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Tecnologia

**Issues on Entrepreneurship:  
Innovation, Strategy and  
Financing**

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# Chapter 1

## Introduction

### 1.1 Topics developed

*“Think P.I.G. - that’s my motto. P stands for Persistence, I stands for Integrity, and G stands for Guts. These are the ingredients for a successful business and a successful life.”*

- Linda Chandler (American businesswoman, Executive and Entrepreneur, creator of the Core Value Training program) -

When talking about economics, it is widely accepted its definition as a science which focuses on economic welfare and the means to its increase. In this respect, there is a wide agreement on considering entrepreneurship as a crucial factor in the diffusion of new technologies (Science, 2001): technological innovations propel industry dynamics and are considered one of the major sources of economic development.

Looking at the management side, Peter F. Drucker ("The Father of Modern Management") has identified in Innovation the specific tool of entrepreneurs that enable them to “exploit change as an opportunity for a different business or a different service”. Opportunity is a recurrent topic in this kind of studies and Mary Kay Ash (founder of Mary Kay Cosmetics) has stressed out the need for turning obstacles into an opportunity in order to win and reach success. Another successful entrepreneur, Richard Branson (founder of Virgin Enterprises) has stated that “business opportunities are like buses, there is always another one coming" pointing out through those words the existence of opportunities to be discovered. The discovery of opportunities is accomplished by the entrepreneurs, whose look for successful innovation through the monitoring of changes and their symptoms in the environment. The result of the searching process will depend upon the objective of that activity as

well as the kind of opportunity discovered. Opportunities arise from changes, whose do not appear continuously in time and show strong non-linearities.

This dissertation takes care of different aspects of the entrepreneurial activity which is uncertain and future-oriented. Hanusch and Pyka (2005) have identified in industry, finance and public sector the pillars of the economy with those the entrepreneur has to interact with. The result of this interaction, in turn, will bring to the economic development.

## **1.2 Aims and scope of the dissertation**

The dissertation has in the role of the entrepreneur a common thread encompassing the different parts in which it is divided. Above, it has already been given an introduction about the central role of entrepreneurs in our economy and in the following chapters it will be given a rather wide overview on how this economic actor has been treated in the different theories.

The entrepreneur is responsible for addressing, knowing, showing and going the way toward business success. Often, he has been associated with the figure of the leader and, therefore, he has been depicted as the most influential person in the company and not just because he is sometimes also the owner. The main reason is because “people buy into the leader before they buy into the vision” (John C. Maxwell, American Entrepreneur, Author and motivational speaker). As written above, entrepreneurs are responsible for taking innovation into the market and this is major because “innovation distinguishes between a leader and a follower” as Steve Jobs stated. This is a reason why an objective of the dissertation is about pointing out the role of innovation, among manufacturing companies, when deciding which strategy to adopt.

Nevertheless, when planning and bringing into practice a strategy, the entrepreneur has to cope with several obstacles. They can be of different nature, not just directly related to business issues but often related to information asymmetry matters. In fact, companies may see difficulties arising because of the problems in getting resources, as well as from family related issues but also from the difficulties in approaching and coping with their environment. Difficulties encountered by the companies change over time and depend also on the company and industry’s life cycle stages. A focus on the financial side will be given in the dissertation because credit constraints are often indicated as one of the main obstacles found on the way to business success. In the specific case, the topic of access to credit is related to discrimination issues.

### **1.3 Structure of the dissertation**

The dissertation will follow the steps described in the previous paragraph and, therefore, the first part will refer to an overview on the role of the entrepreneur given by the scholars since the XVIII century from a historical perspective. This will help in understanding how differently the entrepreneur has been treated in the different theories and it will constitute a common background for the following chapters.

The third chapter is dedicated to the role of innovation when adopting a strategy in a manufacturing company. It is a taxonomy of strategic behaviours elaborated on the basis of a sample of small, medium, and big companies.

The last part is about the financial constraints an entrepreneur may encounter when running a business and considering the case of the USA. This is a research striving to put some more light on a topic still to be completely explored. For the first time, using the data from the NMBO survey, the study takes into account several different minorities (African, Korean, Mexican) as well as the White Americans and tests some new determinants of credit found in the review of the literature dedicated to financial matters.



## Chapter 2

# Role of the Entrepreneur in the Economic Theory

### 2.1 Introduction

*"My son is now an 'entrepreneur'. That's what you're called when you don't have a job."*

- Ted Turner (broadcasting entrepreneur) -

Entrepreneurship and entrepreneurs are part of our everyday life. They are continuously cited on the columns of the most important magazines and newspapers and also politicians refer to them as an invaluable resource for a country: they are held responsible for introducing and implementing innovative ideas (Van Praag, 1999). This is a position radically different from what happened in the previous centuries, when “philosophers of science did not hold entrepreneurs in high esteem” whose “were not at all regarded as enhancing society’s well-being”. Making profit was considered the economic return to entrepreneurship and “was perceived as robbery ever since Aristotle had introduced the persistent idea of economic activity as a ‘Zero-sum game’ (i.e. one man’s gain is another man’s loss)” (Van Praag, 1999).

Holcombe (2003) has described entrepreneurship as indispensable for economic progress and consisting in the action of taking advantage of a profit opportunity that presents itself in the economy. The same author has also emphasized the need for an adequate environment where profit opportunities are available to the entrepreneurs whose will take advantage out of them through their entrepreneurial activity. Entrepreneurship is fed by the oxygen of financial resources, human resources, education, economic conditions, and family (Journal of Business Venture). Furthermore, it has been pointed out that the entrepreneurial phenomenon occurs at higher rates now than at any other time (Gartner & Shane, 1995; Thornton, 1999), with 4% of all adults attempting a start-up venture at any given time (Reynolds & White, 1997). Audretsch and Thurik (1999) show that an increase of the rate of entrepreneurship (number of owned businesses divided by the labor force) leads to lower levels of unemployment through an analysis in 23 OECD countries in the period from 1984 to 1994.

As reported in the editorial of a special edition of the Journal of Business Venture, “entrepreneurship is like fire – rapid, dramatic and powerful”. Entrepreneurship brings change inside the current economic situation and, sometimes, “its destructive side decimates standing forests of great, old industries” whereas in other cases “its power carries innovation throughout the world like a firestorm”.

The entrepreneurial activity is central in the process that leads to the economic growth. As underlined by Wennekers and Thurik (1999), entrepreneurship is directly dependent on the personal, cultural and institutional conditions and produces innovation and competition (intermediate linkages) that, in turn, bring to the economic growth.

The previous few statements contain some of the elements emerged in more than one hundred and fifty years of research in the field of entrepreneurship. Despite of its relevance, the topic was scarcely developed for the first decades whereas it has been increasingly studied by scholars since the wide work done by Schumpeter. The field is experiencing a concurrent growth in academy as evidenced by the increase of research centers, professional organizations, and journals specific to its study (Holcombe, 2003; Katz, 1991).

The diffuse theoretical roots of entrepreneurship (i.e. economics, management, strategy, finance, psychology, sociology, etc.), together with its different contexts in which the field is approached, may also explain why the codification of a single definition has been so difficult.

There is a definition proposed by Hébert and Link (1989) that synthesizes most of the literature on entrepreneurship and describes who an entrepreneur is and what he does: “*the entrepreneur is someone who specializes in taking responsibility for and making judgmental decisions that affect the location, form, and the use of goods, resources, or institutions*”.

There is also who has specified the distinction between entrepreneur and entrepreneurship. Referring to the definitions given by Shane and Venkataraman (2000), the entrepreneur is one who discovers, evaluates, and exploits opportunities for creating goods and services whereas entrepreneurship has a wider perspective and focuses not only on the entrepreneur, but on the intersection of that enterprising person and lucrative or entrepreneurial opportunities. Therefore, entrepreneurship has typically been defined as an action, process, or activity (Audretsch and Keilbach, 2004).

Another obstacle, in developing a theory of entrepreneurship, regards the different figures may be confused with the entrepreneur. One possible distinction is given by Carland, Hoy, Boulton and Carland (1984) whose distinguish the following roles:

- Small Business Venture: a small business venture is any independently owned and operated business, not dominant in its field, and does not engage in any new marketing or innovative practices;
- Entrepreneurial Venture: an entrepreneurial venture consists in engaging in at least one of Schumpeter's four categories of behaviour. The principal goals of an entrepreneurial venture are profitability and growth and the business is characterized by innovative strategic practices;
- Small Business Owner: a small business owner is an individual who establishes and manages a business for the principal purpose of furthering personal goals.

The business must be the primary source of income and will consume the majority of one's time and resources. The owner perceives the business as an extension of his or her personality, intricately bound with family needs and desires;

- Entrepreneur: an entrepreneur is an individual who establishes and manages a business for the principal purposes of profit and growth. The entrepreneur is characterized principally by innovative behaviour and will employ strategic management practices in the business.

## 2.2 From the Middle Ages to the Renaissance

Following the development of the role covered by the entrepreneur in the economic theory, as well as its definitions in the different theories since its beginning with Cantillon (1755), it is possible to have a rather complete overview of the progresses reached in this field.

The different theories are always influenced by the economic situation of the period when they were developed and, therefore, a different perception of the entrepreneurial activity emerges.

The historical retrospective by Wennekers and Thurik (1999) goes back to the Middle Ages when, in Europe, the feudal system ruled an economy characterised by local tolls against a free flow of goods, the absence of a secure recognition of property rights and monetary value for the services offered. Changes in the environment disclose opportunities that can lead to improvements in the economic situation.

Since the Middle Ages, the economy changed gradually offering space to the first entrepreneurial activities operated by merchants (the first entrepreneurs). The Renaissance was a period characterised by the new role of cities, especially the Italian city states, that were on the edge of the development through a new wave of experimentation and innovation: as noted by Cipolla (1981) arts and sciences benefited from those successes and emerged in “an atmosphere of collective enthusiasm, of exaltation and cooperation”. Wennekers and Thurik (1999) have highlighted the importance of the entrepreneurial process in the analysis given by Jane Jacobs (1984) when describing that period (defined as the first round of modern economic growth by De Vries and Van der Woude in 1985) and giving the example of what happened in Venice. She traced the reasons of growth, back to two major motifs as the reliance of backward cities upon one another and economic improvisation. There was no scheme in the diffusion of development but rather a network of backward cities stimulated in producing independently city made innovations. The Southern countries, France and Southern Germany benefited from that period whereas the English society was far beyond the progresses reached in the countries cited before.

### 2.3 The Industrial Revolution

Since 1550, new changes started taking places offering new opportunities to a new entrepreneurial process. The environment was given by England, a country characterized at that time by a society that showed a striking cultural receptiveness and open-mindedness for new ideas and techniques brought into the country by the immigrants coming from the Southern countries and through the studies in universities abroad done by a new generation of young men. English society started giving innovative solutions to difficulties, diversified its productions, entered new markets, established a commercial international network and developed an efficient set of property rights together with the protection of the private property in knowledge with its patent law. North and Thomas (1973) point out also the elimination of feudalism, the declining power of the guilds, the burgeoning of the joint stock company and the development of a banking system as important examples of these improvements. All these changes were the basis for the emergence of a new phase: the Industrial Revolution. Wennekers and Thurik (1999) cite Landes (1969) and Mokyr (1990) in order to point out how the consequent great variety of innovations yielded to Britain an unprecedented increase in productivity as well as the technological leadership between 1750 and 1850. The same authors underline the importance of a skilled workforce as successful element of the British superiority in implementing innovations rather than just their strength in inventions supported also by the constant contact of inventors and manufactures with scientists.

In the Seventeenth century, not only great entrepreneurs born in the most developed countries but also artists as well as jurists. In the same period, in France, a scientist started paying attention to the role of entrepreneur in the economic theory. His name is Richard Cantillon (1680 - 1734) and his studies are a direct consequence of the period he lived in. As described above, the first type of entrepreneurial activity was done by the merchants that bought and sold raw materials and the finished products made by the craftsmen. Therefore Cantillon, in his posthumous publication “*Essai sur la Nature du Commerce en Général*” (1755), recognizes the essence of that entrepreneurial activity in pure arbitrage which consists in “buying at a certain price and selling at an uncertain price” but gathers under the word entrepreneurs also other professional activities not involved in arbitrage as the seller in the marketplace, farmer, transporter and the important role of banker. Bankers operate in a perfect money market and lend money expecting to earn some interests on that money. Cantillon describes an economic system where the entrepreneurs are one of the three agents operating, the others are landowners (capitalists) and the hirelings (wage workers), and are responsible to bring equilibrium of supply and demand. Hence, entrepreneurs do not need to be innovative but rather to bear the risk of their arbitrage practice: they coordinate and connect producers with consumers whereas landowners

and hirelings play a passive role. The number of entrepreneurs in each occupation is determined by the laws of demand and supply: as noted by Van Praag (1999), the worst equipped merchants will go bankrupt whereas, if there are too few entrepreneurs, new ones will be attracted by the advantages of enterprise.

There are a couple of contributions which can be seen as a bridge from the early studies on entrepreneurship by Cantillon to the Classical thought mainly represented through the work by Say. In 1771, Baudeau recognized in the entrepreneur the role of innovator whereas, still in those years, Jacques Turgot described the entrepreneur as the outcome of a capitalist investment decision.

Jean Baptiste Say (1767 - 1832) introduced another improvement in the theory distinguishing the entrepreneur from the capitalist and giving to the entrepreneur a pivotal role in his theory of production, distribution and consumption. The starting points of Say's thought are the explicit rejection of the Aristotle assumption of the "zero-sum game" economy and the recognition that the entrepreneurship is just a superior kind of labour. Say recognizes three industries (agricultural, manufacturing, and commercial) where it is possible to create value through work of the people which is characterised by three operations (theoretical knowledge construction, application of knowledge, and execution). Say (1803 - 1971) identifies the entrepreneur's occupation with "the application of knowledge to the creation of a product for human consumption" and describes it as the "superior kind of labour" necessary to set industries in motion and thereby attain prosperity within a country. In this theory, it emerges the central role of the entrepreneur as coordinator, risk-bearer, modern leader and manager that can be successful because of the combination of moral qualities possessed: judgment, perseverance, and knowledge of the world as well as of business, the art of superintendence and administration. Say takes care also of the problem of having enough funds for financing the entrepreneurial activity: if he is not rich, he "may work upon borrowed capital", "but he must at least be solvent, and have the reputation of intelligence, prudence, probity, and regularity" (Van Praag, 1999).

Therefore, entrepreneurs are not unique but just rare given the combination of qualities and experiences necessary to be successful: the number of competitors in the market for entrepreneurs is limited. Consequently, when the market is in equilibrium, the residual income of the firm (or entrepreneurial wage) can become very high. Again, the concept of market equilibrium is central and, at the micro level, implies that if the entrepreneur's remuneration (turnover minus the payments to the other inputs) is higher than the wage for management and some risk premium, implying positive profits, then the supply of entrepreneurs increases (Van Praag, 1999).

## 2.4 From 1870 to the 1970

The subsequent approaches evolved in mutated cultural and industrial contexts. Wiener (1981) describes the changes happened between the 1870 and the 1970 as the cultural reorientation consequent to the Industrial Revolution. Wennekers and Thurik (1999), taking the step from the observations by Wiener (1981), talk about a romantic reaction to industrial society (“our England is a garden”) and highlight the changes in the values that pass from zeal for work, invention and money making to preference for comfort, enjoyment and public service. Wiener (1981) calls that process “the gentrification of the entrepreneurial class” and Wennekers and Thurik (1999) point out how the change “was reinforced by the school system which, modeling itself on the public schools, separated the middle class from technology and business”. The ninetieth has been a century of decline for Britain which is passed from being the richest nation in the world to lagging behind Switzerland, Denmark, Germany and USA in terms of GDP per capita in 1973 (Maddison, 1995).

### 2.4.1 Neoclassical Theory

This is the environment in which neoclassical economists developed their thoughts, even if there is a difference between the approach of the early neoclassical economists (i.e. Alfred Marshall, 1842 – 1924; F. Y. Edgeworth, 1845 – 1926; A. C. Pigou, 1877 – 1959) and the majority of the later neoclassical economists.

Whereas the firsts have contributed to the theory of entrepreneurship, the others give no space for an entrepreneur in their approach to theory. Rationality and optimality lead the latter approach and become central in a model characterised by agents with perfect information and economic objectives clearly stated (whose are reached by maximising their utility function). Analogously, firms’ behaviour is described by their production function and, consequently, they choose profit-maximizing production packages. Firms, and all the other agents, operate in a market that already exist and are assumed to work perfectly: also credit markets work perfectly and, therefore, internal supply of capital is not needed. Therefore, only exogenous changes (“new shocks”) can shake the markets and start again the adjustment process that brings to equilibrium. These are the reasons why the majority of the neoclassical economists have not given attention to entrepreneurship: in the neoclassical model, there is no need for an entrepreneur (Baumol, 1968, 1993).

As noted above, some of the earliest neoclassical economists have recognized the role of the entrepreneur and “Marshall’s theory attached a more prominent role to the entrepreneur than any other early neoclassical theory” with his seminal work, *Principles of Economics*, first published in 1890 (Van Praag, 1999). Skills and capacities are considered essential for successful entrepreneurs. Marshall (1890, 1930) describe a successful entrepreneur as a “natural leader of men”, general abilities (they depend on family background, education, and innate ability), intelligence, and

specialized abilities such as knowledge of the trade, ability of seeing where there is an opportunity, and of undertaking risks. Under the terms general abilities, Marshall has gathered those characteristics that describe a person goal-oriented: to be able to bear in mind many things at a time, to have everything ready when wanted, to act promptly and show resource when anything goes wrong, to accommodate oneself quickly to changes, to be steady and trustworthy, to have always a reserve of force (Van Praag, 1999). In the Marshallian theory, entrepreneurs are responsible for a variety of tasks: they drive the production and distribution process, they coordinate supply and demand on the market, and capital and labor within the firm, they undertake all the risks that are associated with production, they lead and manage their firms, they are cost minimizers (and are therefore also innovators and the reason for progress). Eventually, it is recognized also the benefit gained by the society through the progress brought by entrepreneurial innovations even if he notes that are the personal profits that motivate a business undertaker. However, in the Marshallian competitive environment, the firms that benefit the society most are not necessarily those that will survive.

The next valuable contribution to the theory of entrepreneurship comes from a different historical period. It comes from the time when Henry Ford started his activity in the USA where he became a folk hero after he commercialized his Ford "T". This was a completely different consideration by the public opinion of the role of the entrepreneur in respect to what happened in Europe in the same years. Wiener (1981) has pointed out, to testify it, the large and unenthusiastic acceptance received by William Morris giving examples of the cultural point of view of the British citizens.

There are two theories developed around those years: one by Joseph A. Schumpeter (his seminal work was published in 1911), and the other one by Frank H. Knight (his doctoral dissertation was published in 1921 and titled "Risk, Uncertainty and Profit"). However, I will describe first the latter approach since it is the closest to the neoclassical one. Knight (1885 - 1972) is American (as Henry Ford) and shares with the neoclassical economists the ability requirements seen before (necessary for a successful entrepreneur). Moreover, he integrates these requirements with the psychological ones and his thought can be considered an extension of the Cantillon's thoughts. Knight gives a better specification of the role of the entrepreneur: in his view, he is not only involved in arbitrage activities but also not a risk bearer but an uncertainty bearer. The differences between risk and uncertainty yield significantly different outcomes (Knight, 1921; Alvarez and Barney, 2005). The following ones are the definitions given by Alvarez (2003):

- Risk: a decision-making situation is defined as risky when two conditions exist:
  - o When all possible future outcomes of a decision is made;
  - o When probability of each of these outcomes is also known at the time a decision is made (Wald, 1950).

The outcomes of these decisions are governed by well defined probability distributions. A well defined probability distribution has three characteristics (Triola, 2003):

- o All possible future outcomes are known before decision is made;

- The probability of any one of these outcomes occurring is less than or equal to one, but greater than zero;
  - The probability of all these outcomes occurring sums to one.
- Uncertainty: decision making settings are uncertain when the possible outcomes of a decision and the probability of those outcomes, are not known, *ex ante* (Knight, 1921). In these situations, decision makers are often ignorant of their ignorance of possible future outcomes (Shackle, 1972; 1979).

Therefore, uncertainty is central in Knight's theory which regards not just entrepreneurship but also profit and competition. In this environment, Knight identifies the entrepreneur as new economic functionary that accomplishes to the work of forecasting and, at the same time, a large part of the technological direction and control of production (Van Praag, 1999). Entrepreneurs are decision makers held responsible for economic progress, like improvements in technology and business organization and his entrepreneurial ability is the bottleneck in determining the size of each business. Knight (1921) stresses out that entrepreneurial ability is made up two basis elements as being a leader ("power of effective control over other men"), having the intellectual capacity to decide what to do and being able to deal with uncertainty. The last one, as pointed out by Knight, requires a high degree of self-confidence, the power to judge his own personal qualities as compared to those of other individuals (competitors, suppliers, buyers, and employees), a disposition to act on one's own opinion, a venturesome nature, and foresight. Furthermore, an entrepreneur without the necessary capital to start a business will need to be able to convince external financiers of his ideas. Competition in the markets will determine the number of operative entrepreneurs as well as the prices of the services produced whose are closely related to the entrepreneurial profit (residual income) for bearing uncertainty. As written above, Knight introduces also motivational factors and, therefore, the income will not just tend to be higher with greater ability and more good luck but will be remunerated also with the prestige of his activity and the satisfaction resulting from being one's own boss.

Eventually, Knight describes the successful entrepreneur as a successful uncertainty-bearer and judgmental decision maker who assumes the uninsurable business hazard and its supply involves the factors of ability, willingness, power to give satisfactory guarantees, and the coincidence of these factors. Real uncertainty is the only source of profits in Knightian theory (Brouwer, 2000). Furthermore, Petrakis (2007) identifies four key risk-taking variables: general socio-economic factors, characteristics of the industry, characteristics of the decision-maker, and characteristics of the problem.

## 2.4.2 Joseph Alois Schumpeter

Joseph Schumpeter (1883 - 1950) was an economist contemporary to Knight and contributed significantly to the theory of entrepreneurship through his publication *The Theory of Economic Development*: the first to treat innovation as an endogenous process. Montanye (2006) has underlined the importance of Say's thought because he paved the road for Schumpeterian theory. Schumpeter brings a big change in the theory of entrepreneurship through the introduction of a new paradigm where the entrepreneur is a leader of the firm and an innovator (hence, a prime mover of the economic system aware of the dynamics of technology) that brings changes in the system. Moreover, he does not consider the entrepreneur neither as a risk-bearer nor as a supplier of capitals: both roles belong to bankers in his thought. Entrepreneurs and owners can be different persons and he explains that a company will stay on the market if it is able to bring out new combinations (innovations). This will be done just if there are entrepreneurs in the firms, persons characterized by open-mindedness that Schumpeter (1911, 1939) describes as "mental freedom ... something peculiar and by nature rare" and such to let them to "swim against the tide of the society in which" they are living (Heertje, 1982).

Schumpeter has contributed also in identifying the five categories of behavior observable and characteristic of an entrepreneurial venture: introduction of new goods, introduction of new methods of production, opening of new markets, opening of new sources of supply, and industrial reorganization.

Carrying out innovations is a profit-driven activity (Van Praag, 1999) which can lead the business to a temporary monopoly power that, in turn as indicated by Baumol (1993), will lead to the entry of new firms that will erode margins until new equilibrium position is reached. However, in order to carry out innovations, an entrepreneur needs some credit to sustain the business. Schumpeter highlights that it is not needed to be rich because innovations can be equally well supported by own wealth as by credits (given by bankers).

Another major novelty brought by Schumpeter is the psychological motives for being an entrepreneur. These factors contribute to his income and let to state that entrepreneurs do not perform their task in the first place in order to satisfy their own consumption wants. The motivating factors are the dream and will to find a private kingdom in order to achieve social distinction, the will to conquer, to fight, to prove oneself superior to others, to succeed for the sake of success itself, not for the fruits of success, and the joy of creation, of getting things done, to exercise energy, to change for the joy of changing (Van Praag, 1999). Therefore, the Schumpeterian entrepreneur can be also an 'intrapreneur' whose actions destroy the equilibrium.

### 2.4.3 Austrian School and Kirzner

There is still one contribution among those considered classic for the theory of entrepreneurship. It is referred to a school that gave to Schumpeter some of the ideas he developed: the Austrian School. It differs from the Neoclassicists, because the analysis of the market is done by considering it as close to a general equilibrium, at any time, and it is never in a state of general equilibrium as for the Neoclassicists. Neo-Austrians consider the process of tending to equilibrium for market economies as arising out of the dynamics of discovery whose identifies opportunities for pure profit. In this respect, a major contribution comes from Kirzner with his contribution to “the Austrian mode of thinking as well as to the theory of entrepreneurship by stating that entrepreneurs are the persons in the economy who are alert to discover and exploit profit opportunities” (Van Praag, 1999). Kirzner considers the entrepreneurs as the equilibrating forces in the market process toward an equilibrium position that is never reached. In *Competition and Entrepreneurship* (1973), Kirzner brings out most of his ideas and considers an entrepreneur with no special ability or personality but rather he is characterized by a special kind of knowledge that lets him to know “where to look for knowledge”. This kind of knowledge is called alertness and it is all the entrepreneur needs for perceiving profit opportunities earlier than the competitors: innovating, changing and creating will take place after the discovery and let the entrepreneur to realize the profit out of the opportunity. Just at this stage additional qualities such as creativeness and leadership are required.

Also Kirzner recognizes the role of capitalists for funding the profit opportunity and points out the need for the entrepreneur to finance the necessary interest payments. “Kirzner’s entrepreneur, however, still bears some uncertainty” (Van Praag, 1999). Endres and Woods (2006), taking a look at profit opportunities in different theories, synthesize the considerations on profit opportunities made by Schumpeter and Kirzner: they distinguish between the ontological position of “opportunities discovered” and the subjectivism included in the opportunity process of the “opportunities enacted”.

## 2.5 From 1970 to our days

Continuing to drive along the time path and getting closer to our days, it is necessary to widen our look from Europe and USA (whose were central in pervious centuries for the development of the theory) to the Far East (which has seen the emergence of its “tigers”). The World Bank policy research report, titled “The East Asian Miracle; economic growth and public policy” and published in 1993, shows the rise of the Republic of Korea, Taiwan, Singapore, Hong Kong, Japan, Indonesia, Malaysia and Thailand between the 1965 and the 1990. The rapid and sustained growth of these eight countries had an average annual growth rate of real GNP per

capita of 5.5% (more than twice that of the OECD countries) and the World Bank linked it to superior accumulation of physical and human capital, allocation of resources to productive investment, and the acquisition and mastering of technology. These investment activities were supported by public policies promoting macroeconomic stability, diminishing inequality and universal primary and secondary education, as well as by a reliable legal framework conducive to competition and international trade (Wennekers and Thurik, 1999). Phelps (1995) and Porter (1990) have recognized in the emergence of entrepreneurship the reasons for this growth and Porter stressed out that there were two factors to justify it: the willingness to take risk and the intensity of competition.

Many different paths have brought a contribution to the theory of entrepreneurship in the last decades. Just starting from the last contributions I have cited, Porter (1990), it has to be stressed out how Porter extended his Five Forces model to entrepreneurship and gave to it a central role in the growth process of a country. He stated that entrepreneurship is “at the heart of national advantage”.

However, doing a step back and taking a global look at the theories of entrepreneurship developed in the last decades, according to Alvarez (2003) it is possible to gather them under two titles.

The first one is the Discovery Theory, also called the Individual/Opportunity Nexus Theory, and it is focused on the existence, discovery, and exploitation of opportunities and the influence of individuals and opportunities (Kirzner, 1973; Shane and Venkataraman, 2000; Shane, 2003). In this approach, the entrepreneurs are risk bearing that can recombine resources in a new mean-ends framework (Alvarez, 2003). Opportunities are objective and just unique individuals can recognize them (Shane, 2003): they cannot be created but just discovered. Kirzner (1973) first, and Shane and Venkataraman later (2000), recognized in alertness the distinguishing characteristic and described the discovery process as the constant scanning of the environment by an entrepreneur who notices market imperfections.

The second theory is called the Creativity theory and its focus is on the entrepreneur and the creation of the firm (Venkataraman, 2003; Schumpeter, 1934; Loasby, 2002; Casson, 1982; Langlois and Cosgel, 1993). Whereas the first theory was closer to Kirzner, this one has more in common with Knight. Uncertainty, and not risk, is a necessary condition for entrepreneurship: entrepreneurs are ordinary individuals and uncertainty bearing that exploit opportunities created by economic actors (this is the reason of opportunities subjectivity). The uniqueness of an individual is a result from the experience of exploiting an opportunity.

Holcombe (2003), when investigated the origins of entrepreneurial opportunities, identified the essence of entrepreneurship in the process of taking advantage of a profit opportunity. In his view, profit opportunities are created by factors that disequilibrate the market, factors that enhance production possibilities, and entrepreneurial activity that creates additional entrepreneurial possibilities. The firsts are related somehow to environment or to preference changes (Stigler and Becker, 1977) whereas the thirds are related to the network externality explained by Bygrave and Minniti (2000). These are the reasons why Holcombe (1998) stated that R&D activity in itself is not entrepreneurship.

Another scholar who tried to clear out the doubts around the concept of entrepreneurship is Miller. In 1983, Miller introduced the organizational dimension in his definition considering entrepreneurship as a composite weighting of three variables: product, market and technology innovation (Schumpeter, Cole, and Cooper), risk taking (Collins and Moore, Miller and Friesen, Kets de Vries) and proactiveness (Miller and Friesen, Mintzberg).

Given the huge number of studies and definitions about entrepreneurship elaborated in the last decades, it could be useful to classify them according to Greve (1995). He grouped the explanations in five different branches: personality theories (McClelland, 1961; Miron and McClelland, 1979), economic theory (Kent, 1982), cultural explanations (Geertz, 1963; Gustaffson, 1985), ethnic background (Aldrich et al., 1983) and network perspective (Aldrich, 1988; Aldrich and Zimmer, 1986; Dubini and Aldrich, 1991).

In this section, it is considered just the first one since the others will be developed further in the next pages. Different studies have brought out different results also in relation with the focus of the research. Absorptive capacity, intelligence and cognitive abilities are the main personality characteristics identified by Shane (2005) that allow people to make superior use of information and, therefore, be the firsts in taking advantage from new opportunities. In other cases have been emphasized personality characteristics as extraversion, feeling, intuition and judgment (Myers-Briggs). Eventually, Cogliser and Brigham (2004) have compared the studies on leadership and those on entrepreneurship. They pointed out as major personality traits of successful entrepreneurs' characteristics as the need for achievement (Ahmed, 1985; McClelland, 1967), locus of control (Brockhaus, 1982; Pandey and Tewary, 1979; Venkatapathy, 1984), risk taking propensity (Ahmed, 1985; Begley and Boyd, 1987; Brockhaus, 1980), and tolerance for ambiguity (Dollinger, 1983; Scheme, 1982; Sexton and Bowman, 1985).

Psychological traits are considered by Gatewood, Shale, Powers, and Gartner (2002) for explaining the relation between expectancy, effort and performance. Taking into account Vroom (1964), they point out that central to expectancy theory is an individual's cognitive recognition of three important relationships: effort-performance relationship, instrumentality relationship (a particular performance level will result in a specified outcome) and valence – personal goals relationship (reward must be attractive to people to attain it).

## 2.6 Conclusions

In conclusion of this introduction on the figure of the entrepreneur inside the theory of entrepreneurship, I just want to synthesize all the roles that have been attributed to entrepreneurs during more than two centuries of research on entrepreneurship. Looking at the characteristics described in the previous pages, and according to Wennekers and Thurik (1999), thirteen different roles for the entrepreneur are identifiable from the economic literature:

- Risk taker;
- Innovator;
- Decision-maker;
- Industrial leader;
- Organizer and coordinator of economic resources;
- Contractor;
- Arbitrageur;
- Allocator of resources among alternative uses;
- Person who realizes a start-up of a new business;
- Supplier of financial capital;
- Manager or superintendent;
- Owner of an enterprise;
- Employer of factors of production.

This synthesis emphasizes the predominant description of the entrepreneur as a dynamic role and their roots are found in the theories discussed above: German tradition (Schumpeter, Baumol, etc.), Neoclassical tradition (Marshall, Knight, etc.) and Austrian tradition (Kirzner, Von Mises, etc.).

After, this overview on the importance of the entrepreneurial role in economic theory and in our society, space will be given to a couple of researches where the entrepreneurs play a pivotal role.

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## Chapter 3

# Taxonomy of Strategy Adoption and Role of Innovation

### 3.1 Introduction

*"I never perfected an invention that I did not think about in terms of the service it might give others... I find out what the world needs, then I proceed to invent."*

- Thomas Edison -

Why researching on innovation? A simple answer can be taken from an article of the Economist (1999) where it was pointed out the major role that innovation has in our society. More precisely, innovation was considered the industrial religion of the XX century, the key factor for improving company's performances. We can agree with those thoughts noting the increasing role played, since the end of the Second World War, by the economics of innovation.

Another answer can be taken from Schumpeter's thought which defines development as a spontaneous and improvise change in the flux channels, a perturbation of the equilibrium that alters and moves the previous state of equilibrium through the introduction of new (economical) combinations of the productive factors: this means to innovate.

This is the starting point of our research and it gives an explanation about the need for researching on the determinants of innovation at a micro-level.

To innovate is then very important because this is the engine of development. But, as Schumpeter pointed out, there are three main difficulties in order to operate this action:

- Missing knowledge about the new economical environment;
- Mindset of the businessman;
- Resistance of the environment (toward the innovator).

It will not be analyzed the economical effects due to price stressed out by Schumpeter. In his view, the price initially fixed by the innovator does not match its

production costs but it is determined on the basis of the costs of the other companies (whose have not innovated yet). The selling price will diminish only when other companies will be able to replicate the innovation.

Other important contributions to the economics of innovation that will not be directly taken into account are those by:

- Usher: he focused his analysis mainly on the innovation as part of a social process (Usher, 1994);
- Rosenberg: his analysis focuses on the forces that may have given the start to the explorative activity in a direction instead of others. He considers the economical incentive as the only explicative variable of the technological change and has introduced the concept of “technological convergence” (it refers to the use of the same skills, equipment and techniques for producing a wide range of final products). Last important contribution from this author is about the identification of three discriminants of innovation:
  - o Time: it is a major restraint when exploring the range of possibilities for cost reduction;
  - o Imbalance among complex technologies;
  - o Disappearance (or drastic reduction) of a usual source of supply.

Immediately, from the lines above, it emerges the major role played by innovation in our society: both in the everyday life as well as in the academic one. This is the occasion to further develop the topic of development of innovation and to take a photograph of the manufacturing in the province of Bergamo.

The analysis of a sample of 225 manufacturing companies, operating in the province of Bergamo, has let to point out the problems investing the local economic system and to contribute to the literature through the identification of the main strategies adopted by the companies in relation to their Research and Development activities. Furthermore, this analysis has included some variables which have never been tested before as the path-dependence indicator as well as the perceived need for qualified workers (our elaboration on entrepreneurs' statements).

Through the analysis of the dataset and an econometric analysis, the research has brought to results that point out not just the three manufacturing strategies adopted. Results obtained are also about the descriptions of the strengths and the weaknesses of the provincial economic system as well as of the companies with indication for policy makers in order to improve the innovative performances of companies in the province of Bergamo.

## 3.2 Review of the literature

In the next pages, it will be given an overview of the literature that will enrich and integrate the previous chapter. The concept of innovation has been developed along the centuries by various scholars belonging to different schools. Through a different perspective, it is possible to take the step for another brief overview of this evolution starting from the Adam Smith's work. In his "The Wealth of Nations" (1776), he gave a role to innovation considering the technological progress as one of the capital goods and he concentrated his attention on its effects on the productivity of labor, on the specialization and on the employment.

Some years later, in 1817, David Ricardo gave his contribution on this topic in its "On the Principles of Political Economy and Taxation". Ricardo proposed the Compensation Theory (actually, the Compensation Principle is led back to Wicksell) where the technological advance brings to lower prices and a bigger demand. Furthermore, the bigger returns caused by the technological change bring to bigger investments.

In 1867, Karl Marx published "The Capital" in which the spur to innovate comes from the capitalistic pressure and from the market size. From this contribution, Joseph Schumpeter took its basis for developing its theory: a fundamental contribution to the economics of innovation. Schumpeter, during the period from 1883 to 1950, was the first who discussed and examined in a wide and systematic way the role of innovation in modern industrial economies.

In the remaining part of this paragraph, the attention will be placed on the literature concerning with the determinants of innovation and four major contributions will be taken into account: Neoclassical, Schumpeterian, Neo-Schumpeterian and by Nelson and Winter. This is a common point of view with what it has been stressed out by Jan Fagerberg (2003) about the major role played by these theories in order to explain the economics of innovation.

Chronologically speaking, the Neoclassical theory was the first one developed among those cited above.

It is a wide theory which encompasses two different streams of research: one regarding the microeconomics (major theories are: theory of competition (Arrow, Von Hayek), theory of decision (Kamien, Schwartz) and game theory applied to innovation (Dasgupta, Stiglitz)) and another one about macroeconomics (neoclassical theory of growth by Solow and new theory of growth by Lucas and Romer).

As synthesized by Dixit in 1996 (chap. 1), researchers following the former approach have to formalize a problem using an objective function that is maximized paying attention to some restraints: the model is solved through the exploitation of its degrees of freedom. After having decided also some normative hypotheses, the economists come to an easily understandable solution which, often, is not very close to reality.

In the Neoclassical view, the enterprise is made up by different factors (they refer to production factors as the ability to organize the resources in an adequate way, as well as the Research and Development of both new processes or new products) whose

are organized and contribute to the production and the commercialization of a good, at a price that at least covers the cost of the resources used. In fact, the Neoclassical Theory considers the enterprise as a black box which turns the productive factors into products as described by the production function: a rule known by everyone which brings to different operative production ways just in case of exogenous variations (i.e. the price of the product or the price of at least one of the productive factors) but that works out in a completely expectable way. Recently, a debate about the role of uncertainty in Neoclassical Theory has arisen since, for a long time, any informative asymmetry have not found place in the Neoclassical Theory because of the “perfection” the scholars strive to reach. By the way, a lot of scholars are against this position since it cannot be stated that the Neoclassical enterprise ignores uncertainty but rather it can act in order to cancel it because its entrepreneur could know the probability distributions of the events regarding its activity: internal and external variables are the sources of risk and, therefore, uncertainty for the activity of the enterprise.

The previous speech brings to the concept of equilibrium: the fundamental characteristic of the Neoclassical theory. The Neoclassical Economics is based on the concept of equilibrium and on the role of prices in a market in conditions of perfect competition (homogeneous products and prices close to the average minimum cost) whose guarantee the optimum allocation of the resources and the coordination of the decisions of the micro-actors. In equilibrium, all the enterprises are equal and gain no extra-profits: the remuneration of capital, or normal profit, is equal to the interest rate. All the enterprises are considered equal since there is no role for knowledge and learning: all the enterprises have perfect knowledge of everything.

Therefore, in the long run, whoever could become an entrepreneur since whoever can have the elements needed for implementing the production function without running into any difficulties because he operates in the “best of the possible worlds”: the so called Robbins’ entrepreneurs have just to do what the others did before him. This is a world characterized by no extra profits because they would be market failures and they would bring to the maximization of the welfare since this is a Pareto-optimal situation. It is understandable why Walras does not attribute any utility to the role of the entrepreneur even if he needs it when it recognizes the uncertainty, the imperfection and the existence of the transaction costs (Walras, 1974/1874, lec. XVIII).

The context outlined by Neoclassical scholars is characterized by entrepreneurs that are not able to acquire new knowledge and by inefficient oligopolies since the number of enterprises is constant. As pointed out in the previous pages, even if it is one of the most relevant factors in order to determine the overall economic system performance, the investment in R&D had not a major role at the beginning of the 1900s and it took a major role just after the 1940 with Schumpeter (1942) and Solow (1956, 1957). Whereas the former refers to a different approach, the latter owns to the Neoclassical one through a macroeconomic perspective.

Other Neoclassical studies have been produced also during the last years and a good synthesis can be found in Hart (1995, Part I). He states that major part of studies have been about the imperfect information, informative asymmetry, principal-agent relationship, incomplete contracts, temporal incoherence and role of externalities

linked to productive complementarities among different enterprises. Furthermore, in the middle of the 1980s, the Neoclassical studies have contributed in enriching Coase's (1937) idea of enterprises as places where the transaction costs are minimized.

In conclusion, also from the latest contributions, it is evident the view of a world with constant technology where improvements in terms of welfare come from efficient exchanges, optimum use of productive factors, improvement in giving the property rights and a more effective system of incentives and monitoring within the company.

### 3.2.1 Schumpeterian Theory

Joseph A. Schumpeter gave the first theoretical elaboration regarding the phenomenon of development and a fundamental contribution to the evolutionary economics. The Schumpeterian hypothesis can be used as natural bridge between the previous section and this one. In fact, talking about the market structure that gives the biggest incentive in investing on R&D, Schumpeter reported the findings of his investigation in the single sectors where the technical progress is more consistent and these companies where big public companies (and not those operating in a regime of almost perfect competition). Moreover, he stated that perfect competition is neither just impossible to reach nor the best market situation and, therefore, it should not be indicated as the ideal model of efficiency (Schumpeter, 1950, pp 82,106).

Schumpeterian background is based on three major influences whose he got in touch with during his period as a student in Vienna: Neoclassical theory, Marxism and the Austrian School.

Directly connected to the concept of knowledge, there is the extended notion of innovation: one of the best results coming from Schumpeter's studies (1934, 1943). Particularly, his notion of innovation it is not just about new processes (as for Marx) but also new products, new intermediary products, new markets and new ways to organize business. Moreover, he differentiated the concepts of innovation and invention pointing out that the first is a social activity regarding new combinations of existing resources with a commercial purpose whereas the latter refers to the discovery without commercial purposes.

First milestone of his work remains the book "Theory of Economic Development" (1912) where he started emphasizing the role of innovation and discussed on various topics. In his seminal work, he immediately emphasized the role of the entrepreneur (the economic actor able to kick off the economic development) and gave an explanation of what he meant for "economic development": the disruption of regular circular flow due to the introduction of novelties. In the Schumpeterian approach, just the entrepreneur is responsible for bringing the innovation into the company and knowledge, habits and beliefs play a major role in facilitating the implementation of an innovation. By the way, these same elements constitute the basis of the path-

dependence phenomena which results into a conservative force: in this respect, it emerges the fundamental role of the entrepreneur mentioned few lines above.

It is major to note the changes in Schumpeter's perspective on how the innovative activities are structured and organized:

- Schumpeter I: "creative destruction" (or process of widening) and technological ease of entry are the main characteristics of an environment where the entrepreneurs come in an industry with their new ideas and innovation bringing the challenge and disrupting current activities. In this context, Schumpeter identifies the competitive capital system;
- Schumpeter II: he talked about "creative accumulation" (or deepening process) and the major role played by large and established firms whose create relevant barriers to entry for new innovators through their accumulated resources (specific knowledge for some areas, production and distribution and financial). This is the case of the trustified capital system where giant firms bring innovation.

Therefore, Schumpeterian Theory (also labeled Paleo-Schumpeterian Theory) is the first wide, systematic and in-depth analysis about the role of innovations in modern industrial economies giving relevant contributions concerning with innovation and technological change: innovation is the principal determinant of the industrial change. In his view, differently from the Neoclassical approach, the best performing entrepreneurs gain a temporal extra-profit resulting from the innovation (it will disappear when the competitors will react to it).

Schumpeter, even pointing out that the dimension is neither necessary nor sufficient for innovating, has also underlined the differences in approaching the innovation within enterprises of different size: whereas the entrepreneur is the principal actor in the small ones ("Theory of Economic development"), in the bigger ones that role is played by the company director ("Capitalism, socialism, democracy").

In Schumpeterian Theory, history has a great importance because it is a source of knowledge of the economical system. Schumpeter has highlighted other notable considerations concerning with the uncertainty of the innovative activity (since it is understood just ex-post and the innovator does not know the probability distribution of the possible results of it), as well as the "limited rationality" of the entrepreneur (an optimum solution for the innovative activity cannot be calculated and, therefore, there are big differences among the strategies implemented by the enterprises). Furthermore, he has recognized that innovations are grouped in some specific sectors of activity and in a limited span of time. Eventually, he pointed out the existence of a relevant difference between "young" and "old" companies in terms of innovative level and investment in new technologies.

He introduced definitions and a classification of the innovative activities and the technological change (placing the basis for the economics of innovation). Nevertheless, he has been criticized from some scholars for the scarce theoretical results of his studies. Another critique moved to Schumpeter's work is the missing of the organizational dimension and of the continuous learning (minor innovations).

To be noted the dispute on the Schumpeterian hypothesis by Schumpeter and Arrow. A univocal version of this hypothesis does not exist, since the informal coverage given by the author, but it states that “the incentive to invest on R&D is directly proportional to the market power”. This point of view implies that a monopolist enterprise is the one with the higher level of possible profits and, therefore, the one which can invest more on R&D activities. The Schumpeterian Hypothesis brings also to a trade off between dynamic efficiency (highest rate of reachable technological progress) and static efficiency: monopoly assures the highest level of dynamic efficiency and the lowest of static efficiency.

In the Neoclassical thinking, there is an opposite position expressed by Arrow (1962) in which opinion the monopolist enterprise will be the less willing to invest on R&D since “it rests on one’s laurels”, innovation would lead just to replace itself. Therefore, from Arrow’s point of view, the higher the intensity of investment on R&D and the resulting technical progress, the higher the competition in the market. A considerable part of the literature, in fact, it has been developed starting from this debate and trying to reply to the question concerning the market structure that gives the biggest incentive in investing on R&D.

However, the market of capitals is not perfect and, therefore, the Schumpeterian hypothesis cannot be considered incompatible with the replacement effect (furthermore, a big company can enjoy advantages like bigger possibilities of auto-financing, presence of economies of scale and economies of scope, and a better capacity for coping with the risks of the innovative activity). A small company could have money from a venture capitalist in order to finance a big innovation but it should convince the financier revealing some information for proving the goodness of the idea: nondisclosure agreements are a kind of solution for this problem.

From another point of view, it can be pointed out that the previous analysis is based on the incentives in investing on R&D and it does not take into account the ability in investing. What it has been considered, it is not really a situation of perfect competition market but just an initial situation of that kind. Moreover, the best market situation suggested by Schumpeter refers to a situation of dynamic competition where the entrance is not blocked.

### 3.2.2 Neo-Schumpeterian Theory

Schumpeter’s influence didn’t stop with his own work but has continued through a new theory made up by a stream of new contributions developed in the following decades. The origin of the Neo-Schumpeterian Theory can be traced back to the 1940s and, nowadays, it is a very prolific field of studies (i.e. “innovation and learning behavior on the micro-level of an economy”, “the studies on industry dynamics on the meso-level” and “studies of innovation driven growth and competitiveness on the macro-level of the economy”).

Scholars belonging to the Neo-Schumpeterian economics approach have five common roots:

- Findings by Joseph Alois Schumpeter;
- Evolutionary Economics: an approach that rediscovered Schumpeter's theory in the early 1980s and focused on the emergence and the diffusion of novelties which are driven by creation, selection and retention. The crucial forces of every evolutionary theory dealing with either biological or with cultural evolution. Learning and cognition are central economic actors in evolutionary economic theories and, since building up knowledge is a cumulative process, corresponds to a feature of path-dependency. As pointed out by Saviotti (1996), in fact, heterogeneity of factors is an important source of novelty;
- Complexity Economics: it refers to the emphasis on the interaction between agents in knowledge generation and diffusion processes. John Casti (2001) defined complex systems as systems with close and frequent interactions of components, combined with negative as well as prominent positive feedback effects other characteristics of complex systems are the strongly decentralized structures, their irreducibility (otherwise it would bring to not full understanding) and a fundamental unpredictable behavior (due to non-linearities caused by interaction and feedbacks);
- Approaches dedicated to change and development whose were popular at the beginning of the 20<sup>th</sup> century and re-gained attention at the beginning of the 1990s when a new interest in the laws of motion and industry development re-emerged, formulating stylized facts of so-called industry life cycles (Utterback and Abernathy 1975, Gort and Klepper 1982, Jovanovic and McDonald 1994, and Klepper 1997);
- System theory: learning and the building up of competences are considered as part of an interactive and collective process where the innovation process [taking place in natural (e.g. Nelson 1993 and Lundvall 1988), sectoral (e.g. Malerba 2002 and 2005), regional (e.g. Cooke 2002) as well as corporate innovation systems (e.g. Cantwell, Dunning and Jane 2004)] is shaped by economic actors (mainly firms) and institutional actors (universities, other public research laboratories) as well as the institutional frameworks and governance structure. These actors play a major role in determining the performance of the systems cited above.

As noted above, Neo-Schumpeterian approach has been developing for the decades. Already in the early 1960s, it was suggested that innovation could constantly disrupt equilibrium forces (Posner, 1961; Hirsch, 1965; Vernon, 1966) resulting in that international trade characterized by the interaction between innovation and diffusion of technology.

In the 1970s, scholars felt the need to get a better understanding of the alternating periods of growth and crisis and, as Schumpeter did in the first part of the XX century, Mensch (1979) argued that long periods of sustained growth result after important ("basic") innovations whose usually come in bunches. At an industry level, he pointed out also the spread of social and political support for the leading industries and their "way of doing things" and, simultaneously, increasing resistance against

new, innovative ventures in other areas that do not conform well to the received pattern.

Coming to the 1980s, the focus shifted with Freeman, Clark and Soete (1982) to a system perspective in which the process of innovation-diffusion was studied as an interrelated whole. The great emphasis placed on the diffusion is due to the new perception the authors had about it, an interactive and creative process in which radical changes in the technology may happen and other related innovations may be induced. The same authors talked about “technological systems” and stressed out that “long waves” may come from technological systems (if a system is very large and of long duration, or if several different systems “roll” together). The relevance of the diffusion process is such that it is also likely to give rise to a number of innovations in how to manage and organize processes using new input.

Now it is clear that, also in Neo-Schumpeterian economics, innovation plays a major role but the approach is wider than what it was done by Schumpeter. In fact, as stated by Hanusch and Pyka, Neo-Schumpeterian economics is concerned with all facets of open and uncertain developments in socioeconomic systems.

Therefore, descending from the previous thoughts, as stated by Hanusch and Pyka (2005), it is possible to underline that the normative principle of Neo-Schumpeterian economics refers to the future developmental potential of socioeconomic systems (i.e. innovation in a very broad sense) encompassing technological innovation as well as organizational, institutional and social innovation. The previous normative principle brings to some consequences that can be labeled as the constitutive elements of this theory:

- Qualitative changes (structural changes and removal of constraints) affect all levels of the economy;
- Punctuated equilibrium is the corresponding concept of qualitative changes. Since qualitative changes do not appear continuously over the time, there are situations of punctuated equilibrium encompassing periods of smooth and regular development as well as periods of radical change;
- Pattern formation is the direct result of the processes cited above whose show strong non-linearities and positive feedback effects.

A brief introduction to the System Theory has been given before when introducing the work by Freeman, Clark and Soete (1982). They introduced the terms “system of innovation” and “long waves” whereas another terminology has been used by Perez for indicating the new ways to manage and organize economic life that influences almost all kind of activities: he talks about “new technological styles” or alternatively “new techno-economic paradigms”.

As pointed out by Dosi (1988), considering innovation in a broad sense, the Neo-Schumpeterian approach (through its evolutionary side) has introduced the concept of “system of innovation” underlining once more the cumulateness and path-dependent character of innovation. Furthermore, through an applied research on innovation, Kline and Rosenberg (1988) have found the non-linearity of the innovation process which it is instead characterized by a web of feedback and loops.

Even if the previous thoughts gained a huge consensus, a question arose in the following years: how should be defined the boundaries of an “Innovation System”? Several scholars have agreed on the impossibility to assume a priori the correspondence between the national boundaries and those of the Innovation System (Carlsson and Stankiewicz, 1991; Cooke et al., 1997; Edquist, 1997). This is the reason why, in 1991, Carlsson and Stankiewicz used the notion of “technological system” indicating with this expression “a dynamic network of agents interacting in a specific industrial area under a particular institutional infrastructure and involved in the generation, diffusion and utilization of technology” (ibid, p. 93). They consider the “economic competence” of the agents (mostly firms) as the scarce resource on which they focus and that it is considered also unequally distributed.

In 1997, Breschi and Malerba pointed out the large and persistent differences existing in the way innovation and diffusion occur across different industries and sectors. Just few years later, in 2000, Etzkowitz and Leydesdorff emphasized the central role played by the interaction between universities, firms and governments in regional and local knowledge agglomeration.

Eventually, last major consideration concerning with the Neo-Schumpeterian approach and its difference with respect to the Neoclassical one refers to the production function of innovation: in the latter case it is linear whereas it is more complex and based on the organizations in the system of innovation approach.

### 3.2.3 Nelson and Winter Theory

Nelson and Winter started developing their approach in the 1970s and resumed it in “An Evolutionary Theory of Economic Change” (1982): a book considered a milestone for Evolutionary Economics.

The novelties of their approach are pointed out already in the introduction of their book where they distinguish the “orthodox” economic theory and their “evolutionary” approach. The first one refers to the broader tradition of Western economic thought whose lines of intellectual descent can be traced from Smith and Ricardo through Mill, Marshall and Walras (they emphasize its pervasiveness in the economic theory, even if it has a major concern on microeconomics) and it is considered to provide essential background for applied work done at a respectable intellectual level. The latter approach describes their alternative to orthodoxy and it is called “evolutionary” because they declare to have borrowed basic ideas from biology following the stimulus of their predecessor Malthus provided to Darwin’s thinking. Descending from these roots, it is the idea of the evolution by natural selection that is developed through an analytical analysis and it is supported by their view of “organizational genetics” (traits of organizations are transmitted through time).

Coming back to the evolutionary models, Nelson and Winter starts from the decision rules as form of a basic operational concept but rejecting the notion of maximizing behavior and considering its three separable components (the global

objective function, the well-defined choice set and the maximizing choice rationalization of firm's actions). Differently from orthodox theory, they consider "decision rules" as very close conceptual relatives of production "techniques".

Nelson and Winter have named "routine" all the regular and predictable behavioral patterns of firms (they include characteristics of the different organizational functions) comparing it to the role played by genes in biological evolutionary theory. The previous comparison has inspired Nelson and Winter in explaining the main characteristics of "routines" which are:

- A persistent feature of the organism which determines, together with the environment, its behavior;
- Heritable since tomorrow's organisms, generated from today's, have many of the same characteristics;
- Selectable since organisms with certain routines may do better than others increasing their relative importance in the population (industry).

Nelson and Winter were conscious that not all business behaviors (especially those at high-level in the modern world since they do not follow predictable and regular patterns) can be subsumed under the heading "routine" but they stated that this fact is accommodated in evolutionary theory by recognizing that there are stochastic elements both in the determination of decisions and of decisions outcome.

Differently from the orthodox theory, Nelson and Winter do not make a sharp distinction between the routines that instead believe to have subtle and continuous differences. Nevertheless, they consider important to distinguish between different types of routines (i.e. different techniques, procedures or decision rules): this is the reason why they use different names for the routines.

Nelson and Winter describe firm's routines as the way to define a list of functions that determine what a firm does as a function of various external variables where techniques and decision rules are not constant and result of the maximization process as the other one but are the reflection at any moment of time of the historically given routines.

Then, they distinguish among three different classes of routines:

- *Operating characteristics routines*: those governing the short-run behavior (i.e. factors of production not augmentable in the short-run);
- *Routines that determine the period-by-period augmentation or diminution of firm's capital stock*: they talk about the selection mechanism analogously to what happens in biology and, therefore, retain that the sensitivity, if a firm's growth rate to prosperity or adversity, is itself a reflection of its "genes";
- *Routines that modify over time various aspects of their operating characteristics*: also these are "rule guided", because they assume a hierarchy of decision rules where the higher order ones can act for modifying the lower order ones.

In their book, they consider models of "industries" and often assume the achievement of "temporary-equilibrium" (but not the long-run equilibrium). The dynamic process is the core concern of the theory where search and selection are simultaneous and interacting aspects that lead the firms, through their joint action, to

evolve over time: this is the reason why they talk about a Markov process (the preceding periods give the seed for the following ones).

The authors defined the model complex but they consider it to have an enormous generality. The focus on “capitalism as an engine of change” and, therefore, on technological competition as driving force of capitalist evolution is shared by their approach with the Schumpeter’s one. Nevertheless, it is important also to note the existence of four major differences with respect to the Schumpeter’s approach:

- There is a clear recognition by Nelson and Winter of the link between evolutionary theorizing and their own work;
- Nelson and Winter added a much more theoretical perspective on how firms behave if compared to an earlier work by Simon and others. Their elaboration is based on the idea of “procedural” or bounded rationality and it is of fundamental importance since recognizes that human beings are conscious of their limited skills and rely on codified procedures (“satisficing behavior”) that will change just when a better one will emerge. In this case, there will be a jump toward the innovation even if, most of the time, will be characterized by a lot of incremental innovations whereas the “jumps” will come as a flow made up by few of them;
- Third principle of their approach refers to the bigger diversity allowed by their modeling efforts and a clearer distinction between the technological activities of firms and the actual outcomes of these activities (the authors they argue that the last one has a strong stochastic element). Nelson and Winter referred to the term “diversity” thinking about firm behavior (an strategies) and industry characteristics;
- Less importance is given to the major discontinuities in economic evolution; they chose a “much more gradualist” flavor (Fagerberg, 2003).

Going deep in the work of Nelson and Winter, it is major to point out that the companies are profit oriented but, given the exogenous conditions, they do not behave for maximizing it. It is emphasized instead, the leading role of the most profitable companies with respect to the others whereas there is no focus on the equilibrium and therefore there is no maximization. Companies are modeled just through the competences owned in a precise moment. It is a phenomenon similar to the natural selection which operates as the market and ‘throws out’ the less profitable ones.

In Nelson and Winter approach, the routine behavior is modeled assuming that firms follow decision rules (or routines) whose determine behavior (actually, together with impulses, they form the environment), are heritable (they are part of the “organizational memory” of the firm) and selectable (through the fate of the firms that apply to them).

### 3.2.4 Analysis of determinants of innovation in the literature

This is a part of theory about Innovation Economics which has gathered an increasing number of studies during the last decade and starting from the different approaches developed in the past. It is fundamental to give an overview of the literature regarding this topic since the objective of this work is to investigate the role of innovation as strategic behavior.

As for the theory of Innovation in its different facets, micro as well as macro approaches have been developed. Considering a paper by Athereye (2001) as a starting point, it is possible to point out two notions of competition whose underlie much of the literature on the determinants of innovative activity. The first one refers to the “conceptualisation of competition between firms” and it has brought to a sharp distinction between price-based competition and non-price competition based on some degree of market power. The latter is about “rivalry among firms” and consists in considering firms as if they were competing with each other but on the basis of some price-making power allowed by a smaller number of competitors in the product market. Looking at the literature, a couple of different thoughts about rivalry can be found: from Schumpeter (1939) and Schester (1967) can be argued that rivalry induces non-price competition among firms of which innovation is an important outcome whereas the analysis by Galbraith (1952), Cohen and Kepler (1996) refers to the increased ability of firm to undertake expenditures in case of higher profits under monopolistic rivalry in monopolistic markets (achieved through a restriction in outputs relative to price competition).

Looking at the evolutionary approach, it is possible to point out another interpretation of competition where it is the distribution of abilities of firms (which compete on the basis of asymmetric or different abilities) in a market that determines the intensity of competition and of rivalry as well as matters for explaining innovative behavior and also post-innovation market structure. Therefore, the novelty of this interpretation of competition consists in not relying upon the number of firms or market shares but brings to the selection of the more able firms that improve themselves and their performances through their innovatory activities (based on their cumulative learning and their unique organizational abilities). This discussion, supported by Nelson and Winter (1982) and Dosi (1988), takes in major account the history of the firms’ activities because the innovative firms accumulate considerable competencies that generate further innovation. Therefore, starting from the basis of unequal abilities between firms, further differences can be introduced when innovations occur (they confer lasting advantages to innovating firms) and they will affect market structure once more.

It is possible to underline from this piece of literature the presence of strong asymmetries between firms and the role of cumulative learning which could result in the persistence of innovating activity.

Given this brief introduction about some common basis of the literature on innovation, it is possible to have a broader outlook of the factors influencing determinants of R&D at a firm level even if it has to be pointed out that innovation is a wide concept with too many different definitions that complicate the search (Downs and Mohr, 1984; Ravichandran, 1999; David Wan, Chin Huat Ong and Francis Lee,

2005). Some different descriptions of innovation have already been given before and David Wan, Chin Huat Ong and Francis Lee (2005) propose their own approach grouping characteristics of innovation in three categories whose are an elaboration of what I have proposed in the review of the literature. The first category is about Product and Process Innovation: as described by Knight (1967) and Utterback (1971), where product innovation is a term referred to “the production of new products and services to create new markets/customers or satisfy current markets or customers”, whereas “Process innovation is reflected in the improvements or introduction of new production process for products or services” In this typology, there is no research available on how they are affected by organizational variables and organizational needs (Damanpour, 1991)

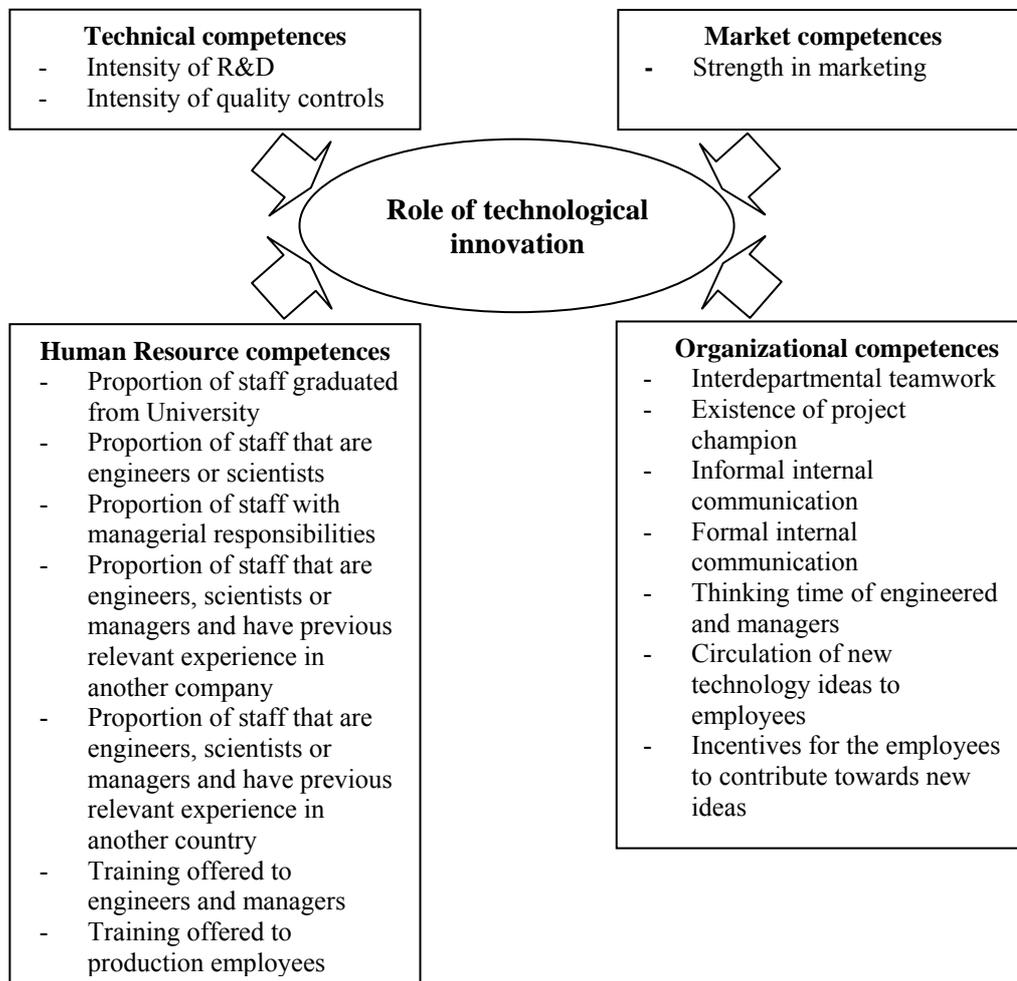
A second category of innovation refers to the distinction between radical and incremental innovation, where the radical innovation recalls the Nelson and Winter definition of non-routine behavior whereas the incremental is the about routine changes close to the present organizational activities as it has been summarized also by Dewar and Dutton (1986) and Ettlie et al. (1984). No dominant explanation has been adopted to explain when an organization adopts radical or incremental innovation (Damanpour, 1991).

Third and last category individuated by the three authors is about the distinction between technical and administrative innovation which was also proposed by Daft in 1978. Technical innovation is closely related to the core of organization's technical ability existing in products, services and production processes (Daft, 1978; Damanpour and Evan, 1990; Knight, 1967), whereas administrative innovation is about the management process and the changes in organization's structural and administrative procedures.

As pointed out by Daft (1982), the importance of the two forms is a direct consequence of the innovation needs of an organization as well as of the kind of organizational structure (mechanistic or organic).

These are some reasons that help in explaining why the studies lead to different results.

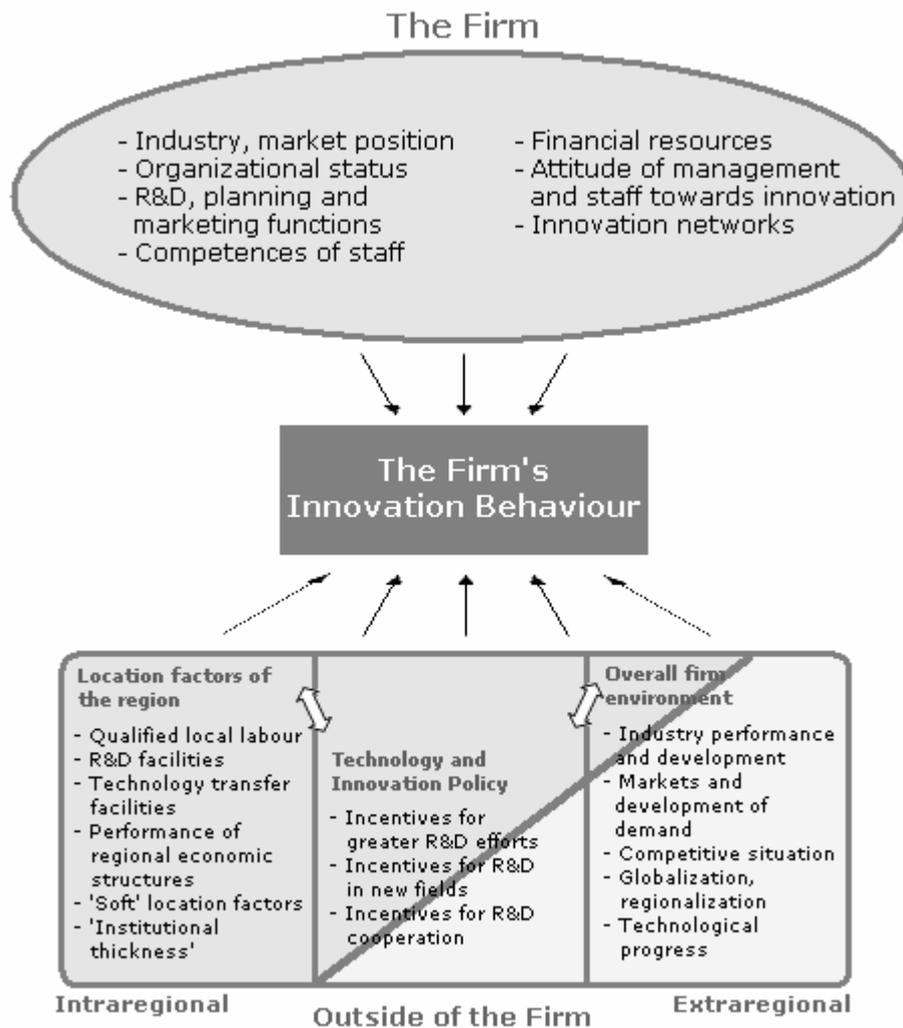
Taking the inspiration from the last cited category of innovation, it is possible to link the approach of determinants of innovation given by Vangelis Souitaris (Firm-specific competencies determining technological innovation: a survey in Greece). He has developed a schema that differentiates the different abilities underlined in the literature, through the grouping of their skills in four areas of competences: technical, market, human resources and organizational.



**Figure 3.1 – Souitaris' framework of firm specific competences determining innovation**

Vangelis Souitaris used the technical competences as dependent variables of his model where the independent variables were all the other competences. It is major to point out that he decided to elaborate a model focusing on the human resources and some other organizational aspects which are mainly concerned with inter-firm communication.

Also Sternberg and Arndt (2001) have offered their complete view of all the variables that they think determine the firm's innovation behavior. They consider the whole firm's environment, inside and outside the firm itself:



**Figure 3.2 - Sternberg and Arndt's model (2001): Firm's Innovation Behavior**

In 2005, a study by David Wan, Chin Huat Ong and Francis Lee (2005) approached the topic of determinants of firm innovation giving, as Souitaris did, a major emphasis to the organizational aspects. Before starting with their analysis, they took from the literature six major determinants that tested on Singaporean firms. Here, follows a brief description of the main reasons that led the authors to this selection.

Their first hypothesis was about communications channels whose are supposed to favor innovation since brings to the cross-fertilization of ideas (Aiken and Hage,

1971) through the dispersion of ideas within the organization (there will be an increasing amount of ideas and diversity). Furthermore, contributions in this respect come from Ross (1974) and Nonaka (1994, pp 14-15) who agree on the goodness of such an environment for the survival of ideas as well as the induction of changes in the organization's wider knowledge system through the interactions that diffuse of explicit and implicit knowledge.

A second hypothesis is about the positive relationship existing between innovation and decentralized structure. This is due to the widespread belief that decentralized and informal organizational structures facilitate innovativeness (Subramanian and Nilakanta, 1996). Similar conclusions were drawn by Kanter (1983), whereas Aiken and Hage (1971) and Thomson (1965) saw as an obstacle to innovation the existence of the centralized organizations: a support to them was given in 1991 by Damapour's meta-analysis of the relationship between organizational innovation and its potential determinants.

A third point is about organizational resources and the idea, confirmed after a study by Delbecq and Mills (1985), that innovation benefits of a greater amount of organizational resources whereas Rosner (1968) stated that an organizational slack would have had a positive effect on innovation.

Another shareable hypothesis, used in this study, refers to the need for motivation of the employee in order to innovate. This is a feeling that can pervade the company just in case of an appropriate group norms and organizational ideologies as found by Russell (1986), in a study on SMEs, where he pointed out the existence of a set of seven norms significantly related to the absolute number successfully implemented and the frequency and importance of innovation as an element of organizational strategy. Again from Russell (1986), it has been taken the idea of the positive effect given by the willingness to exchange ideas toward innovation.

Eventually, the study has taken into account the positive effect of the willingness to take risks being supported by Tushman and O'Reilly's (1997) belief.

Another kind of approach has been used by Cassey Lee (2004) as well as by Shefer and Kerfel (2005); they introduced the technology level of the industry and the export among the determinants of innovation to be tested.

The first one is an econometric analysis at the firm level of the determinants of Innovation in the Malaysian Manufacturing sector who have worked on both technological and market concentration characteristics. This approach has taken into account some variables according to literature findings that have not forgotten the notion of systems of innovation. Particularly, they underlined the influence of industries (industry labeled on the basis of the OECD classification), as well as the importance of internal research and development capacity and technology acquisition (at a country level), on innovation performance (Nascia and Perani, 2002). The major role played by industry type in determining the propensity to innovate has been confirmed in a study by Mohen and Dagenais (2002) on Danish firms together with the firm size (measured in number of employees) and group subsidiary. Firm size has been found to be a major determinant of innovation also in a Canadian study by Baldwin, Hanin and Sabourin (2002). To a different result came Martinez-Ros and Labeaga (2002). Based on Spanish data, they found that firm size is not a significant

determinant of innovation: as noted before, this is a much debated question in literature. Anyway, this study has pointed out also the relevance of some time invariant variables (e.g. managerial ability, corporate culture and know-how) as it has been pointed out previously talking about the works by Vangelis Souitaris as well as David Wan, Chin Huat Ong and Francis Lee (2005).

Still referring to the literature that influenced Cassey Lee, it has to be considered also the contribution by Cabagnols and Le Bas (2002) which developed the “sectoral appropriability” conditions in France. They did not find a significant influence of patent protection related variables on innovation whereas, on the market side, they noted that stronger competition is found to induce more process innovation.

Other major sources of new stimulus have been some empirical studies that have examined the influence of external factors. Stemberg and Amtdt (2001) as well as Roper et al. (2000) have found region-specific factors (i.e. the region’s capacity for research) to be significant determinants of innovation even if the latter found also the relevance of industry type (and the degree of R&D intensity) whereas the market concentration was not found to be significant. Anyway, Cassey Lee has chosen to test also the market concentration through the Herfindahl-Hirschman Index (HHI).

Last important influence for Cassey Lee has been the result of a study by Rolfo and Calabrese (2003) that pointed out the overall negative perception of the impact of industrial policy aimed at fostering technological innovation in the SMEs.

As written above, also the study by Shefer and Frenkel (2005) on Israeli firms has emphasized the role of the technology level of the industry but they have grouped firms in high-tech and traditional on the basis of investments in R&D as suggested by Frenkel et al. (2001) and Acs and Audretsch (1993). The other common factor has been the export level which has brought to the evidence that high-tech companies are more export-oriented: this matches the common point of view of several studies (Suarez-Villa and Fischer, 1995; Porter, 1990; Grossman and Helpman, 1990; Krugman, 1979, 1991, 1995), those point out that the need to export is in part due to the decision of the company to invest in R&D in order to produce new innovation.

Other determinants considered, common to other cited studied, are the age of the firm (of which it has already been emphasized the doubtful effect on innovation) and firm size (another uncertain situation: studies by Fisher and Temin (1973), Dosi (1988), Acs and Audretsch (1988, 1991) stress out that there is a bigger propensity to invest in R&D for large firms whereas other studies underline the role of small firms in high-tech sectors (Acs and Audretsch, 1993a; Kleinknecht, 1989, 1991; Scheirer, 1991)).

The study by Shefer and Frenkel (2005) has added, with respect to the other cited studies, further inside on other three variables: location, belongingness to a concern and innovation. The first one refers to several studies that have pointed out the huge presence of high-tech firms in metropolitan area (Davelaar, 1991; Davelaar and Nijkamp, 1989; Feldman, 1994; Ciccone and Hall, 1996; Shefer and Frenkel, 1998; Audretsch, 1998; Audretsch and Feldman, 1996), whereas the positive relation to the second it has been pointed out by Frenkel et al. (2001) because of the bigger ability to secure the necessary funding for R&D and to lower the risk for each firm. The third one, innovation, has been introduced since firms with good innovation performances

will be positively related to a bigger level of R&D as stated by Acs and Audretsch (1988, 1991), Feldman (1994), Audretsch (1995), Kleinknecht (1996) and Freeman and Soete (1997).

Other than that it is going to be presented, in this brief review of the literature on the determinants of innovation at a firm level, it is a study that has placed a strong accent on the role of export by Zhao Hongxin and Li Hongyu (1997) in Chinese manufacturing firms. The interest for this variable is due to considerations given by two lines of economic literatures: the neo-technology theory of trade and the economics of technological innovation.

Neotechnology theories of trade have a point of view that starts from the positions of Leontief (1954), his paradox and Vernon (1966) and place emphasis on technological change, on the resulting pattern of trade and on the empirical relationship between firms. In these theories, it is pointed out the role of research and development activities whose are the forms used by technological change to take place at an enterprise level in the form of R&D activities. In 1989, Franko stressed out the role played by R&D as a principal mean of gaining market share in global competition. Zhao Hongxin and Li Hongyu (1997) date back to 1972 with Morral the older support to this relationship (he verified the positive and significant relationship between coefficients about relative growth rates of labor efficiency and those of capital efficiency: measures of labor saving innovation and labor skill ratio). Another couple of contributions come from the USA where, in 1981, Soete found positive relationship between US export performance and the shares of U.S. patents held by industries in other countries (used as an output indicator of technology) and, in 1994, Lee and Stone found both product and process related to R&D to have significantly positive impacts on export.

The other strand of literature that has developed the relationship between trade and technology is the economics of technological innovation of which I have already given a wide description in the previous pages. As it has already been shown, it focuses on the determinants of innovation at firm level but there is also a considerable body of analysis developed in the 1960s that has studied the influence of market structure on innovation (Scherer (1965), Horowitz (1962), Philips (1965), Grabowski (1968, 1973)).

Zhao Hongxin and Li Hongyu (1997) have not just given a major emphasis on the relation between export activities and technology but have also emphasized the importance to consider not only the exporting companies but also all the others in order to get not distorted results.

### **3.2.5 The strategic management**

Strategic management has been approached for the first time in 1911, when the Harvard Business School started teaching a course about business policy (Montgomery, 1995). The main stream of research in strategic management emerged

in the 1960s when it gained a separate identity as an academic subject with a shift to strategic planning due to the influence of accountants, engineers and specialists in operations research, the emphasis had shifted towards strategic planning (Kay, 1993).

In fact, that school assumed the “rational decision making process” that allow firms to solve problems as well as decide, and later control, their future in five or ten years. Strategic planning was just one of the branches developed at that time because contemporarily there was the rise of strategic marketing. It was introduced a demand-side orientation, in contrast to the supply-side orientation involved in planning, which placed more attention on what the public demands. (Robertson and Yu (2001). It emerges the need for a continuous process of control of the results and adjusting to changing conditions (Mintzberg, 1987). Robertson and Yu (2001) refer to this characteristic of the firm as strategic ability. John A. Murray (1984) has called “entrepreneurial strategy”, “the means through which an organization establishes and re-establishes its fundamental set of relationships with its environment”. He points out the changes in the pattern of decisions taken by an organization and highlights the need for an adequate organization.

The need for a vision of future outcomes has been stressed out by Hamel and Prahalad (1989) whose named it the company’s ‘strategic intent’ and it has been described by Robertson and Yu (2001) as the goals set by a firm in order to outperform its competitors and become highly profitable.

Given the company’s vision and mission, the way to reach them is traced by the company’s strategy which directly influences the company’s behavior in allocating its resources and managing outside events. Schendel and Patton (1978) adopt a definition of strategy given by Cooper and Schendel (1976) where “Strategy is defined as the basic goals and objectives of the business, the product-market matches chosen on which to compete, the major patterns of resource allocations, and the major operating policies used to relate the firm to its environment”.

Moreover, Schendel and Patton (1978) state the existence of three fundamental aspects of any purposive organization at whatever organizational level. The first dimension refers to the goals of the organization, the second is about the means or resource allocations possible, and eventually there are the environmental constraints to which the firm must adapt.

According to Robertson and Yu (2001), a synthesis of the major economic-based approaches to strategic management consists in considering two branches of theories as the so-called ‘Bain-type’ model of Porter and the ‘resource-based’ models. Jacobson (1992) points out how Porter has reversed the message coming from the studies based on the Structure Control and Performance model by recommending that firms adopt strategies that allow them to become local monopolists. From this assumption descends the Five forces model elaborated by Porter where the major drivers of competition are identified: threats from substitute products, the power of suppliers, the power of customers, the threat of new entrants, and competition within the industry itself. Robertson and Yu (2001) have stressed out how his model brings out a message and utilizes tools also associated with the traditional marketing literature.

Looking at the Resource Based Model, it emerges an approach more concentrated on the strengths and weaknesses that are internal to the firm (Barney, 1991) whereas

Porter's view concentrates on the elements of a firm's external environment. Resource-based theories of strategy, by contrast, concentrate on the strengths and weaknesses that are internal to the firm (Barney, 1991). The Resource Based Theory focuses on a company's specific resources that can be both tangible and intangible. From this approach two types of competences emerge: distinct competences (unique to a particular firm), and core competences (abilities central to meeting a firm's strategic goals). It is possible to distinguish two main branches inside this approach. In both of them, strategy is chosen on the basis of firms resources whereas differences refer to the way competences are acquired.

One school is associated with the studies by Hamel and Prahalad and they consider the firms to possess a vision of future outcomes in which a firm outperforms its competitors and becomes highly profitable (strategic intent) (Hamel and Prahalad, 1989; Prahalad and Hamel, 1990).

On the other side there is the school led by Kay (1993). In his view, companies should beware of choosing strategies (and consequently fixing goals) that require significant competences they do not already possess. This is the reasons why he talks about wishes describing the companies as lead by 'wish-driven' and points out the difficulties in acquiring new resources.

Robertson and Yu (2001) has noted that the two main approaches described above do not place the demand-side factors in a central position as it is done in strategic marketing. Anyway, the same authors have recognized in the contemporary use of the three approaches (Porter's model, Resource Based model and Strategic management model) the way to consider both the internal and external factors affecting a firm.

Schendel and Patton (1978) have pointed out that the strategy concept may be used in any time orientation, to describe past, current, or expected conduct and referring to multiple levels of strategy as: corporate level the product/market choices, the business level-how to compete within a given product/market area, and the functional area level-marketing, financial, manufacturing, R and D, etc.

This thought lets us to widen our view on the literature about strategic management and including the innovation factor. A link can be done with the market dimension because "product innovation is universally recognized as a strategy for building market share in both mature and expanding markets" (Varadarajan, 1985) and this has been verified in practice (i.e. survey by Booz, Allen and Hamilton in 1982 to managers of Fortune 1000 companies).

Vázquez, Santos, and Alvarez (2001) note that "an innovation strategy poses a permanent challenge for any company" because of the scarce number of standardized markets and, therefore, innovation currently plays a key role in business performance (Edgett et al., 1992; Brown and Eisenhardt, 1995). The same authors point out the existing debate on the role of market orientation in fostering innovation or whether it leads just to incremental developments in product portfolios derived from modifications in customer preferences. The latter results in incremental innovations that are profitable in the short-run (Atuahene and Gima, 1996) but just the former sustain competitiveness in the long-run (Davidow, 1986).

As already seen in the previous paragraphs, innovation is closely related to entrepreneurship and the link is highlighted once more when combining that topic with market orientation. In fact, Han et al. (1998) point out how the "explicit

acknowledgement of the positive effects that innovation has on entrepreneurial results makes it desirable for market orientation to produce an effect on the firm's innovation activity, in terms of both the quantity and novelty of the new products developed" (Vázquez, Santos, and Alvarez, 2001). Furthermore, since the Nineties, scholars have started talking about entrepreneurial orientation identifying it with the willingness to be involved in change: rejuvenated market offerings, taking risk to try out new and uncertain products, services and markets, and to be more proactive than competitors in order to be first in taking advantage of new marketplace opportunities (i.e. Covin and Stevin, 1989, 1990, 1991; Knight, 1997; Miller, 1983; Wiklund, 1999; Zahra, 1993; etc.).

Entrepreneurship is central also in Miller and Friesen's work (1980), which focuses on the identification of transition packages or 'archetypes of organizational transition'. Change has been one of the words used at the beginning of this paragraph and it is important also when it comes to talk about organizational transition. "A transition is seen as a system of changes that occurs from the onset of stress owing to a misfit between the organization and its environment until the final resolution of the stress and entry into a period of equilibrium" (Murray, 1984). Miller and Friesen (1980) isolate six primary archetypes of transition which they label 'entrepreneurial revitalization', 'consolidation', 'towards stagnation', 'towards centralization, boldness and abandon', 'maturation' and 'troubleshooting'.

However, also market orientation has received the deserved attention in the literature of strategic management and it has been considered an organizational resource which contributes to competitive strategy formulation (Hunt and Morgan, 1995). According to Slater and Narver (1996), market orientation's role, in competitive strategy formulation, is a key step for achieving an appropriate comprehension of orientation's long-term benefits for the organization (Slater and Narver, 1996).

It is possible to point out several contributions to the literature of strategy management with regard to the market orientation. In the next lines, it will be given a short overview of the major typologies of business strategies found in literature.

The first approach dates back to 1975 when Buzzell et al. described the existence of three kind of strategies that relates investments and market share: 'building' relates high investment to an increased market share position, 'holding' consists in maintaining a market share and 'harvesting' is about lowering the investments in order to generate cashflow but allowing a market share to decrease.

In the same year, also Utterback and Abernathy pointed out a strategy articulated on three different positions: 'performance maximizing' places emphasis in product and / or service performance (and, therefore, emphasizing technology and product R&D), 'sales maximizing' is about increasing total sales and market share of firm, and 'cost minimizing' emphasizes process technologies R&D to decrease total cost of production.

Few years later, in 1978, Hofer and Schendel proposed a model structured on six points whose look at the industry conditions: 'share increasing' happens when there are high investments to increase market share, 'growth' is referred as maintaining position in expanding markets and investment happens at industry level, 'profit' is about cost controlling in order to get cash and industry is at industry norms, 'market

concentration and asset reduction' is a way to realign resources, 'turnaround' refers to the probable need for investment when an improvement of strategic posture is pursued, eventually there is 'liquidation' which consists in generating cash while withdrawing from the market.

In the same year, Miles and Snow (1978) identified four basic types of competitive organization with regard to their approach to market based on the way companies respond to variations in the competitive environment: 'defender' firms are focus on the defense of their competitive position, 'prospector' businesses are the pioneers of the market trying to launch new products, 'analyzer' organizations have an intermediate behavior with respect to the two previous ones, and 'reactor' firms just react to environmental changes.

In 1979, Vesper identified a four points business strategy: 'multiplication' is about multiplying present market structures in order to expand the market share, 'monopolizing' look at the elimination of competition through the establishment of barriers to entry and the control of resources, 'specialization' consists in the specialization in products and/or production process whereas 'liquidation' refers to the decision of giving up the business and the market position.

Coming to the Eighties, there is the widely know and accepted model by Porter where business strategy is described though three possible behavioral options: 'cost leadership' is about efficiency and it is a solution that relies on experience curve policies, on the reduction of costs and control of overheads, 'differentiation' is about creating uniqueness in product and/or service and 'focus' is the behavior consisting in concentrating firms attention on a specific buyer group or market.

In the same year, Wissema et al. pointed out a model that could resemble the concepts of the life cycle: 'explosion' is about the improvement of the firms competitive position in short term, 'expansion' refers to the improvement of competitive position in long term, 'continuous growth' consist in maintaining firms position in expanding markets and normal investment is realized, 'slip' is about giving up market share to generate cash in growing market, 'consolidation' still refers to give up market share to generate cash in stable market, and 'contraction' refers to liquidate assets and terminate market position.

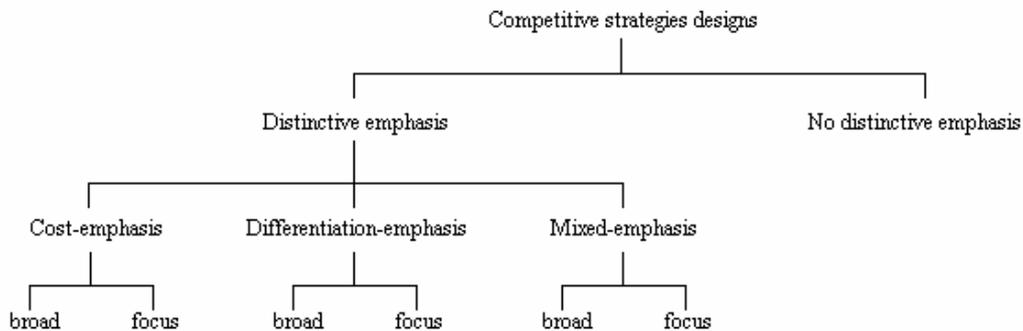
Eventually, another major approach elaborated in that period is the one by Miles (1982) which points out two major positions: 'domain defense' when the focus is on the preservation of traditional product-market, and 'domain offence' that points out attacking strategies based on product innovation and market segmentation.

Since the Nineties, there has been a growing stream of studies about business models applied to electronic commerce (Mahadevan, 2000; Morris, Schindehutte, and Allen, 2005). Just giving a rapid overview to the models developed during the nineties, it is possible to differentiate between those elaborated on a general perspective and those about e-commerce: the focus has shifted to the specific components of the model. On the general perspective side, there is the approach by Horowitz (1996) which points out as specific components the price, product, distribution, organizational characteristics, and technology whereas Viscio and Pasternak (1996) gives relevance to elements as the global core, governance, business units, services, and linkages. Markides (1999) points out as specific components of

his business model the product innovation, customer relationship, infrastructure management, and financial aspects. Between 2000 and 2001, it is possible to point out the empirical contributions by Chesbrough and Rosenbaum, Linder and Cantrell, Hamel and Applegate: they considered a wide variety of parameters. Among these contributions, notable is the one by Hamel (2001) which has focused on particular aspects as core strategy, strategic resources, value network, and customer interface.

Business models applied to e-commerce integrated the components already widely used in literature and with some others such as the information flow architecture (Timmers, 1998), internet/extranet capabilities (Donath, 1999), stakeholder network (Gordijn, 2001), core technology investments (Gartner, 2003), infrastructure and network of partners (Dubosson-Torbay et al., 2001), IT infrastructure (Weill and Vitale, 2001), transaction content, transaction structure and transaction governance (Amit and Zott, 2001).

In order to classify all the strategy models proposed during the decades of research on the topic, a taxonomic description of generic competitive strategy has been proposed by Campbell-Hunt (2000). The explanation distinguishes between models with distinctive emphasis and those with no distinctive emphasis. Among the first branch of approaches the models place emphasis on cost, differentiation or are mixed: all of them can be subdivided again in broad and focus.



**Figure 3.3 – Taxonomy of generic competitive strategies by Campbell-Hunt (2000)**

According to Hofer and Schendel (1978), independently from the classification of the strategies considered, it is possible to point out three basic elements that can identify the strategic behavior of a company. They state that there are few identifiable strategies that can be described by different:

- Patterns of competitive position objectives;
- Investment strategies;
- Competitive advantages.

Getting closer to the topic of this research, which is based on manufacturing strategies, it is possible to give evidence to some studies that have specifically treat this topic. Swamidass and Newell have defined manufacturing strategy as “the effective use of manufacturing strengths as a competitive weapon for the achievement of business and corporate goals” (1987).

Kotha and Orne (1989) have synthesized four levels of strategy that influence manufacturing competitiveness: industry, corporate, business and functional. The Industry Level Strategy is about incentives for investment; import and export trade barriers, duties and quotas; the balance between imports and exports; inflation and the cost of capital; transportation and educational infrastructure; health and safety standards; antitrust regulations; employment levels; patent policy; etc. . A level below, there is the Corporate Level Strategy and consists in the definition of businesses in which the corporation wishes to participate and the acquisition and allocation of resources to these business units. Getting closer to the operative level, there is the Business Level Strategy which is performed according to its boundaries and the operational links with corporate strategy, and also on the basis on which the business until will achieve and maintain a competitive advantage within its industry. Eventually, there is the Functional Level Strategy which supports and complement the desired competitive business level strategy through the specification of functional strategies (i.e. marketing and sales, manufacturing, research and development, accounting and control, etc.).

Few years before, in 1984, Hayes and Wheelwright identified four stages in the development of manufacturing’s strategic role even if studies in literature are concentrated mostly just on one of them. According to Mill, Platts and Gregory (1995), in ‘internally neutral’ strategy the objective is to minimize the impact of the manufacturing function whereas the ‘externally neutral’ strategy is usually pursued by following industry practice in order to maintain parity with competitors. The third strategy they identify is called ‘internally supportive’ and it is based on the consideration that manufacturing has to support business strategy and, therefore, it will be consistent with it. The fourth manufacturing strategy is ