The approach of the following analysis is based on Porters’ diamond model with references to a recent study on industrial clusters in Russia conducted by the school of economics in Moscow⁸⁶. Among the four element analyzed, which together form the famous diamond, Bek et al, put a lot of emphasis on the analysis of the competitiveness

⁸⁵ Mikhail A. Bek, Nadezda N. Bek and Marina Y. Sheresheva (2012) Perspectives of SME innovation clusters development in Russia. *Journal of Business & Industrial Marketing* 28/3 (2013) 240–259

⁸⁶ For further details see Mikhail A. Bek, Nadezda N. Bek and Marina Y. Sheresheva (2012) Perspectives of SME innovation clusters development in Russia. *Journal of Business & Industrial Marketing* 28/3 (2013) 240–259

of the related industries. According to the WEF (World Economic Forum) Global Competitive report (2011), the quality and quantity of local suppliers is strongly correlated to the level of cluster development and property rights protection. Thus, low quality of local suppliers and poor cluster development are more likely in countries with poor property right protection like Russia. Positioning on a low level of the Global Value Chain is a symptom of poor cluster development as well. All these variables are strongly correlated, thus determining a self-incrementing vicious cycle. The low level of cluster development in Russia could be explain with the poor property right protection, and weak position in the Global Value Chain of most part of its exporters, excluding some excellences which stand out for the innovativeness of their products. This explanation is not complete. Property rights protection and position in the Global Value Chain could not be the only accused factors, as in some countries where there are the same or even worst condition, industrial clusters are much more diffused. Consider the countries analyzed before, all of them suffer of weak property rights⁸⁷ protection and low position in the GVC, and still clusters in these countries are becoming an even more diffused phenomenon. There are some other reasons to be investigated. The inherited planned industrial organization by the Soviet Union played a great role in shaping the geography and traits of the current Russian industrial apparatus. The smaller share of Small scale industries could be another reason as well.⁸⁸ If compared with the other BRIC countries, “Russia lags behind in terms of cluster development (3.2 points,

⁸⁷ Russia lags behind other BRICS countries. For example, the degree of property rights protection in Russia is assessed by 2.9 points on a seven point scale while 5.1 in China, 4.5 in India, and 4.3 in Brazil. (Bek et al. 2012).

⁸⁸ Fan Lemin and Zhang Yuytin point out that SMEs share in GDP is 16 percent in Russia, compared to 58.5 percent in China and 56 percent in the EU. The share of employment in small and medium business in Russia is 25 percent compared to 75 percent in China and 80 percent in the EU (Lemin and Yuytin, 2010, p. 141).

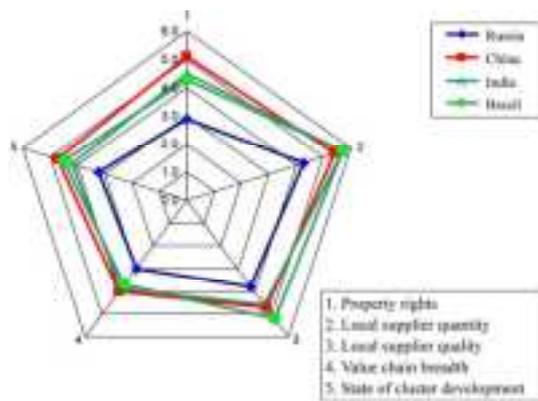


Figure 65 Conditions and results of cluster development in BRIC countries. Source: *Journal of Business & Industrial Marketing* 28/3 (2013)

compared with 4.7, 4.2 and 4.6 points in China, India and Brazil, respectively) as well as the quality of local suppliers (3.8 points, compared with 4.7, 4.6 and 5.2 points in China, India and Brazil, respectively)⁸⁹. What is more astonishing is that results for all of these variables

(level of property right protection, position in the GVC and level of cluster

development) have deteriorated in the period 2004-2009. Comparing results from the WEF report of 2004 and 2009, property right protection decline from 3.1 to 2.9 points; the number and the quality of local suppliers as well (4.8 to 4.3 points and from 4.1 to 3.8 points respectively). A decrease have been recorded in the estimated position in the GVC (from 3.8 to 3.0 points), and consequently in the cluster development level (from 3.34 to 3.2 points). This situation call for the intervention of the policy maker in order to let Russia stay competitive in the global scenario, since estimations for the other BRIC countries have improved.

