Contents of the doctoral thesis

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FOREWORD

Economic research means pointing the main goal of the research towards showing the realities of contemporary economy and the real needs of the human sociaty, some of the most valuable research projects are those that explain how economic mechanisms function or those that illustrate probable evolutions of the economic environment in connection with some analized parametres, these parameters definitely influence world economy, by this meaning international trade, finance and governmental policies.

Research has a dual utility that derives from its essence, has a bivalent nature, both theoretical and practical, on one hand it contributes to enlarging the sum of human knowledge, on the other contributes to finding new methods, techniques and instruments that make economic analysis easier, in an era that is characterized by the stringent need for efficiency, and mostly in the field of our research.

Our choice of research, ``The efficiency of emergent clusters in contemporary world economy`` is proposing a double mixture of elements, of novelty to both academic and society in general. Those two elements reffer to bringing to front and analysing the new trends of business clustering and birth of business platforms. Our paper aims at judging the manner in which clusters appear, the links that form within them, to show those interest issues that are linked to the speed, direction and efficiency of these processes, or to show the elements that contribute to enhancing the efficiency or on the contrary those elements that reduce the efficiency of the clustering process.

The second issue of novelty that we here point to is a spot analysis on how to relate to an emergent cluster, we will try to show some of the elements that make for the faithful image of these structures then we will try to use the statistical instrument to draw some valid ideas in connection with the instance in which we can consider these clusters as being efficient or inefficient. Another element that brings more value to this research in the sense that it casts a practical and local interest is our trial of having the set of investigations that we spoke of the behalf of a cluster that we consider being emergent and that exists in Cluj-Napoca, having as main activity I.T. industry.

Obviously, we will not forget about those issues that are connected with economic clusters, pointing out those elements that go alongside other focus subjects as: technology transfer, economic

relationship between developed and emergent economies, elements of novelty generated by the emergence of some economic clusters and their impact on trade.

The main incentive for this study has its roots in doctorand`s affinity towards the branch of economic research regarding foreign affairs and economic relationships, in recent global events, in the desire of continuing his intellectual becoming in this branch, in the great importance of the clustering phenomenon for world economy and in the interest for all those others distinctive elements of international economics (scale economies, change ratio, imperfect competition, etc.).

This projects tries to follow the main stream described by the phenomenon of business clustering, in the distinctive case of emergent clusters. The first interest is for discovering the criterion and the elements that can guide us to a method of establishing (of showing) if and how this process of clustering can be efficient or inefficient. So, it is obvious that we face some difficulties, some physical (the lack of data that can help us analyse as good as we can all those component elements), others that are linked to being subjective when conducting an analysis, both because the human nature of the author and the calitative component of the study are to be influenced by own beliefs, personal thoughts, etc.

Then again, we consider sensible to bound our study from the geographical component of this brach of economic studies, we will try to focus mainly on those issues concerning the economi dynamics and on those motivational ones and less on those in connection with geometry, mathematical patterns or economic geography, even though we will try to cover those that influence our research. We have also tried avoiding to deepen the elements that reffer to the interdependence between foreign direct investment – economic growth or foreign direct investment – economic clustering as a lot of studies have focused on this coordinate.

We consider also that it is sensible to admit the fact that the lack of a formal frame, of some precise and well contured methods of analysing the aspects of our research, we do not have the guiding lines that are necessary to check the fairness or our thoughts, then again, we wish this research to be.

We also separate our work from a strong passion towards some of the well known opinions concerning this issue, being sure that every known theory is proper to explain just a certain part of these issues we here relate to. We have tried to use and sinthetize as much as possible from every well known idea, mainly those parts that concure with our interest and beliefs and our needs for explaining some of the subject of the research.

As stated before, scientific research in the field economic science must follow one of the two main directions[1]: first, fundamental research, involving those general aspects of science and action, aiming to clarify theoretical, abstract grounds, those of philosophical and logical nature. Fundamental research focuses on identifying the principles on which fundamental understanding of phenomena and economic explanation of some processes. So, This kind of aproach must develop, test or reject theories, hipothesis and connections evolving from general and not particular actions. So, in principle, this kind of research follows researcher`s intuition without being guided by rules imposed by the instution that supports the researcher, nevertheless every researcher`s strategy must be guided by the directing lines drawn by the most prestigious researchers in the field.

The second main direction that scientific research can follow is the applicative one, having as an immediate result the translation of all concerned theories and hipothesis proposed by the fundamental scientific research in practice, mostly, this kind of research is meant to test the incumbed theories and hipothesis. Applicative research can be perceived as oriented by the strategy of the researcher`s institution and by trends more than by the intuition of the one that engages in it. So, in many cases, theories and hiphotesis having their scientific fundaments properly build have for long stood as items in the intelectual heritage of the world without having found a true applicability[2].

Apparently, applicative research becomes useful to society, as the other kind, the fundamental one, in the same apparent pattern seems to be exhausting researcher`s resources and in the end the vital resources of society in general. But, in reality, these two coexist, their simbiosis of background and essence links the without a doubt, no one of these two will generate the element of novelty without having beside the other. Theory appears as a certain need of explaining phenomenon, need that is satisfied then at the lower level by applicative and quantitative research. The ideal image is having the two togheter without the need of two pure and distinctive branches.

Before starting the intended research, we based our choice on some criterion like: the knowledge accumulated as a student, our intention of continuing the line of studies in this field, the importance and the impact of our research subject and having lectured a multitude of other papers and articles on this isuue.

Scientific interest as a way of accumulating new knowledge and improving the existing ones concerned reading and interpreting on some scientific work that covers the are marked by: localization theories, the most important changes in the structure of world economy, economies of scale, knowledge and difussion of knowledge, and not the least by work on business clusters.

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[1] Otiman Păun Ion, *Despre cercetarea ştiinţifică economică, cu luciditate*, pag. 1, available at: http://www.acad.ro/com2009/doc/articolIIOtiman.doc

[2] după Otiman Păun Ion, Op. Cit., pag. 2

In the stage when work hiphotesis are designed we considered as useful the following guiding lines: showing and interpreting on structure changes that appeared in contemporary economy with the intention of building a framework that describes the environment in which clusters appear and develop; the analisys of the main advantages of working in economic proximity (scale economies, knowledge and knowledge flows); a comparative analisys using case studies of the supposed homogeneity of this category; a research focused on a certain local cluster that is emergent and that can offer us some answers concerning the effciency of inefficiency of the clustering process.

When verifying hiphotesis we have used as main methods of analysis induction, which starts from particular cases and builds a general truth; deduction – which uses general statements and goes to the level of particular cases. In this stage of the research the main conclusions are to be generated on the basis of the sum of revealed valid information discovered by the focused analysis of the elements. So, we consider being sensible to use a mixture of quantitative and qualitative methods of analysis that we consider being compulsory for extracting the valuable conclusions of the study.

The economic sistem of our days becomes tributary more than ever to consumer„s preferences that preface and determine some patterns of consumption, forcing the economic agent to adapt its algorithms of functioning to those preferences, on the other hand, more than ever, the individual, being in essence, from the economic point of view, the sum of his concumption choices, he is a product of the capitalist society of today, living, consuming and justifing his choices by the impulses that are transmitted by the economic agent via mass-media or directly, stimulating some areas of every consumer`s personality, generating needs that were hidden before that moment.

The question that can derive from such a sentence is: How looks a succesful economic agent. Is he the one that can adapt faster to a consumption pattern or is he the one that has the abbility to influence the pattern we made refference to? Then, it is interesting to think about those elements that are needed to make an entrepreneur pass from the category of trend followers to that of trend setters.

Sinthetical presentation of the chapters

The first chapter is meant to introduce the category that we study (business clusters) in the contemporary economic environment, considering the most important changes of structure in today`s economy and tries to establish some connections between these changes and the way in which the development of business clusters is influenced.

The second chapter analyses those elements that generate the force of attraction of a business cluster and the elements that make enterprises desire proximity. We have considered two: information spill-over and economies of scale, the first being and element of concentration in the case of emergent cluster that we study and the second because it as a generic element of agglomeration.

The third chapter focuses on those aspects linked to the localisation theories, being mainly a reinterpretation of the cluster notion, this consideres making a connection between some of the attributes of this category and the standards imposed by the knowledge economy of today. It also tries to synchronize the most important aspects of the cluster notion with all those elements that define the state of emergence.

The next chapter is meant to shed some light upon giving business clusters the quality of homogeneity or heterogeneity. This chapter is very important, as the conclusions of this chapter can lead us on two different tracks. Building sets of three examples we try to observe some of the particular elements as to be able to draw some pertinent conclusions regarding their status quo.

The fifth chapter, even if small as lenght becomes important because of its main subject of discussion, marking those issues that can classify a cluster as being emergent. The importance of the content derives from the particularity of our study, the main element of interest being emergent clusters. Our work needs consistency and a theoretical framework for being without a doubt, so, the issue in discussion (business clusters) have to own this quality.

The last chapter aims at showing an emergent cluster in its dynamic nature, to identify if there is a significant concentration of firms and if on a certain time span we can determine if clusters are efficient or inefficient. More, it aims at discovering those elements that generate efficiency or inefficiency in the concentration process and extrapolating to ascertain if there are premises for considering some issues that are valid for all emergent clusters or if we can draw conclusions just for some of the clusters..

1st Chapter: The present economic context, variables that influence the existence of business clusters

This chapter shows a distinct perspective on the way in which changes in the structure of world economy can affect the manner in which economic activity concentrates in some focal points. From those many changes we here present a selection of the ones we consider most important:

> ➤ The industrial revolution and the extinction of the traditional branches of economy.

The era triggered by the industrial revolution started in 18th century England was, prbably, the most important event in human history after the taming of animals[3], nothing so important in human economic evolution has happened since[4]. To sustain these statements we can bring forward some statistical facts that underline the strong impact that industrial revolution has had on the evolution of human society, fact that makes us obviously sustain that this has been the most important structural change in human evolution.

If for instance, in 1759, the GDP per capita in England was about 11,5 pounds, in 2009, the same index was close to 22600 pounds sterling[5], while the progress of real GDP marked values from 1560 to 20000 in 2009[6].

Paradoxically, the industrial revolution was the starting point of a process of economic growth within the human society but also the beggining of discrepancies between individuals and between economies. So, currently, the 5 % richest individuals on earth own almost a third of world wealth and the richest 10 % almost a half, while the 5 % poorest, just 0.2 % of world wealth and the poorest 10 % just 0.7 %, with other words, discrepancies are huge, on average, the first earn 165 times more than the others, the richest earn in 2 days as much as the poorest in one year[7].

From the historical point of view, figures show that, at the beggining of the 19th century the ratio between the average earnings in the richest countries and the poorest did not exceed 3 times, at the beggining of the 20th century the ratio was of about 10 times and at the beggining of the new millenium they were more than 60 times[8].

In 1900 agriculture was the main field of economic activity, almost half the work force in Europe and Asia being engaged in this kind of activities, in 2000, agriculture was a job for just 5 % of

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[3] Floud Roderick, Paul Johnson, *Cambridge economic history of modern Britain*, Times Education Supplement, Cambridge University Press, 2004, pag. 87

[4] Lucas E. Robert Jr., *The industrial revolution: past and future*, *The Region*, 2004, vol. 18 , pag 4.

[5] Officer H. Lawrence, *What was the UK GDP then? A data study*, database available at http://www.measuringworth.com/datasets/ukgdp/result.php# (GDP per capita calculated as 2009 sterling pounds equivalent – current prices)

[6] Idem (GDP per capita calculated as 2005 sterling pounds equivalent – current prices)

[7] Milanovic Branko, *Global income inequality: what it is and why it matters*, United Nations, Department of Economic and Social Affairs, Working paper no. 26, 2006, pag. 16

[8] World Trade Organization, *Trade liberalisation statistics*, available at http://www.gatt.org/trastat_e.html

those able to work[9]. So, we can say that the main human economic activity dissapeared in just some few decades .

 ➢ Fortification of the middle class

Another structural change is the passage of world population gains in tandem with world GDP and total production to superior curves as shown by the next chart:

Figure 1: The comparative evolution of average income distribution, on intervals, in the 60`s and 90`s
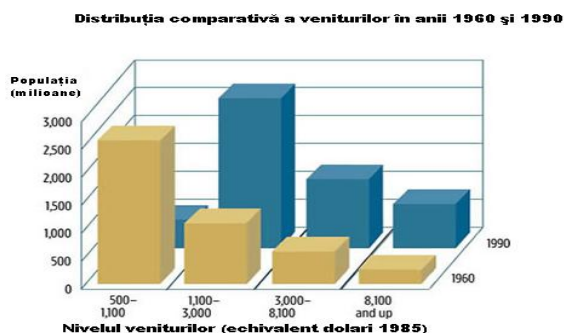
Source: Lucas E. Robert Jr. , *The industrial revolution: past and future*, *The Region*, 2004, vol. 18 , pag 11

 ➢ Emergent economies

An important feature of today`s economy is the emergence and development without precedent of some economies, that we call emergent[10], economies that a decade or two ago were described as being third world ones, recently, being responsible for balancing some chapters of world economy.

In the purpose of showing the economic force of these world powers we can bring to front some figures that UNCTAD delivered, so, it is estimated that currently, China`s capital reserves are around 2.9 trillion dollars[11], those of Russia about 507 billion dollars[12], Brasil having about 287 billion

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[9] Boltho Andrea, Toniolo Gianni, *The assesment: the twentieth century – achievments, failures, lessons*, Oxford review of Economic Policy, vol. 15, no.4, pag. 3-4

[10] This term has been introduced by Antoine van Agtmael, clerk of the World Bank, who, to avoid using the term ``third world countries``, considered being a phrase that brought great disadvantages to those economies that were called this way, these being avoided by foreign investors, used the word emergent. Currently, The World Bank classifies economies related to their GDP per capita: a) low income countries, under 995 $, b) low to medium income, meaning from 996 to 3945 dollars, c) medium-high income countries, over 3946 but below 12195 $ and d) countries having a GDP/capita higher than 12196 U.S. dollars, countries with large incomes. (http://data.worldbank.org/about/country-classifications);

[11] UNCTAD, *Unctad Handbook of Statistics*, 2011, pag. 412; reserves include gold ones, as for 2010;

dollars[13] and India little above 276 billion dollars[14], as in 1980, China`s were just around 3 billion and in 1990, around 30 billion

The four most populated countries in the world (China, India, Indonesia and Brasil) have made great progresses in the sense that they have increased their growth rates, having in the last decade average growth rates of 6 percent per year, this meaning that for about 40 % of world population the real an nominal rates of growth have grown constantly[15]. We can observe the same trends for some emergent economies of the new wave like Chile, Peru, Tunisia, Ghana, etc. People living in economies with high income or with income simmilar to the average of OECD members has grown 4 times in the last 3 decades.

> Economic growth

Economic growth becomes a concept that has been given new meanings in the last decades, both theoretical and empirical direction have opened the path of new ideas, visions, interpretations of this concept. Theoretical developement as the analysis of endogenous growth determined by technological progress or scale economies have offered a better perception of the emchanisms that determine economic growth.

Anyway, there are still authors that consider the concept of economic growth and sustainable development as being paradigms that are impossible to implement in social practice for at least three reasons[16]: they engage the growth and deepening of inequalities and injustice in the world, between the rich and the poor; they create they image of an illusory welfare of present generations, whilst sacrifying and decreasing the chances of welfare for future generations; growth economy and development does not direct humanity towards moderation and choosing a durable society model but creates a society ill of its own wealth.

On the other hand, measuring externalities derived from economic activity gives us a clearer image of the concept of economic growth, an index to show more than the progress of GDP in evaluating economic growth has been introduced by Herman Daly, he proposes GPI (Genuine Progress Indicator), an index that equals the difference between GDP and the sum of social costs implied (the costs of water, aer and soil pollution, etc.). The difference between evaluating growth by

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[12] At 20.07. 2012, according to Russian National bank, they include gold reserves, available at: http://www.cbr.ru/eng/pwe.aspx?file=/eng/press/120726_153206eng_res.htm

[13] UNCTAD, *Document citat*, Pag. 412

[14] Idem

[15] Lin Yifu Justin, Monga Celestin, The World Bank Economic Development Series, The *growth report and new structural economics*, Policy research working paper 5336, iunie 2010, pag. 3

[16] Popescu Gheorghe, Filimon Ruben, *Nicholas Georgescu Roegen, Epistemologia evoluționistă, săgeata timpului*, Editura Risoprint, Cluj Napoca, 2009, Pag. 253-260

GDP or GPI is observed at the detail level, as GDP does not make distinction between expenses for producing new goods and services (progress, growth) and those expenses that are implied by externalities. As an example we show the comparative evolution of GPI and GDP in the USA during 1950-1990:

Figura 2[17]: The comparative evolution of GDP and GPI during 1950 to 1990
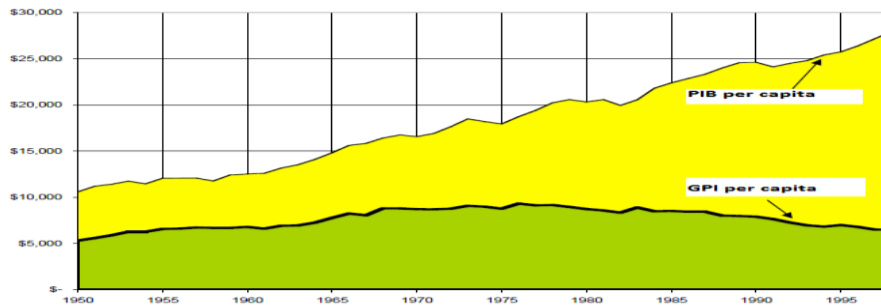
Sursa: Miller Peter, Westra Laura, Anielski Mark, Soskolne Colin, *Just ecological integrity: the ethics of maintaining planetary life*, Rowman&Littlefield Publishers, Maryland, 2002, pag. 90

Economic growth is an issue intensively debated in economic literature having a lot of factors that favor it a alot of factors that are inhibitive. It looks like lately, just those factors that favor it have manifested, even if there were lots of economic problems and a general feeling of economic pesimism, mathematically we have proven that, in general, we can discuss about economic growth. On the other hand, we consider that the pesimistic perception can be put on the shoulders of the confort standard of human beings that has constantly grown and sometimes, these economic problems make it stagnate or reduce it temporarely, generating the pesimistic feeling[18].

> ➢ Multinational Corporations

Another dimension of the structural changes in today`s economy is linked to multinational corporations, power poles of the new economy, carriers of capital flows and technology, sometimes pressure groups, sometimes positive influences, especially for all emerging economies, subject of controvercies, entities that develop their structure under ever more efficient and flexible forms, in essence, forms of manifestation in the private economic environment of those features that a state or a group of states should acomplish. This derives from the analysis of some facts like: their dimension (regarding their turnover, the number of persons they employ, their assets or the ties they bond with state institutions or private ones); the importance in implying capitals in the process of reproduction (capital transportation between economies, substituting the state as an agent of investment) ;

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[17] GDP as 1985 dollar equivalent, PPP

[18] Rovinaru Flavius, Mada Florin Manuel, *Economic growth, a constant in human evolution*, Revista Economică, nr. 2, 2011, pag. 567

multinational corporations substitute states when renewal of fixed capital is involved (especially lately and mostly in emerging economies) ; in some fields, monopolies and oligopolies make these entities, most of them private, become unique suppliers of goods and services..

To sustain these hipothesis we will bring to front some figures: for instance, Wal-Mart Stores, considered being the largest MNC concerning the turnover, has acomplished in 2011 a turnover of over 421 billion dollars[19], more than the GDP of some E.U. state members like Austria, Greece, Hungary or Romania.

> ``Virtualization`` of the economy, economic crisis

Another issue of interest that can be included in the subject we discuss about reffer to modern stock echange and the elements linked to them, the developement without precedent of those methods and products of this type giving birth to, and encouraging speculative attitudes, generating a large virtual economy, in this branch certainties become an abstract concept. One of the trends in recent years has been the use on a large scale of financial derivatives[20]. Investments in this kind of products ever grew, the temptation of some substantial gains made transactions ever larger, the growth has been so large that in 2008 they have surpassed world GDP by a factor of 10, the aggregate world production has been of about 61,3 trillion dollars[21] and financial derivatives market of about 672,5 trillion dollars[22].

In essence, having into consideration the dimension of this fact we can ascertain that real economy, by this meaning the production of goods and services becomes a subsidiary of "virtual" economy, the real component, in this pattern becomes a symbolic one. The abbility of these markets to innovate on a regular basis as well as the multiplying of the forms they exist in become a consistent change of world economy reshaping some of the patters and certainties under which they existed in the past.

We have been witnesses to noumerous economic downturns after the industrial revolution but the development without precedent of the channels the economies use to communicate made these

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[19]According to Fortune 500, available at http://money.cnn.com/magazines/fortune/global500/2011/full_list/

[20] These financial products have as support assets shares, indexes, raw material, etc., so they do not fluctuate on their own but meantime with the support actives they define. Their emergence has been mainly determined by the volatility of the exchange mechanisms of the 70`s and 80`s, these financial products became popular in the case of companies that were trading abroad and became threatened by exchange rates`

[21]World bank data available at http://data.worldbank.org/indicator/NY.GDP.MKTP.CD/countries/1W?display=graph

[22]Bank of International Settlements data available at http://www.bis.org/statistics/otcder/dt1920a.pdf

crisis not posiible to isolate and to travel fast, virus-like, affecting the economic and social environment of all countries, especially of those emergent ones.

> ➢ Economic geography and some aspects regarding the thories of economic establishment

From the historical point of view we can observe that economic geography has studied closely those issues and dependancies involving relationships between human settlements, optimal location of production units and the geographic structure of trade and communications.Because of this, economic geography has been anchored in the classical methods and techniques of identifying and expressing the optimal location[23]. Anyway, recent changes observed in the trends of this science suggest that the paths of research have been multiplying, the width of interests and the mixtures with other sciences are numerous and profound, theese being determined and fueled by the consistent structural chenges that appear in world economy.

A certain location can generate different cost curves for an enterprise, making the entity consider multiple options. So, it becomes important for the economic agent to find the location that can offer the lowest costs, as entities are capable to substitute different types of input to ensure an optimal structure of production costs.

As for the models that have emerged in this direction we consider sensible to reffer to, especially in the genral context of our scientific interest of the following models: the von Thunen model, Alfred Weber`s model, Walter Christaller`s model, John Dunning`s eclectic paradigm . In out doctoral thesis we make a detailed presentation of these theories.

2nd Chapter: Advantages in production, scale economies, knowledge and knowledge diffusion

As to be able to discuss without doubt about scale economies and increasing returns to scale it is neccesary to point out some of the features of modern trade flows, this being that, currently, they exist under a climate of imperfect competition. Even if classical trade theories base their hipothesis on a set of initial concepts like: production input immobility between economies and prefect mobillity inside an economy; the existance of constant returns to scale, etc., in practice, after the Industrial Revolution it has been observed that in the case of some economic activity, the increment of input determined a disproportional increment in the output, so, one of the main concepts we talked about

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[23] Clark Gordon, Feldman Maryann, Gertler Meric, *The Oxford Handbook of Economic Geography*, Oxford University Press, Oxford, 2000, pag. VII

earlier were infirmed. This phenomenon – the increment with more that a percent of outputs when inputs grown with a percent is called increasing return to scale. Obviously, we can observe the opposite situation when outputs raise with less than a percent as inputs grow with one unit, this being called decreasing returns to scale.

The evolution of these theories has been greatly influenced by the beggining of industrial mass production, by the standardization of production processes, by the development of management as a science, by valuing all 19th century inventions, by replacing manual labor with machine labor, this making every operation more efficient, and last but not least the perception of economists

So, if in practice we encounter a situation when in the case of an industry we can observe increasing returns to scale and this is a trend and not an accident, the time horizon being long, we can discuss about scale economies.

Economic ciclicity offers for an analyst the possibility to explain some phenomena, in what follows we will try to take advantage of this opportunity, using the features of a long economic cycle, we can identify and point out those aspects linked to the existence of scale economies. Observing those correlations between the phases of the economic cycle and the type of scale economies that appear, it facilitates a better understanding of their succesion and a foreword for the following ideas. As an example we will use a Kondratiev cycle that defines long term economic evolution in comparison with the evolution of the short run cost curve.
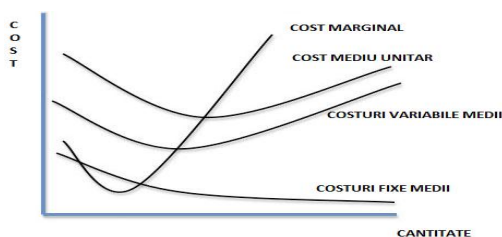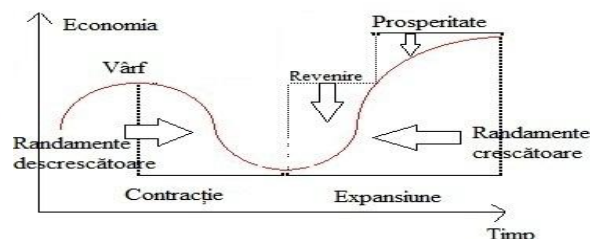
Figure 3a)   Figure 3b)

Figure 3a): Average short term cost curve
Source: own drawings
Figure 3b): Uneven returns to scale in the case of Kondratiev cycle
Source: own drawings

It is obvious in figure 3a) that initially, the average cost is high, in principle because all those expenses involved by the initial investment affect the structure of costs (fixed costs) beacause of the underusage of production facilities, etc., but by increasing production level, so, by supplementing the input of factors, the average cost decreases under the action of increasing returns to scale, the marginal costs decrease more than the average cost to one point, where marginal costs are lower than the average costs and minimal.

In the case of the Kondratieff cycle, the first peak, the highest phase of economic development belongs to the the previous cycle and it has as features: the increment of interest rates, an increment in the price of raw materials beacuase of increasing demand, a direct consequence of economic expansion, then a growth in personal income, an increment in the price of work force, so, a growth of the average cost, linked to the point where the technology that has proppeled economy to this point has reached its maturity phase. Beyond this point economy overgoes a phase of recession, of economic tensions, of rising average costs, the ``engine`` technology being already on the path to extinction. The acute phase of this period is represented by an economi crisis, this being the starting point of economic regrowth. Passing to a new production dimension, the decreasing price of capital, low wages, and lower raw material prices determine an increment in production processes because of the increasing level of inputs introduced in the process but also because of lower average and marginal costs, generating again increasing returns to scale and scale economies.

Scientific literature greets this phenomenon a generous space, especially modern one, but the first references to these concepts are to be found in Anne Robert Jacques Turgot`s work, he develops in the middle of the 18th century the famous law of ``uneven returns to scale``. In the same pattern, Alfred Marshall marks some aspects but of a distinct manner, he observes that in general, the components of capitals are made of organising and knowledge[24], a large part are privately owned and the other is not public owned, so, probably for the first time in history, he integrates in economic literature the links between advantages in production generated by sclae economies and the external factors that determine its appearance.

Economists like Paul Krugman, Michael Porter, Bertil Ohlin or Paul Samuelson have a distinct vision of this issue, different as form but identical as essence, but there are differences that emerge from all those structural changes we have shown already. The newest references on this subject bring often forward the issue of economic clusters being related to scale economies, these two notions are almost always linked as a couple of elements that influence eachother.

Interactions among firns that settle in proximity give birth to two sets of advantages, economies of localisation and urban economies, so, we can consider the category of agglomeration economies with its two sub-categories, two types under which scale economies appear because of business concentration in cities. The first is represented by economies of localisation and the second is urban[25]. The two make scale economies manifest freely, as to be able to ``capture`` them from thin air, without having to adhere to organisations, a simple advantage of their settlement in large inhabited areas. These types of scale economies have been observed first by Marshall. Economies of localisation emerge in the instance in which, in a small area, there are lots of enterprises having their main activity

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[24] Marshall Alfred, *Principles of economics*, Prometheus Books, New-York, 1997, pag. 79

[25] O'Flaherty Brendan, *City Economics*, Harvard University Press, Londra, 2005, pag. 31

in the same field, being part of the same industrial branch and urban economies emerge where in a small area there is a large number of enterprises from various branches that function in close proximity.

In our point of view, in the dynamics of a business cluster the sum of localisation economies (if it exists and if it is significant) becomes more important than the sum of urban economies that emerge, certainly beacuse of, when there are fields of activity where economic concentration is higher, they will lead to obtaining those urban economies, more, they will act as an anchor of the local economic environment, while the existance of urban economies is not conditiones by the strong agglomeration of some economic branches but by the existance of a significant market, which in the case of big cities sustains the largest part of all fields of activity.

Among aspects related to decreasing transportation costs concerning industries that rely on intensive merchandise exchange, proximity of markets or proximity of supply or distributor chains, we can bring to front the most relevant fact in the specific case of our study this being the advantages that derive from knowledge, its diffusion and competencies.

Theorized first by Alfred Marshall, this phenomenon (knowledge diffusion) has attracted the attention of some well known researchers like Robert Solow, Paul Romer, Paul Krugman and others, their trials searching, among other things to explain the way in which spatial dispersion of innovation generates correspondant effects in the effective process of goods and service production. One of the main things that derive from Michael Porter`s work is that, within the business clusters, areas of intense economic concentration, competitiveness is fierce so it stimulates the need for innovation, as innovative firms have the chance of surviving more than those that don`t innovate in the contemporary economic landscape

We can distinguish between innovation processes that start from sinthetical knowledge and those that start from analitical knowledge. The first type of processes emerge in industries where innovation is a row of combinations between different elements of novelty that appear in that field of activity, as a stringent need to solve a certain problem, generated by the interactions with suppliers or customers[26]. Analitical knowledge is common to those productive systems where scientific research has an important place, anyway, the two types are the extremes of this discussion, in reality, the processes of innovation, development or research that rely on sintethic or analitic knowledge come together, depending on the type of good and service that it produces, one enterprise will position itself in an intermediary spot on this path, point that has a unique couple of fetures described by (% analitical knowledge, % sintethical knowledge) of their innovation process.

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[26] Wolfe A. David, *Cluster policies and cluster strategies: lessons from the ISRN national study*, pag. 7,downloaded from: http://www.utoronto.ca/isrn/publications/NatMeeting/index.html

Innovation emerges when scientific research is based on a set of coordinates belonging to a paradigm which is tested, this method being the best suitable for generating changes in that paradigm. Innovations as factual novelties and inventions as novelties in theory emerge when in the process of testing that paradigm, the ones implied in this process observe an anomaly[27]. Their commercial utility appears as a result of the interaction between a product, let it be a good or a service, that owns distinct features, which are not simmilar to those of others and competes on markets and on the other side, consume needs. When there is a direct and strong correlation and the new peoduct is able to satisfy better an existing need or to generate a new type of need we can discuss about a novelty, a new product and of innovation as a process that generated that new good or service. Anyway, because we mainly talk about small and medium size enterprises, innovation can not be always assimilated to a revolutionary discovery but can be considered more as a marginal improvement of the products or processes that appear as being novelty for the enterprise.

Knowledge networks can be defined as systems of scientific information transport, of norms and production methods, of novelty, of some odeas that need to be subjected to collective thought, these network can emerge in the shape of scientific journals, mass-media, internet, formale social-interaction networks, isolated social interactions, etc. The importance of labour force becomes vital for the succes of the enterprise because the employees become vital for collecting information from the available or locally accesible knowledge networks.

The capacity of absorbing useful information from the knowledge networks sits at the bottom of the differences that stand among firms in the cluster. Knowledge does not represent a homogenous category, that as Marshall said can be collected out of thin air and can be accumulated in equal shares by all members of the cluster, but on the contrary, linked to the individual absorbtion capacity of firms, the distribution of knowledge follows a pattern that indicates a nucleus of firms that have the abbility, but close to that of others, of accumulating the useful volume of information.

For the enterprise that collects information from the economic environment this is clearly an advantage but for those that share information it can be considered a disadvantage as it can reduce the competitive advantages that an enterprise gains through R&D. Building a climate of mutual trust between agglomeration parteners is a thing of great importance in this process of difussion, if this exists and if there are premises for a reverse transfer the entity accepts silently to transmit the information within the cluster, otherwise, it will ensure a strict protection on that intangible active that can grant a strong competitive position or enhancing competitiveness. Trust among partners does not emerge otherwise than the consecutive interactions build a solid frame of connections between firms and employees.

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[27] Kuhn Thomas, *The structure of scientific revolutions*, University of Chicago, second edition, 1970, pag. 52

Difussion of knowledge is in the first place a local phenomenon, anyway, in the emergent fields of economy that we wish to talk about, losing the edge of novelty that an innovation or invention bring is quick, difussion follows the mentioned pattern, it influences first the local economic environment and spreads then fast, but the high speed of diffusion makes positive externalities hard to detect, grab and fix in the environment of the enterprise.

This is why, usually, it is hard to identify a regular spatial distribution of enterprises from emerging clusters concerning the patters of knowledge difussion, because even if naturally, physical distance influences knowledge diffusion, the speed of diffusion makes the potential advantage of locating near a source of difussion unavailable in decent timing, the short time span during which a concept, idea or patent brings an advantage makes this lose fast. If the initial source of diffusion is able to maintain the rithm of upgrading then the cluster will emerge under a circle like shape, if the source of diffusion is constantly changing we can identify an agglomeration that does not group under a certain pattern but under an irregular shape.

In emergent clusters there is a high potential of enhancing the technological level of the firms in the cluster. The complexity of technology used in an emergent cluster becomes an important factor of analysis in the knowledge diffusion phenomenon, more, the way in which knowledge, as a generator of advantages influences the production of goods and services claims a typology of transmission systems, which is different, and it can sustain high levels of enhancing the complexity of cluster activities. In emergent clusters innovation appears more often from the product level to the process level and not vice-versa.

Chapter 3. Cluster type business agglomerations

To continue, our research deals with those elements of background and form which govern the existence of business clusters. The most important aspects that deserve evaluation are those refering to the way they appear, the needs that generate their appearance, general and particular circumstances that lead their development, but also the disappearance of points of agglomeration in economic activities.

Clusters can be considered as a set of economic activities, economic entities and institutions, geographic agglomerations at local and regional level, wich interrelate in formal and informal way, horizontal and vertical as well, in order to favour the part of affairs (industrial and more recently services) that turn into reason of changing goods, information or knowledge for developing a product for both sides.

The study of clusters is connex to the study of economic competitiveness. The observation that Michael Porter, the economist credited with the revival of interest for economic agglomerations, starts when building the cluster concept with the idea that those succesful firms, the competitive ones at international level (those that by exporting goods have again succes on international markets) are not isolated but part of a network, of a group of partners that are competing with other groups within the same industry at national level.

Our opinion is that in the unstable economic environment of today, that has as main features capital flux liberalization, international knowledge difussion and accelarated virtualization of the world economy, we can not discuss about competitiveness as a constant function in time, or at least liniar on long term, but more as a fact gained with consistent efforts and difficult to maintain on long term.

Alfred Marshall pointed, inspired by the economic background of that time, some features of the industrial aglomeration that he observed in the general context of elements that generate atraction forces among firms. He names the economic structure that agglomerates production of goods - industrial districts, considering this category as having its own force of attraction. This appears once the critical mass is generated, this mass being formed as a result of repetitive local interactions and when this (critical mass) becomes significant the economic agents from other areas will search the same proximity.

The ``hub&spoke`` cluster supposes the existence of a number of local firms, medium sized, which function in close proximity as a consequence of the existence of a number of big size producers in the same area. This type of cluster appears more and more frequently in the contemporary economy, mainly because of the inability of small and medium firms in an industrial district to engage in business needing high capital and to overcome downturns of the economy.

Sattelite clusters is another category formed by subsidiars or subcontractors of a larger economic entity wich appears in adjacent zones of large urban agglomerations. They take the form of industrial platforms, borrow some of the features mentioned in a previous paragraph, but remain mainly production units coordinated at distance.

Apart from the generic concept of cluster, which also has asa a defining element spatial proximity, the next concept emphasis the socio-cultural proximity, the one which is indispensable to the existence of a ``milieu innovateur``. The mixture between the spacial proximity and the socio-cultural one rises the possibility that within the agglomeration interactions and cooperations are generated and the results of repeated interactions are called ``relational capital``. The ``milieu innovateur`` concept spins around the idea of collective effectiveness, this referring both to fortuit

effects and to programed ones, planned or followed, and tries to impose the idea according which competitivenes can`t be understood or improved, focusing only on individual firms.

Physical proximity, both spacial or organizational is not in itself anything else than a precondition of the economic process sinergy, but an indispensible one for this type of structure. Complementary approaching, the capacity of these entities to act individualy, but for a common goal must be developed. This is the so called ``proximity relationship``or the ``relational capital``of economic communities. This is built on the framework of different elements, some belonging to macro, other to micro economic background, having a tangible character, other times an intangible one, but all having at least something common to notions like trust, reputation, socialization, etc..

For an isolates firm it is difficult to engage in business with other parteners because it is not easy to initiate researches on self expertise, while the proximity of other entities lowers the costs of the process. An isolated entity will attract less potential clients while an industrial agglomeration will be attractive for a larger number of buyers which will consent to contracts having a certainty of negotiation and a good price.

Apart from these short examples it is a certainty that a business cluster emerges when there are two features of the economic background: the existence of some advantages like natural factors which abound due to some particularities (climate, soil, resources etc). Another explanation resides in the so called ``accidents ``, an antrepreneur decides to build an entity in a special domain, and in time this activity turns into a prosperous and important one, either because the initiator was a visonary, a pioneer and innovator in a certain branch, or because in time a local demand for those goods was launched, triggering the attractivity of the area.

Sometimes, there are situations when a local initiative, sustained by authorities, can become a successful one. Local authorities try to attract affairs in a certain domain in a well defined area, which usually uses the name of industrial platform, technological park or industrial zone.

Territory can be considered neutral, having no particular features, not on its own the capacity to generate advantages. So, a territory becomes important when some of its atributes become viable for generating advantages in production and then profits. Firm`s capacity to become competitive is not connected to physical proximity but with the proximity of some good resources which can be secured or generated only in the presence of other firms, in the condition of divison of labour.

Proximity can be understood as having there levels: physical (the first level), specific to those industrial districts described by Marshall. They mean the coexistence in a reduced space of firms, schools an authorities; the second level is the organizational nearby which needs that entities group in the considered space to become part of an integrated system, most of the time, a system of financial or technological interdependence, and the third one which we can consider the cultural-technological

proximity that means that the firms have the same values, using production technology and almost identical systems, this approach being physical or virtual. The last type of proximity is recently being used more often, because the current economic backgroud provides all incentives for the use of virtual space to make business or to share ideas.

There are some phase that industrial agglomerations pass in their existence, the emergent one – when the critical mass is generated and agglomeration begins, the efficency stage, the decreasing stage and in the end the disappearing one. However, it doesn't mean that any agglomeration will follow this course of development, some might never become competitive, they appear as emergent and then, due to the lack of appropriate condition they disappear . Others might be in a perpetual change, avoiding the decline.

When they are emergent, agglomerations have the features of a fully functional cluster apart from consistence, the critical mass of elemnts need for gaining vital inertia is built, the agglomeration becomes competitive on regional, national and international level. The continuous accumulation of information capital, strategy and competence leads to the appearance of scale economies both internal (at the level of individual firms) and external –the level of agglomeration, and to inventions, innovations etc., but according to some circumstances , agglomeration can survive more or less in the economic background. Some witness a strong climax, then they disappear shortly, but others live a longer life. Clusters are capable of transforming within some limits, but usually are incapable to change the structure and technology of production on short term. The reasons that lead to the disappearance of some agglomerations are: structure disagregation, firms reorientation to other branches of activty, even though the physical proximity is the same, the bounds between the component membres brake and this also brings the force of reciprocal attraction that generated the agglomeration. Another is the emergence of some more competitive agglomerations in the adjacent zone, or the dependence on the informational network of the cluster.

Chapter 4. Description of some business clusters wih the aid of a 3x3 tipology

This section of the paper offers some practical explorations, some examples of industrial agglomerations wich are consacrated, but also to describe the example of some that have all characteristics of an emergent cluster. By presenting the way in which they emerge and function, the way they create bounds inside the structure or with central anthorities and local ones, and how they

enhance their development, we would like to generate some ideas that would help us integrate agglomerations in the framework of contemporary economy.

For the firts case study we chose the car industry and three representative agglomerations. Among these, one appeared as a result of capitalization of local tradition in the field, accumulation of competences, the second as a result of putting into practice the strong ambitions of local visionary entrepreneurs, and the third one for exploiting the advantages offered by a developing economy.

German car industry imposes quality standards in the field and according to statistics it is shown as an industry which generated, in 2010, a production in quantum of 249 billion euros, out of which 175 billions exports. The producers from Baden – Wurttenberg contribute with over 30% to the total german car industry production. The car industry of Baden-Wurttenberg engages approximately 342.000 workers, which means that in the manufactures-industrial sector in the area one of four jobs are in this field. Furthermore this industry employs around 41% from the work force in the car industry from Germany, and around one out of six at EU 27 level.

Among the advantages that impelled the industrial groups from the area to the actual standards we can mention: industrial tradition in the field of metal bonding and the transmision of knowledge from generation to generation in the condition in which there is a very consistent and highly sustained educational system in the domain. R&D receives in the region an enormous quantum of financement, about 40% out of the total expenses with research and development in the german car industry and roughly about the same amount is used for training specialists.

Figure 4: Main innititives of agglomeration in the car industry in Baden-Wurttemberg
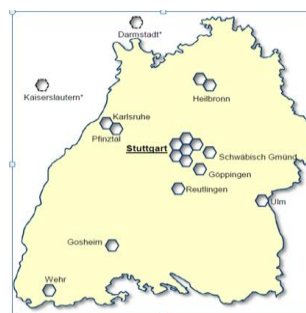
Source: Agenția pentru Cooperare Economică Internațională, Gesellschaft für internationale wirtschaftliche und wissenschaftliche Zusammenarbeit, *The automotive industry in Baden-Wurttember*g, BW-invest, pag. 7

Another case study that we have considered useful in our trial of showing some typologies and their particularities is the example of the car industry in Emilia-Romagna, Italy. One of the main features of the italian economic environment is the presence of small and medium sized enterprises. In this region of Italy there are threee of the best known and appreciated brands in the sport-premium car industry: Ferrari, Lamborghini and Maserati.

This cluster was born, opposite to that in Baden-Wurttemberg out of the passion of some enthusiasts that have initially desired to build performant cars, dedicated to high-end clients, the financial implications being put in the background but then, observing the niche that has been created they have made all posible efforts as to build a brand image and some products that could guarantee important market shares and priviliged positions in this segment.

The inabbility of small and medium enterprises tipical for the italian industrial district to financially sustain the development effort is a thing that can be spotted instantly, currently, important social shares of all three main producers belong to large multinationals (Volkswagen Aktiengesellschaft Group and FIAT Group).

Figure 5: Spatial distribution of the auto industry firms in Emilia-Romagna, Italy, involving the number of employees in 2006
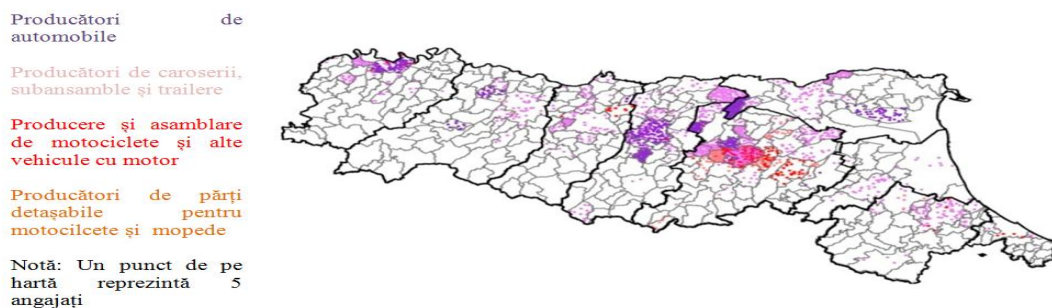
Source: Agenția de dezvoltare regională Emilia-Romagna, ERVET (Emilia-Romagna Valorizzazione Economica Teritorio S.p.A., *Investire nella motoristica,* document descărcat de la adresa de internet http://www.investinemiliaromagna.it/wcm/investiner/pagine/schede_filiere_produttive/Investire_nella _motoristica.pdf

Apart from the cluster in Baden-Wurttemberg that manages to maintain a high level of competitiveness through deepening its vertical integration, the italian cluster maintains its competitiveness through its capacity of changing fast its structure and content whenever it is needed.

In Maharashtra, India, in the financial year 2009-2010, there have been approved investments of 1.512.090.000.000 rupies, so, about 29.000.000.000 dollars, these investments are going to be the workplace for 230.000 persons. In Maharashtra, there are clustered togheter facilities of: Daimler-Chrysler, Fiat, VAG (Skoda Auto), Tata Motors, as well as indian enterprises: Mahindra&Mahindra, Bajaj Auto, Bharat Forge, Kinetic Engineering, etc. Out of the 6 provinces, Pune is the one in which the car industry has the strongest concentration, in this region of Maharashtra, over 4000 production facilities are functioning in proximity[28]. In this area main Bajaj Auto, Daimler, Tata Motors production

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[28] Maharashtra industrial Development Corporation, *Invest destination: auto sector, Putting Maharashtra on Fast Lane*, Knowledge Partner Ernst&Young, pag. 9, document descărcat de la adresa de internet: http://www.midcindia.org/Sector%20Profile/Auto-Auto%20Ancillary%20Sector.pdf

facilities but also supplier facilities are concentrated, the distance between members is low, suppliers function in the close proximity of the manufacturers.

So, this type of clusters have as main features the close proximity between cluster members especially beacause of the coordinated spatial development and then, strong heterogeneity, some of the members have as a main incentive for clustering a stable market, some advantages like the abbility to gain important shares because of the superior quality of their products, then because of the mixture of strategies producers use.

Figure 6: The teritorial dispersion of the main business clusters in the auto industry in Maharashtra, India
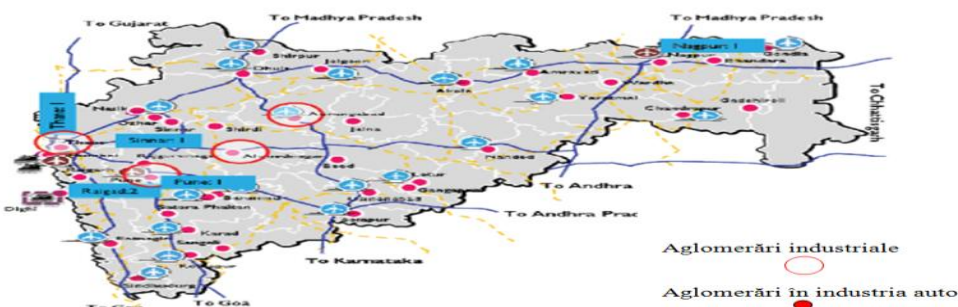
Source: Maharashtra industrial Development Corporation, *Invest destination: auto sector, Putting Maharashtra on Fast Lane*, Knowledge Partner Ernst&Young, pag. 11

The coordinated disposal of production units is visible, surely a result of an initial plan, almost all centres are established on the important communication routes of the country, there are more in the western part, dur to the existance of harbors. In comparison with Baden-Wurttemberg or Emilia-Romagna these are not concentrated around strong nuclei thata are large cities but are dispersed over the territory.

It is a common practice in Silicon Valley that when a company reaches a strong developmet level some of the key persone in the company to leave and to build a new company, because it is already impossible to put in practice some of the ideas they have. In most cases, the company they part from ensures the capotal needed for the spin-off. If the infant days of this cluster identify themselves with a period when scientific breakthrough was more important than their economic viability, financing business was almost always a question of personal funds, nowadays, financing is no problem, the most important thing being the project, the economic perspective of the business or the profits that it can bring. Silicon Valley remains a preferate destination for the so-called venture capital, the importance of this type of capital resides in their dual component, that of fund transfer and knowledge transfer.

The succes storire of were born in coffeeshops, this stand for a collocvial description of what things meant back then but it underlines the importance of informal networks for the development of

the cluster. So, in this cluster we can find all the ingredients that a fast growing business needs: capital, competencies and visibility. The cluster is homogenous as structure and field of activity, the largest part of enterprises are concentrated in the I.T. or hardware industries but it is heterogenous because of the fact that firms`strategies arevery different.

Thirty years ago, in Cambridge and in the adjacent area there were about 20 I.T. enterprises, meantime, this region has evolved into an area where important I.T. business function and where around 1400 firms have their headquarters, employeing about 40.000 workers[29]. At european level, this is the region of most business initiatives in I.T. and high-tech industries supported by governmental programmes, being constantly used as an example within the E.U.

This cluster, that we can reffer to as ”Silicon Fen”, ”Cambridge Technopole” or ”Cambridge Phenomenon” is include in the boundaries of 25 km around the city of Cambridge, an area of intense activity in R&D.[30]. Currently, the critical mass of firms, employees and competencies raises the question of the viability of including ”Silicon Fen” in the ”supercluster” formed in the triangle London-Oxfor- Cambridge. The architecture of the cluster can be defined as a classical one, in the sense that there is a certain symbiosis between the economic activity in the cluster and the events that take place in the three university, so, a university becomes a great influence for all those processes that take place in the cluster.

This cluster has the feature of being a focal point for more than an industry, in the last 30 years it has evolved from a competitive group of firms in the semi-conductor and hardware industry to a competitiveness pole in software industry, nanotechnologies, biotechnologies, etc. The pattern of emergence is tributary to spin-offs as they appear like celular division, most times, the effect is not of splitting but of doubling.

Our third case study reffers to Bangalore, a centre for I.T. industries in India, being called many times the asian Silicon Valley. Currently, it is the place where more than 1500 enterprises in the software, biotechnology, electronics and other industries function in proximity.

In the 1950`s and 1960`s the federal government in Bangalore made great investments in the area, they have established Hindustan Machine Company, Bharat Electronics Limited, Bharat Heavy Electricals Limited, Hindustan Aeronautics Limited, Indian Telephone Industries, etc. Then, the software export schema meant one of the first and most important aids to this economic branch in Indiam the immediate interest being that of stimulating software export. Another factor of great

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[29] East of England Development Agency, *East of England technopole report, an overview of the Uk`s leading high technology region*, St John`s Innovation Centre Ltd., Cambridge, 2010, pag. 6

[30] East of England Development Agency, *Cambridge technopole report – an overview of the UK`s leading high technology business cluster*, St. John`s Innovation Centre Ltd., Cambridge, 2011, pag. 1

influence has been the large number of bachelor degree persone that left India in the 1970`s-1980`s, and when opportunities emerged in India they came back, bringing with them not just capital but also manager skills that enabled them to link the business environment of the area to the trends and rigors of the mature world markets[31].

Another issue of importance that certifies the extent of the activities in the indian cluster is the upmost performance of enterprises in this cluster to ensure high quality standards in the process of production, many of them have already gained a series of certificates that are internationally recognized.

Anyway, currently, Bangalore can become the victim of its own advantages as these have attracted a large number of multinationals but the lack of a proper infrastructure the high level of wages, the rise in the prices of properties, the aggresive marketing that other regions of India make have made some investors leave bangalore for other regions, some of them having into consideration this.

The last of the three sets has as a feature the fact that the clusters it represents are of smaller spatial span and they all are clusters involved in the tile industry.

The world tile market has been dominated by italian manufacturers for almost 30 years. In Sassuolo and in the sourroundings of the city there have emerged turning into an advantage the tradition of clay manufacturing a series of small producers of ceramics that were initially used as traffic signs, house plates, pavements, etc. These pioneers were those that have initiated the transition form craftsmanship to industrial manufacturing

In 2010, 81 % of the total tile production in Italy has been accomplished by enterprises around Sassuolo, over 10 % in other areas of Emilia-Romagna and just 8,71 % in other partes of Italy[32] fact that assures us of the importance and great concentration that enterprises in the tile industry have in this area. In the beggining, the largest part of all industrial machines had been imported but the proximity of a cluster in automotive industry and the fact that improvements could be made on the spot made italian tile industrial machine industry develope fast. The competitiveness of the cluster has been earned by inside efforts, the difficulties linked to the lack of raw material or high production expenses in comparison with foreign rivals have been avoided one at a time

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[31] Saxenian Annalee, *The Bangalore boom: from brain drain to brain circulation* în Kenniston Kenneth, Kumar Deepak, Bridging the digital divide: lessons from India, Sage Publishers, Delhi, 2004, pag. 170

[32]Confindustria Ceramica, *Indagini statistiche sull`industria italiana*, Piastrelle di ceramica 31a edizione, Assopiastrelle Italia, 2010, pag. 16

The importance of the internal market in this industry is underlined by the percent of trade in this industry, on national markets, in 2009 these have accounted for 79,5 % of the toatl world tile trade, more, we have the example of Spain, in this country, the downturn of real-estate has made Spanish tile industry drop fast and has lowered the spanish quota of world total from 609.000.000 m^2 in 2005 to 324.000.000 m^2 in 2009), from 2006, the spanish tile industry has dropped a number of place in the this ranking, from 2nd to 6th[33].

The number of enterprises has grown constantly in Sassuolo until the mid 70`s, then, the fierce rivalry became overwhelming, some owners decided to sell as to avoid strong competition or to avoid successions as economic canibalism is obvious in this cluster. The tendancy of firms to grow brought up the need to concentrate economic activity, for instance, in 1998, the most important firms had together a share of more than 61 % of total cluster production[34]. If in the beggining the cluster had been an industrial district it started to change the shape into a ``hub and spoke`` type. This tendancy is in our opinion a proper answer to the emergence of strong foreign competitors but is also one of the elements that undermine the essence of the italian industrial district, to function as a structure made up mainly of small and medium size firms.

This cluster has few links with support industries or with academic ones, the university environment being just slightly involved in the R&D processes that take place in the cluster, the largest part of them being attributed to the private economic environment.

In Castellon, Spain, in the region bounded by Alcora, Borriol, Onda, Nules and Castellon de la Plana, a rural area having mainly craftsman villages has evolved in 30 years into a world centre of tile production. In essence, the geographic dispersion of production units seems to be simmilar to that of the one in the italian cluster but around 80 % of the spanish tile manufacturers are concentrated in this 20 km strip. So, if the italian cluster seems to be a large focal point sorrounded by small points, the spanish one seems to be a medium-large sized point sorrounded by medium size points of agglomeration, which are not organised under some patterns. Between them, links are pretty strong.

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[33] David Stock, infotile.com, *World production and consumption of ceramic tiles*, 2009, pag. 2, utilizând date ale Ceramic World Review Magazine, downloaded from http://www.infotile.com/pdfFile/advicetopic/1404201140909.pdf

[34] Mayer-Stamer Jorg, Maggi Claudio, Seibel Silene, *Creating competitive advantage in ceramic tile clusters in Italy, Spain and Brazil,* Institute for Development and Peace, report 54/2001, pag. 15

Figure 7: The evolution of ceramic tile production in Spain between 1966 and 2000
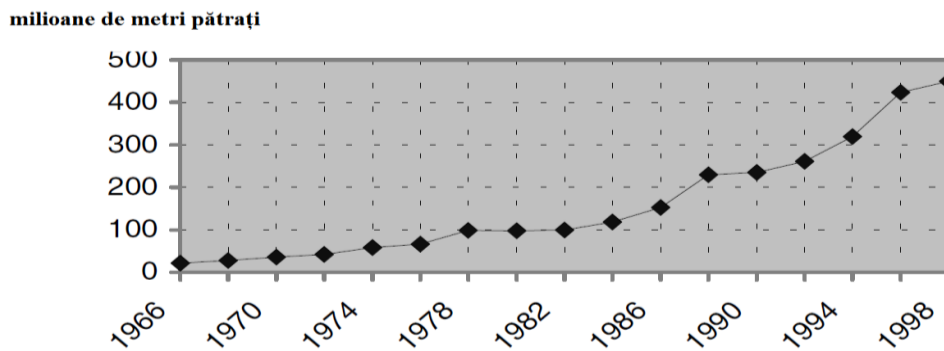
Source: Albors Jose, *Networking and technology transfer in the Spanish ceramic tiles cluster: it`s role in the sector competitiveness*, Journal of Technology Transfer, no. 27, 2002, pag. 264

The industrial cluster concentrated in 2004 about 80 % of the total number of enterprises and about 95 % of the total spanish tile production, over 90 % of the enterprises being medium and small[35].

Table 1: The evolution of the turnover for the ceramic tile producers between 2005 and 2011

Anul	2005	2006	2007	2008	2009	2010	2011
Exporturi (milioane euro)	2041	2183	2295	2211	1673	747	1870
Piața autohtonă	1609	1799	1871	1460	918	801	700
Cifră de afaceri	3650	3982	4166	3671	2591	548	2570

Source:Ascer (Asociația producătorilor spanioli de plăci ceramice), *Topline figures from Spain`s ceramic tile industry in 2011*, pag. 1

As we have mentioned before, the spanish tile industry is dependant and very sensitive to internal market movements, the national demand, that has initially triggered the dimensional growth of the cluster is again the element that can determine the restraining and contraction of the dimensions. The fact that it is mainly composed of small and medium enterprises puts Castellon in the picture of having a faint immunity and to be highly influenced by internal movements on this market. Italian manufacturers have an export structure concentrated on north-american, french and german market while spanish industy has an eterogenous structure, small quota on a large number of markets.

The lack of engeneering tradition and the downturn of the celulosis and pulp industry in the 1960`s have determined the closing of mechanical shops in the area and the dilution of competencies
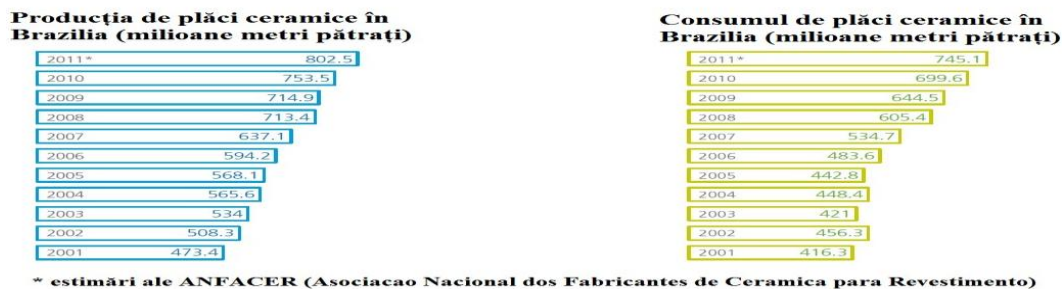
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[35] Vidal-Alegre Joaquin, Alcami-Lapiedra Rafael, Gomez-Chiva Ricardo, *Linking operations strategy and product innovation: an empirical study of Spanish tile producers*, Research Policy, no. 33, 2004, pag. 832

in this field[36], which for the spanish tile industry, trying to develope a local production network meant generating a dependancy on foreign industrial machines, especially from Italy. Anyway, Castellon cluster detains two precious advantages, the first reffers to a better abblility of firms to perceive tile production of a technical manner and the second linked to the good performances that spanish industry has obtained in the tint, dye and enamel industries. The abbility of understanding tile production of a scientific manner enhances the chances that this cluster will develop in the future some revolutionary products or processes but reduces as well the time span needed for a project to be brought to light.

As for the structure and density of the support institutions we can consider that the spanish cluster is well organised, we could say that the succes of the spanish tile manufacturers and the high degree of concentration in this industry is due to those organisms that have supported the industrial initiatives.

The brasilian tile industry is build on the same pattern as the italian and spanish one with the single adnote that it is not so highly polarized, there are not points that concentrate the majority of production activities. Anyway, a cluster of significant dimensions, the first emerged in Brasil in the tile industry is that formed in Santa Catarina region, around the city of Criciuma.

Figure 8: The evolution of tile production and consumption in Brazil between 2001 and 2011

Producţia de plăci ceramice în Brazilia (milioane metri pătraţi)		Consumul de plăci ceramice în Brazilia (milioane metri pătraţi)	
2011*	802.5	2011*	745.1
2010	753.5	2010	699.6
2009	714.9	2009	644.5
2008	713.4	2008	605.4
2007	637.1	2007	534.7
2006	594.2	2006	483.6
2005	568.1	2005	442.8
2004	565.6	2004	448.4
2003	534	2003	421
2002	508.3	2002	456.3
2001	473.4	2001	416.3

* estimări ale ANFACER (Asociacao Nacional dos Fabricantes de Ceramica para Revestimento)

Source: Anfacer (Associacao Nacional dos Fabricantes de Ceramica para Revestimento*), Numeros do setor, Producao Brasileira de revestimento de ceramicos e vendas de revestimento ceramicos no mercado interno*, grafic descărcat de la adresa de internet: http://www.anfacer.org.br/

It is obvious that there is a strong bond between the evolution of internal demand and the advance of brasilian production, this being a dependancy similar to that of the spanish industry, anyway, opposite to that one, demand for sanitary ceramics has constantly grown in Brasil, making the industry react normal.

Tile production is concentrated consitently in four industrial clusters, three of them medium as size, situated in Sao Paulo region (Grande Sao Paulo, Santa Gertrudes şi Mogi Guacu), and a large

[36] Albors Jose, Networking *and technology transfer in the Spanish ceramic tiles cluster: itls role in the sector competitiveness*, Journal of Technology Transfer, no. 27, 2002, pag. 268

one, the subject of our research, Criciuma cluster of Santa Catarina province. In the early 90`s there were some economic struggles, the dropping in demand on the national market because of the serious imbalances as well as the strong competition coming from the enterprises in Santa Gertrudes cluster, which had specialised in low-cost tiles claimed radical measures involving changing production lines and rethinking the operational structure of production, especially for the larger companies in the cluster, they gave up functioning as integrated manufacturers and outsourced some of the activities to cluster partners that have recently oriented their business strictly in that direction[37].

The enterprises in this cluster were responsible for about one third of the total production and two thirds of exports[38], the cluster being built in the mid 2000s by the interactions of 10 tile manufacturers, 14 suppliers and 5 equipment, enamel and colour manufacturers[39]. This cluster though remains a classic example for the lack of cooperation between members, their main interactions are those that appear in a value chain. As support institutions we can highlight SEBRAE, support institution for small and medium enterprises but also ANFACER, the association of tile manufacturers in Brasil, its most concerns are for making brasilian tile industry popular abroad.

The brasilian cluster has the advantage of being close to the american merket, of having a large and fully expanding internal market, capable to make up for the lack of mechanisms that permit engaging on international markets. On short term, the proximity of the U.S. market, the downturn in the apetite for high-end but expensive italian goods, the fact that there isn`t strong competition in the area and the fact that the majority of central and southern american countries have enhanced their standard of living can make for the brasilian manufacturers, especially for those in the Criciuma cluster, manufacturers of better quality products, the chance of growing their sales as well as ensuring a place on the U.S. and Canadian markets where south-american communities are numerous.

5th Chapter: The concept of emergence. The emergence of clusters

The term ``emergence`` is used commonly by rresearchers to describe the spontaneous appearance of some modifications without precedent in the natural order, its usage in describing scientific phenomenon has been the for the first time, the main work of John Stuart Mill. The

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[37] Garcia Renato, Scur Gabriela, *Knowledge management in the Brazilian tile industry and new challenges of competition in the global value chain*, Journal of Knowledge Management Practice, vol. 11, no.1, 2010, available at: http://www.tlainc.com/articl213.htm

[38] Mayer-Stamer Jorg, Maggi Claudio, Seibel Silene, *Op. Cit*, pag. 38

[39] Garcia Renato, Scur Gabriela, *Op. Cit.*

significance of this term is related to the image of an object that comes out in the light, not being hidden anymore, being visible for the first time, something without precedent and surprising[40].

In the author`s point of view, emergence in the particular case of clusters has as definitory feature a triple perspective: we can consider emergent those clusters that have great development potential, as in a high level of interactions, solid and viable advantages that are exploited but not enough, as they miss a critical mass, meaning the sufficient business density that can make the cluster visible, perceptible by the world business environment. We can consider this term as being destinctive as well as when it is used for naming business clusters that are formed in emergent economies – the links that the macro-economic level and macro-economic level share makes the features of the macro-level transmit also to the micro- level, so, this enrights us to say that the majority of clusters in an emergent economy will be emergent. Then, we can discuss about this feature when we talk about a business cluster that has as a center point an industry that is in full development, an industry that has great perspectives,a field of activity that is constantly enhancing its importance and that count for an ever larger share of world trade.

6th Chapter : The efficiency of emergent clusters

In essence, the study of business clusters reffers mainly to the analysis of the way in which in a defined space, limited as span and that is in fact the expression of those social and economic changes that it undergoes, an industry becomes denser that others, giving birth alongside other enterprises and support institutions to an eterogenous structure as compositions but to an homogenous structure as concerning the goals that the members have from the functioning in proximity.

Regarding the components, we can distinguish at a first glance the firms and the links that emerge between them. If the enterprises and the support institutions make the bricks, the links act as a cement, giving the structure strenght and flexibility.

Efficiency must be a feature of all types of economic activity. Formally, efficiency can be described and measured using a ratio of results and expenses (effect/effort) or a ratio of input consumption and output total (effort/effect). Efficiency seen in a wide context must show the sum of

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[40] Deacon W. Terrence, *Emergence: The hole at the wheel`s hubs*, în Clayton Philip și Davies Paul, *The re-emergence of emergence*, Oxford University Press, 2006, pag. 121

effects that an economic activity outputs, not always these effects are measurable or certain (identifiable) of their origins.[41]

Having in mind the international standards, we considered sensible to include in the category of information technology (I.T.) the following groups of economic activities, each of them being distinct and included in some specific CAEN codes (Romanian ISIC correspondants). We have used a 3 digit CAEN sorting and we have identified and used data concerning enterprises that have as main activity one defined by the next groups: 26 (1,2,3,4,5,6,7,8), group 58.2, group 61 (1,2,3,9), group 62 (0), group 63 (1,9).

Because of the fact already proven that clusters are heterogeneous as shape and essence, we will try to analyse the efficiency and dynamics of a single cluster, to draw some conclusions and then, having into consideration the conclusions we could shape a matrix that shows the essential elements for every distinct category. This option appears to be necceasary and compulsory as it is impossible for us to create a true and exact image of the general dynamics in clusters all over the world. Our trial is to present efficiency as an average of the individual economic results of enterprises, obviously, in a business cluster some firms will be more efficient than others, but what can be admitted as a valuable result is the average that gives us an important image of the dynamics in the cluster.

In a business cluster, the activity of each enterprise depends on the way in which it collaborates with cluster partners so, we will also try to view efficiency from the qualitative point of view, as a proper manner of measuring the efficiency of the links between the firms.

Because there were some initiatives in the direction of encouraging and building a framework for the development of a cluster in Cluj-Napoca, having as a main focal point enterprises in the I.T. domain, we considered useful to analyse the state of facts in this cluster, the quantitative-qualitative study we propose will give some insights about the way in which we can perceive, manage and improve the efficiency of emergent or modern business clusters. We consider this cluster significant for this territorial level, more, there are debates in the direction of constructing a romanian ``Silicon Valley`` in Cluj Napoca.

We can classify this cluster as being emergent because of the following features that it shares: it has no formal shape to define the cluster, it is a cluster that seeks recognition in the region and has a strong capacity of attracting and generating new business. It is then emergent because it has a strong nucleus of firms that are involved in the I.T. industry, an industry in full expansion worldwide, that is highly based on research and development, mainly attributed to multinationals, this industry needs a set of preconditions to develop and it has not reached yet its full potential, so, in our opinion, it is still

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[41] Ciobanu Gheorghe (coord.), *Tranzacții Economice Internaționale*, Editura Risoprint, Cluj-Napoca, 2009, pag 659

emergent. Then, being a cluster in an emergent economy, it receives the features of the macro-economic environment, so, it is emergent. We have found three criterion that legitimate a cluster as being emergent and it is clear that the subject of our analysis (the I.T. cluster in Cluj-Napoca) has all of these features.

While for the actual method of analysis we considered sensible to focus on two distinct parts, one of them being the analysis in dynamics of the cluster and the other the qualitative analysis of the link that are established between members. The source of the data we will use is the most comprehensive data base we have found yet, bought from Borg Design Romania but also a questionnaire that we have conceived and that we have sent to firms. The interval for which data was available is 2002-2010. Regarding the dynamics, we are witnesses to the growth of the number of firms, the progression being a moderate one, developed under an algebrical and not geometrical trend.

Table 2: The number of firms in the I.T. cluster in Cluj Napoca ordered by the CAEN code of the main activity from 2002 to 2012

An Cod Caen	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
26	1	4	7	7	9	13	14	14	15	15	15
58.2	7	13	26	31	40	53	58	64	64	73	82
61	9	17	32	4	53	66	76	89	90	93	95
62	22	72	129	189	257	315	370	404	435	530	573
63	6	21	33	33	56	70	85	90	99	127	135

Source: Own work using figures provided by S.C. Borg Design S.R.L.

Because of reasons that are linked to the good economic performance of Nokia Romania we have decided to exclude the data reffering to Nokia from our set of analysis, as its influence did distort the results. Instead we have dedicated an enlarged paragraph to it.

We have considered relevant for the dynamics of the enterprises in the cluster to calculate and interpret the average of the turnover, profits, current assets and the average of the number of employees for all those firms that we have included in the I.T. industry, as a whole and also for every CAEN code group in particular. Then, we thought sensible to analyse some indexes like labour productivity, gross profit margin rate, the ratio of financial dependancy, and the debt recovery term. This analysis materialized in some conclusions about the evolution but also about the trends that I.T. firms in this cluster shown.

Figure 9: The simoultaneous evolution of tha analytical indexes calculated for the five considered groups fron 2002 to 2010
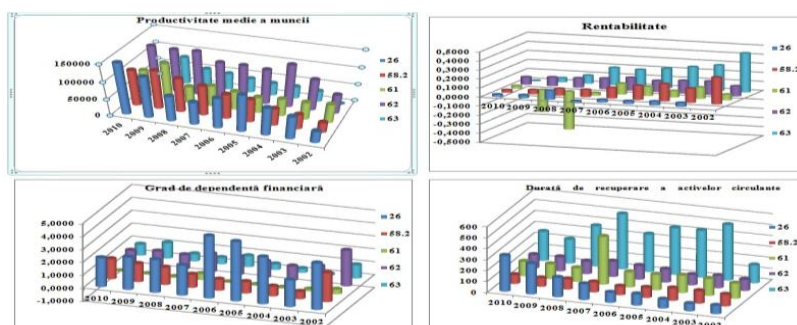
We have also used linear regression as a method to establish the influences that emerge between those elements we have considered. We have tested using the ANOVA statistical method, the influence of the variables profits, current assets, fixed assets, debts, number of employees and equity on the imobile variable turnover. We have conducted the usual tests and have built the statistical model that we consider the best as regarding the level of confidence, so its relevance. The statistical analysis has been done with the help of STATA and the output of the regression solely for 2010. Detailed analysis for every year have been done but the lack of space made us not include them in this summary.

```
. regress  ln_ca ln_profit ln_datorii ln_capitaluriproprii ln_angajati
```

Source	SS	df	MS		Number of obs =	361
					F(4, 356) =	492.82
Model	945.288889	4	236.322222		Prob > F =	0.0000
Residual	170.711191	356	.479525816		R-squared =	0.8470
					Adj R-squared =	0.8453
Total	1116.00008	360	3.10000022		Root MSE =	.69248

ln_ca	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_profit	.2047914	.0273991	7.47	0.000	.1509069	.2586758
ln_datorii	.2704394	.0255524	10.58	0.000	.2201867	.3206921
ln_capital~i	.1098695	.0295422	3.72	0.000	.0517705	.1679686
ln_angajati	.626097	.0422763	14.81	0.000	.5429543	.7092397
_cons	5.465721	.3251609	16.81	0.000	4.826243	6.105199

It seems obvious that the explained variance of the model, MSS=945,288889, is bigger than the residual one, RSS=170,711191, this offers us a first glimpse on the fact that this model is representative and that a large part of the evolution of the turnover is conditioned by the chosen factors. Splitting Ess by TSS we obtain the value of Adjusted R squared = 0,8453 (84, 53 %), this showing that the chosen factors explain the evolution of the variable for 84,53%. So, for our model, the endogenous variable (turnover) is explained for 84,53% by the exogenous variables. More, having into consideration that the value of the Fisher test, that evaluates the efficiency of the model, is 0, it is obvious that the model is representative and that is is useful for our predictions

The coeficients of the variables show us that the most important influence on the turnover is that of the number of employees. Beyond the fact that an enterprise with many employees it is more likely to have a larger turnover, in our case, even though the turnover has constantly grown, the

number of employees stood still in the analysed timespan. From this point of view we consider that the influence manifested over the turnover is more a result of the enhancement of labour productivity. So, we could say that the constant growth of the average turnover is due to the progression of average labour productivity. So, in this cluster, the main influence on the turnover is an endogenous one (labour productivity). Another important influence is that of debt, this can be translated into the borrowed sums being used for business development, debts having a direct and strong influence on the turnover.

For finishing the quantitative analysis we have thought of a questionnaire having 25 relevant questions for this analysis. We have tried to follow, interpret and to measure using the proposed questions the opinion of the subjects regarding different issues involved by our analysis: locational efficiency, the efficiency of positioning inside the cluster, the efficiency of interactions inside the cluster nucleus, the efficiency of competency mass formation, the efficiency of the R&D processes, etc.

Because of the fact that it is difficult to condens all individual answers we will express some of the significant ideas as conclusions of this type of analysis: most of the subjects do not know the significance of the cluster concept, they way in which it operates or the utility of jpoining such a structure, they do not consider that it could bring advantages but as a paradox, they would participate in such a structure; the majority of enterprises consider the business environment as being highly concurential and just occasionally firms collaborate, they are reserved in collaborating with partners and do this just if imediate advantages are involved; the majority of enterprises preffer young formally and unformally trained persons that they train on the spot, most of their employees followed UT Cluj or UBB Cluj Universities; a lot of the enterprises have developed with the aid of foreign capital and have as main clients persons or firms from outside the borders, more, the majority of enterprises are not involved in R&D activities

Concluding remarks and research perspectives

Emergent clusters, appear all over the world though they are specific to economic branches that are expanding or to emerging economies. Because of the multitude of criterion that define them (location, activity domain, structure, form of organisation, type of emergence, etc.) emergent clusters are an eterogenous group marked by differences of background and shape.

Because of the fact that it is a complex structure, the efficiency of an emergent cluster can not be expressed under a single criterion but it is the sum of localisation efficiency, of the financial efficiency, the efficiency of the educational system, etc. From this point of view, it is important to analyse the efficiency with the aid of well known methods, using as many criterion as possible for fulfilling the picture of an emergent cluster`s functioning. We can consider more efficient and with a

greater development perspective an emergent cluster that has a main source of advantages those sources that can be maintained and enhanced in time (well trained labour pool, tradition, good educational system, etc.), the source being dependant of the endogenous elements have better chances of becoming fully functional, efficient.

Full functionality of a cluster emerges when that agglomeration is recognized by the international markets, when it developes an identity of its own, when it developes own labels and has the abbility of multiplying business using capitals accumulated within.

An efficient business cluster needs a ``virtual information market``, without this it can not develope enough as to become fully functional. The efficiency of the way in which information is used in common depends mainly on two components, on the competencies detained by the labour force, this influencing the manner in which information is sorted and used and on the intensity and number of connections that appear between firms.

Without the elements mentioned above and without a status of cooperation between firms that compete, these being convinced that rivalry among them but inside the cluster is less dangerous than that involving outside firms and cooperating inside they have the chance of enhancing their competitivity outside the cluster, the cluster can not become competitive in comparison with pther clusters.

We have also realised that in emergent clusters the initial structure is a industrial district type one, rarely, emergent clusters form around one or more large sized economic enterprises, just after the formation of a strong nucleus foreign investment emerges and is materialised usually in the shape of MNC implantation.

We have identified three criterion that define the emergent status of a cluster these being: from an activity branch that it is in full expansion, in course of obtaining its recognition and from an emergent economy, these criteria define our subject of analysis, not all clusters have this status, some will tick just one or two, some none. Because of this our conclusions can not be extrapolated to the case of other clusters without some major adjustments.

In emergent clusters, cohesion that is compulsory for a consistent sinergy is hard to obtain, the maturity of economic actors in the cluster emerges in late stages of the cluster life cycle, most times too late, after the sum of advantages that determined agglomeration has been lost in spite of other firms, so, it becomes necessary that the decision factors or the educational system to fill the lack of motivation to angage in mutual activotoes of firms in the cluster.

It is very important that firms in an emergent cluster to function in symbiosis and to generate and take advantage of external scale economies. The actions undertaken by each and every firm in the

direction of obtaining cohesion can be an advantage gained by cluster partners, this phenomenon being a mutual one. In the beggining phases of development it is almost impossible for firms, because of their small dimensions to generate and take opportunity of internal scale economies, instead, they can develop an economic environemnt that favors mutual development. More, in the competitive environment of today, functioning in symbiosis can mean enhancing the competitive capacity of the cluster from adding the individual competencies of firms

A great influence on the development of an emergent cluster and on the efficiency or inefficiency of the activities in this type of structure is the way in which labour productivity evolves. In the case of our analysis this has been a major influence, being the element that makes turnover evolve significantly. We could also observe that labour productivity has grown much more when the number of firms that have as stockholders foreigners rose and also meantime with the increasing number of foreign clients. Debts also had a significant importance in the evolution of the turnover, in each year of the analysis they have influenced strongly this index.

The emergence of clusters is conditioned by the same elements as the critical mass needed for them to appear is influenced equally by some forementioned elements dar also by some random factors that appear as unsual circumstances at a certain moment in time determining the evolutionist path of the cluster. These factors can not be included in our analysis under some other form than residues. We have done the exact same thing, in our econometric analysis, the value of residuals is significant for all the ten years we have analysed, meaning that the turnover has been influenced in a large percent by facts that could not be included in the analysis beacuase the lack of data or because they can not be measured.

The inefficiency of clusters are determined by the fact that some of the factors mentioned before do not appear or have a less than sufficient level. From our point of view, it is highly important that an emergent cluster withstands in a certain shape or modifies its shape in the sense that it enhances its dimensions over a period of two business cycles as to be considered an efficient one. The elements that lead us on this path reffer to the facts that advantages that make emergent clusters develope and mature are hard to maintain on a timespan of at least two business cycles, fact confirmed by some practical examples that we have studied. More, excepting those clusters that are built on extractive activities which depend on the schedule of the extractive process, the others can develope only if firms in the cluster obtain a high level of competitiveness. So, in our point of view, if during two business cycles firms in a cluster can maintain their competitiveness level or to enhance it, we can discuss about the existance of an efficient cluster.

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