⁸⁹ Mikhail A. Bek, Nadezda N. Bek and Marina Y. Sheresheva (2012) Perspectives of SME innovation clusters development in Russia. *Journal of Business & Industrial Marketing* 28/3 (2013) p.243

6.5 The role of the government in cluster development

Since Perestroika Russian economy has undergone a radical changes and a process of transformation is still going on. Up to 1980 every kind of business was submitted to the hierarchical regime of the soviet union, thus relations among firms were not ruled by the market. In this way firms lost all the competitive advantage of establishing economic relations on the basis of the economic convenience. These relationships were characterized by a lack of flexibility, difficulties in coordinating activities in the economy and limited communication within and between organizations (Johanson, 2008, p. 46). The real problem arose with the Soviet Union collapse and the subsequent transition phase, when the “imposed” relationships came to the end. The market power cut the net built by the hierarchical political administration leading to the death of the “allocated” relationships between the former suppliers and producers. This collapse caused supply problems within industries, particularly, those ones where suppliers were located in the former Soviet republics (Davis et al., 1996)⁹⁰. With the transition towards a market economy relationships among firms and industries in Russia have been to be rebuilt and in a such big country they would be more likely to be locally concentrated. As Porter said, “companies, not nations, are on the front line of international competition”. Yet, the most competitive companies are not spread around various territories and countries randomly. Furthermore, they tend to be presented as “a spatial and sectorial concentration of firms” (Bresnahan, Gambardella, and Saxenian, p. 114), or in clusters. This is why we believe that if Russia organize its industrial activities on the basis of industrial clusters, its competitiveness will be enhanced and some of the above-mentioned problems could be solved. In recent years some evidence on the increase of the awareness about the enormous developmental potential of clusters have been observed, and the Russian government is slowly approaching policies of clusters development. The approach of the Russian government is still very far from those in the

⁹⁰ How do interfirm networks influence the emergence of Russian clusters? *Innovative Marketing*, Volume 5, Issue 3, 2009

countries where clusters have reached a good level of diffusion. Although Russian industrial policies have a strong regional dimension, due to the extent of the territory, they are still very far to be cluster-oriented. One of the aim of Russian industrial policies is building special economic zones, that someone define clusters, despite that we think that they can't be associate to industrial clusters as they have been intended in this thesis. The public sector is still often predominant, furthermore some of these special economic zones have been initialized by the Soviet Union, thus any international competitive advantage of these firms is not of a market origin. "Non-market competitive advantage was achieved not just by efforts of the firm, rather it was achieved as the play of external factors. It means that not every oligarchic group of the Russian oil and gas complex is able to form around itself a cluster of highly competitive firms" (Yudanov, 2007, p. 33).⁹¹ Thus, that is one of the big obstacle that Russia has to overcome in order to make its industrial textile more competitive and dynamic. We know from cluster theory that the public intervention is essential for the good operation of a cluster, nevertheless firms have to be let free of playing in the market, competing and cooperating among them, triggering the self-incrementing process (see chapter 1). The public intervention shouldn't be an obstacle in the development of this processes, rather it should favor the implementation of these kind of mechanisms among firms operating in the same areas or sector. As for cluster development policies, great progress have not been made yet. Indeed no results have been obtained by our survey on Russian cluster policies: no of them included the word "cluster" (in all the other countries which have been analyzed there was at least one industrial policy which was associated with the word cluster). Industrial policies in Russia are regional and the various regional programs of the Russian government are conducted at the level of 83 federal subject. One of the priorities of Russian regional policies is developing *special economic zones*, which include industrial economic zones. Someone define this areas as industrial clusters, even if they are quite different from those ones that we have analyzed in China, India and Brazil.

⁹¹ How do interfirm networks influence the emergence of Russian clusters? *Innovative Marketing*, Volume 5, Issue 3, 2009

6.4.1 Russian special economic zones

Special economic zones (SEZs) are areas eligible for special business regulations and were created in 2005 with the aim of attracting investment into the regions of Russia. Russian legislation outlines four types of special economic zones: Industrial and development zones; Technological implementation zones; Tourist and recreational zones; Port zones. The main aim of Russian SEZs is to make the market entry process as simple as possible for foreign businesses. The difference with the cluster development policies analyzed before is clear: instead of promoting the development of local industrial clusters as a tool of local economic development, Russian SEZs aim to attract foreign investments. The general aim is that one of improving Russian economy but using an external actors as economic engine. Understanding if this kind of policy will be effective or not is not the aim of this thesis, anyway we think that a cluster development policy with the aim of promoting local development making local firms more competitive would have probably higher positive effects on local economic and social development and would probably make Russian firms less dependent from foreign investors and would empower them towards big Russian oligarchic companies. Overlooking the effects on the local development, we want illustrate which are the main strengths and weaknesses of Russian SEZ and describe some of them. The main strength of Russian SEZs are linked to the legislative advantages offered in the area of the SEZ and to the easier bureaucracy. Moreover in these zones efforts to fight corruption are greater, as a consequence investors are more likely to invest in these areas. Another strength is the offer of qualified labor, which is cost- competitive compared to the researchers in western countries. As for weaknesses, the Russian SEZs remind one more of Soviet-type "plan factories" rather than real activity centers. Another big weakness is that Russian SEZs do not form an integrated network, SEZs can be defined as isolated innovation-oriented oases in Russia's low-tech desert. They should work on spreading innovativeness in other areas of the country. The analysis of the Russian innovation system indicates that Russia does not lack innovation-related agencies, but it definitely lacks innovation-related activity. Currently, Russia's innovation sector reminds one more of Soviet bureaucracy rather than a business-

oriented innovation-promoting cradle.⁹² Furthermore the big influence of the public actor in the administration and organization of these zones represents a disadvantage, as Russian government is notorious for its inefficiency and wide-spread corruption. The promotion of these areas is very weak, government should act on enhancing the awareness about their existence both inside and outside Russia.

As you can see from Figure 66 all industrial economic zones are located in the Western part of the countries, as we have seen for industrial activities in previous paragraphs. Since the theme of this thesis regard industry and more precisely manufacturing we will briefly describe the Russian industrial economic zones, even if they could not be assimilate to industrial clusters, as seen before.

Industrial Production SEZs are located in the most economically developed regions of Russia. They are characterized by predominance of industrial enterprises and well-developed transport infrastructure, rich natural resources and skilled manpower.⁹³ Four industrial economic zones have been created up to now, they are:

- **Lipetsk Region, Lipetsk:** The Lipetsk SEZ is located in the European part of Russia in the heart of a large metal-processing cluster. This is the place where large volumes of steel and ferrous metals rolling are produced. Besides, refrigerators and other home appliances are produced in Lipetsk. In the close proximity to the SEZ there is NOVOLIPETSK Metallurgical Combinat, one of the largest companies in the world of full metallurgical circle.
- **Tatarstan Republic, Alabuga:** The Alabuga SEZ is located right in the centre of Volga Automotive Cluster represented by such producers as AVTOVAZ, GAZ, Sollers, KAMAZ etc. Besides, the Alabuga SEZ is located in the centre of Oil and Chemistry Cluster of Russia where such largest companies as OAO Nizhnekamskneftekhim, Kazanorgsintez OJSC, OAO Ufakhimprom, Salavatnefteorgsintez JSC produce the whole range of polymers.

⁹³ See

<http://www.economy.gov.ru/wps/wcm/connect/economylib4/en/home/activity/sections/specialEconomicAreas/main/zone02e/>

- **Samara Region, Togliatti:** Special economic zone Togliatti is situated in close vicinity to such largest car manufacturers as JSC “AVTOVAZ”, OAO GAZ, etc. A number of chemical industry enterprises are centered in Samara Region, such as JCS TogliattiAzot (ammonia production), “KuibyshevAzot” OJSC (mineral fertilizers production), “Togliattikauchuk” LLC (artificial rubber plant).
- **Sverdlovsk Region, Titanium Valley:** Titanium Valley Special Economic Zone is located in the territory of Sverdlovsk oblast. This zone is particularly competitive as it benefits from a multiplicity of competitive advantages such as the availability of raw materials, specialized staff resources and educational institutions, relevant infrastructure, developed logistic networks, export potential of future residents of the special economic zone. Moreover, firms operating in this zone could count on a qualified human assets with higher and specialized secondary education working in the mechanic engineering, metallurgy, electric power industries. In the region some training program have been planned in order to educate personnel according to projects requirements. 500 km away from the Titanium Valley, there are enterprises manufacturing all kinds of metals located. In relation of the country extent, we state that this zone benefits from the vicinity of some important suppliers, such as: VSMPO-AVISMA Corporation OAO (supplier of titanium parts for such companies as Boeing, Airbus, Rolls Royce, Goodrich, Embraer, GE); EVRAZ Nizhniy Tagil Iron and Steel Works OAO (one of the nine major Russian integrated steel-smelting plants belonging to Evrazholding); UralVagonZavod Scientific Industrial Corporation OAO (the largest in the Russian Federation manufacturer of tanks and carriages).



Figure 66 Special economic zones in Russia. Sources: *Russia beyond the headline* (July, 2013)

6.5 Conclusion

We want to conclude this chapter trying to answer the question “Will Russian industrial clusters reach the same level of diffusion as it is in the other BRIC countries?” What an arduous question! First of all, Russia has an industrial structure which is different from that one in the other BRIC countries, with a much more less dominance of the small scale industry. This could be the first obstacle in cluster development. However we know from cluster theory and case-studies that industrial clusters could be developed around big firms, which could enhance the competitiveness of the surrounding small and medium firms instead of oppress them. Thus, the industrial structure do not impede the emergence of industrial clusters. A real obstacle is instead the still permanent industrial setting imposed by the Soviet Union, as well the sometimes pressing role of the government. As for the industrial heritage of the Soviet Union, we think that industries and the government as well will still have to do a lot of efforts for uprooting the imposed setting. Maybe the market should be let free of playing for making the more competitive Russian locations to emerge. If firms and economic players in general continue to be bridle by the imposed industrial geography of the Soviet Union and by the public sector, clusters will not have space for emerging. As said before, the role of the public sector is fundamental for cluster development and support, but it should act in a different way. Russia lacks of governance, which entails the complementary action of the private and the public sector. Thus, what prevent the emergence of clusters in Russia is not the presence of the public sector, but its way of acting in the economic environment. Another obstacle is the weak awareness about the potential that clusters could have on enhancing the economic competitiveness. The government and institutions, such as trade union etc., should promote the emergence of industrial clusters. In addition to that, we think that Russia should orient more efforts towards enhancing the competitiveness of its national firms rather than focusing only on attracting foreign investors as it does in its SEZs. Attracting innovative foreign investors could have many positive effects on the local economy, but it is necessary to find the

way of spreading the value brought by the foreign investment around. This could trigger a self-incrementing process which could diffuse innovation and make local firms more competitive. Let's go back to the question, we think that clusters are models of industrial organization which could adopt to all kind of situation and industrial structure, thus we believe that they could reach a good level of diffusion in Russia as well. We think that clusters development could help Russia to solve some big problems, such as the big disparities, both economic and social, which afflict Russian population, to enhance the level of innovativeness of the Russian firms, to go one step further in the Global Value Chain. Finally we think that adopting a cluster approach could help Russia not only to be less dependent from its natural resources, but also to find a better and a more sustainable way of exploiting them. Policy for cluster development in Russia are needed.

Chapter 7

CONCLUSION

7.1 Comparative analysis of the main results and conclusion

We want to conclude our analysis making some comparisons among results about the countries investigated. As seen in chapter 2, BRIC countries are playing an even more important role in the global economic scenario, accounting for a substantial part of the Global Gross Domestic Product. Their increasing weight has led to a realignment of international economic institutions, and allowed emerging economies to state their opinion about international affairs with a stern voice. Bric countries have a lot in common, above all the experience of years of impetuous growth, and the same willingness to stand out in the global scenario in order to have a voice when global decisions are taken by the major economies. They all have the common interest to protect themselves from the game played by the most powerful countries, and recent events have confirmed that their role as a permanent coalition of economic power has a great influence when global economic decisions are taken. They are even more aware about the power they can have if they defend their interests together, this is why they met at least once a year at the BRICS summit and why in the latest summit held in Durban, South Africa on 27 March 2013, the BRICS Development Bank has been established. Their competitiveness is often associated with specific competitive advantages which characterize each of them. Brazil, where the manufacturing lags in terms of productivity, has been focusing on intensive agriculture, as much as many talked about the “Brazilian agricultural miracle”; Russian Federation relies on its rich primary resource-based extractive industry as a driver of its economy; China on low-wage manufacturing labor; finally India, where the significance of the manufacturing sector has decreased since 1980, is building its competitiveness on the services sector. All these “advantages” have allowed the BRIC to experience an astonishing growth in terms of GDP. Growth in terms of GDP is often associated with economic development and competitiveness, but development and competitiveness could not be measured with an economic index, which is too simple and does not consider many developmental aspects

of a nation. BRICs are countries which experienced a tremendous growth in a very short period of time. In our opinion they do not have enough time to assimilate this growth, in the sense that economic growth should be followed by changing in the institutions, society, infrastructure, etc. in order to guarantee sustainability and long-term prosperity. If the process of growth is too fast and uncontrolled there is the risk to lose what has been achieved in a flash. The country is much more likely to be hit by external shocks because the brittle foundations on which the economic growth “is running”. This is one of the explanation of the current financial crisis experienced by the emerging economies (September, 2013). Beside the innate volatility of the global finance, this crisis has been highlighting the fragility of such economies, even though they appear among the biggest world economic powers. Their fragility depends on their weak fundamentals proving that there is still a long way to go! Going back to the concept of competitiveness we should refer to the recent theories which consider competitiveness as the combination of multiple factors, which are both economic, social and institutional. Competitiveness should be associated with the concept of *productivity*, as state by M. E. Porter on his innumerable studies. Productivity is measured by the value of goods and services produced per unit of the nation’s human capital and natural resources, thus it depends from a multitude of factors, which go far beyond the mere digit of an economic index. The most quoted definition of competitiveness, which is in line with all the latest theories, is that one given by the World Economic Forum, which says that:

“Competitiveness is Collection of factors, policies and institutions which determine the level of productivity of a country and that, therefore determines the level of prosperity that can be attained by an economy”(Lopez-Corlos:2005)

The economic performance of BRIC countries in the last few decades have proved that they have enhanced their global competitiveness, but the question is: is that a sustainable competitiveness? will it be long-lasting or a short-time phenomenon? What is well accepted is that these countries could not lean only on the competitive advantages that have triggered their economic growth. They should enhance their competitiveness strengthening their fundamental and focusing on social value. This will let them to have positive effect on the level of productivity and as a consequence on their global competitiveness. M. E. Porter suggested that traditional focus on

macroeconomic stabilization, that is having good fundamentals, is not sufficient for understanding a nation's rising productivity. Although most of the discussions on competitiveness and economic development focus on macroeconomic, political, legal, and social aspects, they are necessary but not sufficient. They make the basis for producing wealth but they do not themselves create wealth. Wealth is actually created at the microeconomic level, at the firm level, whose productivity is higher when the microeconomic environment in which it competes is sustained by rooted fundamentals. Thus, macroeconomic policies which encourage investments in a country will not translate into higher level of productivity unless the form of investment are appropriate, companies possess the skills for making the investment efficient, a dynamic industrial structure support the investment through mechanisms of collaboration and competition, triggering the process which make the level of productivity to go higher. Thus economic development is a process which entails both macroeconomic and microeconomic aspects. Therefore the process of development should include the building of solid economic and social fundamentals, focusing at the same time on more specific economic issues, clusters development to make an example. We have done this foreword on competitiveness, because here is the reason of reconstructing the economic geography of industrial clusters in the BRIC countries. These countries, as said before, have built their global competitiveness on the economic advantages which let them experienced such an explosive rate of growth of the GDP. Although these factors let these countries to go under a process of development, often they depend from foreign investments and most part of the value is added in other countries, this signifies that they are losing part of the value which if it had be retained within their borders it would have been translated in growth, development, and as a consequence in higher productivity rates and higher level of competitiveness. Putting all the efforts exclusively on these economic advantages will not ensure a sustainable development for BRIC countries, as growth often concerns very few subjects, think about multinational companies, in respect to their enormous population, and an economy which relies on products which are for the most part exported is submitted to external shocks which could compromise its level of development. We believe that enhancing cluster development in these countries could foster their sustainable development and therefore their global sustainable competitiveness, this is why we have analyzed the economic

geography of industrial clusters, and the economic policies for clusters development in each of them. Cluster development indeed belong to the set of measures which together form the Global Competitive Index, which is a comprehensive tool that measures the microeconomic and macroeconomic foundations of a national competitiveness (The World Economic Forum).

In order to understand the level of diffusion of industrial clusters in BRIC countries we started from analyzing their industrial structure. We focused on industry although in all the countries analyzed the service sector is growing even more, accounting for the most part of the Gross Domestic Product. Despite that most of the service activities are linked to industrial ones, we mean that often services are supporting activities of industrial ones. Moreover in these countries, although the share of employed people and of GDP has been decreasing, industry is still and will remain one of the most powerful engine of economic development, manufacturing as well. What is necessary, is finding the way to enhance the value added of the industrial output, and therefore reach an higher position in the Global Value Chain. This is one of the main results that is possible to achieve through clusters building. We took this assumption as starting point for our analysis. We wanted to understand if the structure of the industrial sectors in these countries have those features which make clusters more likely to emerge and develop, and if they had them, to analyze their economic geography and their level of development. We have investigated if industrial activities, and economic activities in general, in the countries analyzed, tend to be agglomerated in certain locations or in certain economic sectors. To do that we have looked at the distribution of business entities and employed people by region and economic sector. We could have calculated some indexes of economic agglomeration, like the Location Quotient or the Gini Index of agglomeration, but data were not available for such an ample field of analysis. In this way we could identify in which regions and in which economic sectors industrial activities are more concentrated. Our results could be summarized as follows:

- In India, where industry employs around the 22 per cent of the total employed people, the economic sectors which have the highest level of concentration of employed people and business activities are food products, textile, metallic and no metallic mineral, chemical, machinery, and automotive. As for geographical

concentration there are four states which have a high level of concentration accounting for around half of the total business entities and employed people. While in the first 10 states for number of business entities and employed people are agglomerated around the 80 per cent of the industrial activities (measured by the number of business entities and employed people);

- As for China the sectors which recorded the highest level of concentration in terms of business entities and employed people was, as expected, the manufacturing ones. China is the BRIC country with the highest share of employed people and business entities operating in the industry, and more precisely in the manufacturing. Consider that almost the half of its Global Domestic Product comes from the secondary sector. Data confirm what was said before talking about the competitive advantage of China. As for geographical distribution, as we have seen for India, economic activities are concentrated in very few provinces, all in the south- eastern part of the country.
- Brazil, where industry suffered a lot in the last few decades, could still boast of its strong manufacturing sector with a high concentration of industrial activities in clothing and accessories, food products and metal products except machinery and equipment. What has emerged from our analysis is that Brazilian industry concentrates its labor force in sectors where the competitive advantage of some Asian countries, among others China, is incomparable thanks to their lower level of the cost of labor. We suggest to go up in the value chain focusing on products with more added-value, as Asian market have the preeminence of these sectors. Geographically speaking, industrial activities are very concentrated in few states in Brazil too. Consider that Brazil is made up of 27 states and more that the 80 per cent of employed people and business entities are agglomerated in only ten of them.
- Finally Russia, whose industrial structure is quite different from that one in the other three countries of the BRIC giant. While its weight on the national economy is relevant, Russian industry distinguishes it-self for its qualitative features. In Russia the most part of the business entities deals with heavy industry, while industries which produce consumer goods have not the same economic relevance as in the other BRIC countries. As for the industrial

geography, Russian industrial activities are agglomerated and dispersed at the same time. We mean that there are a certain level of concentration of the industrial activities due to the extent of the Russian territory, but in regions where they are located they are quite dispersed in term of sectorial agglomeration, and they do not seem to have experienced a phenomenon of agglomeration in general. This inconsistent structure of the industry is a legacy of the Soviet Union. This first analysis make us thinking that clusters were not diffused on the Russian territory.

After this first general analysis we have gone in more depth analyzing the small scale industry in each of the BRIC country. We do that because, as we have seen in chapter one, clusters are more likely to emerge when the industrial woven is made up of small and medium enterprises which try to reach economies of scale through mechanisms of collaboration. Often the main constituent of an industrial cluster is a group of small enterprises. Besides that many industrial policies for supporting the Small scale industry are conceived to be addressed to a group of SMEs, or more appropriately a cluster of SMEs. For all these reasons we retain necessary to analyze the Small scale industry environment in all the BRIC countries, as it is useful for reconstructing the economic geography of industrial clusters and for having some insights about the emergence of industrial clusters in the near future.

First of all we have analyzed which was the share of SMEs in each of the country. Results was very similar for three of them, India, China, and Brazil, where the shares account all for more the 90 per cent of the total enterprises. Every of these three countries are characterized by a dynamic small scale industry. In particular SMEs sector is the most vibrant sector in the Indian economy accounting for 45 per cent of the industrial output, 40 per cent of the export, and employing 60 million people. Chinese Smes account for the 99 per cent of the total enterprises, their output accounts for at least 60 per cent of the national GDP and generate more than 82 per cent of employment opportunities in China. In Brazil there are about 5.6 million formal Smes, which account for about 99 per cent of the total formal enterprises. Brazilian small scale industry, as well Chinese and Indian one, have a great potential for further development and for unleash a new source of growth. In all of the three countries SMEs suffer of

similar problems, e.g. lack of financial resources, low level of innovativeness, weak linkages with the external markets, low knowledge-intensity, lack of management skills etc. As for their sectorial and geographical distribution we have done the same analysis that we did for the entire industrial sector where data were available. Anyway results are very similar to those obtained in the general analysis as small scale industry includes almost the totality of the enterprises. In all of the three countries the government seems to have understood the potential that the small-scale sector could have for the further development of the nation: India and Brazil have a focused and detailed policy for SMEs development, and are putting a lot of efforts in order to sustain them and make them more competitive in the global scenario. As for Russia, the analysis on Russian SMEs environment revealed that the Russian business climate for the development of small scale industry looks unattractive. If compared with the rest of the world, Russia lies in the latter of all the ranking used to measure the goodness of the business environment for SMEs, and in some cases is close to the very bottom.

After having analyzed the main traits of the industrial structure in all of the BRIC country providing a picture of its sectorial and geographical distribution, and the economic relevance and level of development of the small scale industry, we try to reconstruct the economic geography of industrial clusters and to understand where clusters are more likely to emerge in the future. To do that we start from the calculation of an index, that we named the “*enterprise density index*”. The index was calculated dividing the number of business entities in every region, or state, or province, by the geographical area expressed in square kilometers. This index, although it could seem quite rough and too simple, let us have some first insights about where industrial activities could be organized through clustering. Databases about state of cluster development and diffusion were not available, except for India, where a dedicated institution provide open-data about clusters (The Indian clusters Observatory). Thus reconstructing the economic geography of industrial clusters was quite simple for India, as data about their sectorial and regional distribution was easily accessible. The same thing could not be said for the other countries analyzed. As for China and Brazil, we start from the calculation of the *enterprises density index*, this let us to pinpoint which regions of the two countries recorded the highest level of concentration of enterprises.

Then, we compared our results with those obtained in other studies and researches. Results could be summarized as follows:

- In India clusters represent a face of the Indian industry reality. They are very diffused all-over the country and are in some sense part of the Indian culture. Gathering information about clusters in India one could immediately realize the significance that they have for Indian economy. Indian government seems to be particularly dedicated to the promotion of new cluster initiatives and to give support to the crowd of Indian clusters scattered all-over the country. The great majority of Indian clusters are Micro-enterprises clusters (75%). Industrial clusters account for the 23 per cent. Although the service sector is the predominant sector in the Indian economy, there are still very few clusters operating in the IT sector. This sector would be probably a future fertile field for the emergence of new clusters. As regards the state wise distribution, more than half of Indian clusters are located in only six states. This let us supposed that in India there are certain regions, that for some reasons are more favorable environment for cluster development. Sectors where the highest number of clusters was recorded are food-products, metal products and no-metallic mineral products.
- From the evaluation of the enterprises density index, we saw that in China economic activities are all agglomerated in the south and south-east coast and that they tend to be concentrated in proximity of big metropolis. Studies about labor-intensive clusters, which are the most part of Chinese clusters, proved that they are located in east-south costal area. Most of the Chinese clusters operate in the labor-intensive manufacturing sector, at the lower end of the Global Value Chain. The 90 per cent of the Chinese labor-intensive clusters are located in 15 province. This let us deduce that in China, as in India, there are certain areas with some particular features that make them suitable place for cluster development. Industrial sectors with the higher rate of clusters diffusion are those ones producing consumer-goods e.g. apparel, footwear, furniture, TV set, Home electrical appliance, toys and motorcycle.
- In Brazil clusters are named Local Productive Arrangements, and they are very far to be considered a novelty for Brazilian industrial organization. Brazilian

government is particularly dedicated to give support for their development, as they are considered, in the Brazilian industrial policy, tools of development that make more efficient policies which aim to support the small scale industry. As we done for China, the starting point was understanding which Brazilian states recorded the highest concentration of enterprises, through the “enterprises density index”. Enterprises are all concentrated in the South and South-East part of the country. Thus industrial clusters were expected to be located there. Referring to other studies and research, and particularly to that one conducted by the APL GTP, which is a permanent team-work with the aim to support Brazilian local clusters, we reconstruct the economic geography of industrial clusters in Brazil. Industrial clusters are for the most part located in the south and south-eastern part of the country. In the rest of the country local governments are promoting clusters initiative in other sectors, giving a lot of emphasis to the agricultural- agro-industrial ones. The manufacturing sector seems to be the prevailing sector for industrial clusters which produce especially jewelry, wood products, ceramics, footwear, mining, textile and metal products. APLs in Brazil are tools for enhancing the competitiveness of Brazilian manufacturing, hard hit by the fierce Asian competition.

- As for Russia, we do not find significant results about clusters diffusion. Since the absence of considerable phenomena of industrial clustering in Russia, we didn't do the same analysis as that one done for the other countries, and we focused on investigating the reason of the scarce diffusion of clusters in Russia. We found out that many of them are tied to the legacy of the planned economy of the Soviet Union.

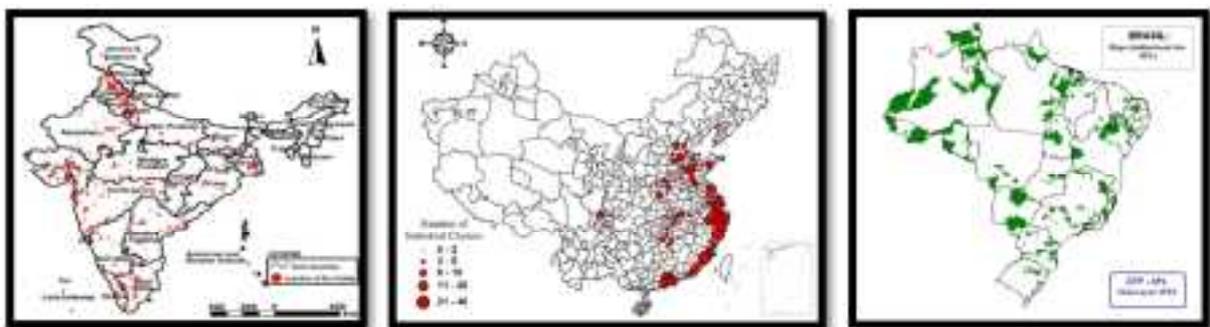


Figure 67 Geographical distribution of industrial clusters: comparing India, China and Brazil. Source: Author

We have succeeded in reconstructing the economic geography of industrial clusters in three of the four countries analyzed, that are India, China and Brazil. We don't exclude that clusters could emerge in Russia too, although it seems to be a less favorable environment for cluster development. Results of the first part of our analysis could be summarized by the three maps of clusters (Figure 67), which represent their geographical distribution in India, China, and Brazil.

In order to assess the level of cluster development in the BRIC countries, we have investigated if any industrial policy for cluster development existed in those countries and subsequently, which were the main tools for cluster development provided. Starting from India, the Indian government is particularly dedicated to give support to Indian clusters. A cluster development approach has been adopted since the end of the 90s with the aim to sustain the small scale industry, as the government has recognized that adopting a cluster approach will increase the productivity and the competitiveness of Indian Micro, Small, Medium enterprises. Thus industrial clustering is broadly considered a powerful tool of development in India. In order to understand if there was an acceptable level of awareness about the existence and the role of clusters as tool of economic development, we investigated if an "institutional" definition of cluster existed, in other words if any governmental institutions provided a definition of clusters in all the countries analyzed. As for India, a detailed definition and classification of clusters exists proving their importance for the economic development. The cluster development policy in India is conceived and responds to the modern cluster approach, that is enhancing productivity through improving technology and innovation, providing finance resources for cluster development, starting-up self-incrementing approaches, adopting a governance approach, that is a public-private partnership mode. Furthermore India benefits from the action of some important non-governmental institutions which aim to sustain clusters, among others the most powerful is UNIDO which has been implementing a strong program of cluster development for already two decades. As for China, although we did not find a direct link to the governmental policy for cluster development, we know from other studies and researches that the success of certain Chinese industrial clusters is due to the local government support and nurturing. Even though multifaceted, cluster development policies in China tend primarily to build a good business environment and to focus on the "market failure" and "externalities"

areas. Among the tools that the Chinese government has foreseen in order to sustain clusters there are infrastructure building, where special attention is given to build specialized market or industrial parks; regulation, quality assurance and standard setting, even if they still represent a big challenge; technology, skills, and innovation support, which is particularly important in Chinese clusters where imitation within a cluster is very easy, making firms hesitant to invest in innovation and technology upgrading; preferential policy and financial support. We believe that Chinese government is not doing as many efforts as the Indian one for making its cluster development policy known. That could be probably linked to a problem of general lack of transparency. Getting data and information about China was indeed more difficult than in the other countries. As a result we couldn't assess the level of awareness about clusters as tool of development, as we did not find any information coming directly from a governmental institution, and an "institutional" definition about clusters was not identified. Finally Brazil, where a cluster development policy was launched at the end of the 90es with the Local Productive Arrangements approach, which spread at a fast pace all over the Brazilian country. The extraordinary and fast diffusion of LPAs led cluster development to be one of the priority of the federal government, formalized in the long-term plans for national development, and to the creation of a dedicated permanent team-work for cluster development (GTP APL). This permanent team-work responds directly to the ministry of development, industry and foreign trade, proving the importance that cluster development have for Brazil. The main aim of the integrated developmental policy for Brazilian local productive arrangements is to enhance local sustainable competitiveness through local developmental processes. Through that policy the government intends to achieve some broader developmental aims, such as economic development, reduction of regional and social disparities, technological innovation, up-gradation, etc. Brazilian cluster development policy is based on some principles such as capacity building, governance, social capital, innovation, multi-level administrative inclusiveness, sustainability. As for India, there an "institutional" definition of clusters, anyway gathering information about Brazilian cluster development policies one could immediately realize how important they are for the government of Brazil, and the level of awareness of clusters as tools of development, in other words clusters are widely recognize as tools of development in Brazil. Russia has not been considered in this

analysis as the absence of considerable phenomena of industrial clusters. We tried to investigate the reasons Russia could benefit from cluster development, and which are the obstacles that should be removed in order to let industrial clusters to emerge.

After having analyzed the economic geography of industrial clusters and the cluster development policies we conclude that industrial cluster development could be considered a powerful model of development for BRIC countries, above all in India, China, and Brazil, where clusters are already diffused for some reasons, such as the presence of a vast bulk of small and medium enterprises, natural propensity to agglomerate, the relevant weight of the manufacturing sector, the action of some non-governmental organization, the existence of policies which aim to support and diffuse clusters, the awareness about clusters as tools of local development. We believe that through cluster development BRIC countries could diversify their strategy and maybe to fill the gaps that focusing on a sole competitive advantage could entails. In other words we believe that India will still focus on its growing service sector, Brazil on agro-industry, China on its competitive manufacturing sector, and Russia on its natural resources, but if they will make some efforts on sustaining clusters they could make their growth more sustainable and long-lasting. Since they, excluding Russia, have all the prerequisites for cluster development, their governments should put a lot of emphasis or continue to put it on clusters as they are powerful tools of sustainable development. Clusters building is linked to the concept of sustainable competitiveness building, as it make the nation stronger toward the miserable “attacks” of the globalization, which make these countries very vulnerable to the volatility of the currencies and the price of the commodities from which a big part of their economy depends, and dependent from foreign investments. Cluster building could act on those poor fundamentals about which we talked before. The level of cluster development is indeed one of the variable used to calculate the level of competitiveness by the World Economic Forum in The Global Competitiveness Report. The latest one proves that clusters are an important variable in determining the level of competitiveness of three of the countries analyzed, India, Brazil and China, that globally rank respectively 29th, 28th, and 23rd. The report confirms what we said about Russia, which ranks 144th. The gap between it and the other three countries is clear once again. This comparison between our results and data of the Global Competitiveness Report demonstrates that

acting on cluster development could lead to great positive effects in terms of competitiveness in China, India, and Brazil. We do not exclude the emergence of industrial clusters in Russia, but at the moment, as demonstrate by the report by the WEF, there's still a long way to go. To conclude we think that, through our analysis, we could give an answer to each of our initial questions. The analysis proves that in India, China and Brazil clusters have reach a good level of diffusion. The same thing could not be said for Russia, where clusters are still an isolated phenomenon. We believe that this model of industrial organization is likely to get even more diffused in the future, as there is a growing awareness on its power in term of developmental tool in these countries and it is sustained by governments and institutions through dedicated policies. Given the results of our analysis there are reasons to believe that clusters are likely to gain ground in the countries analyzed, with some exceptions for the Russia Federation.

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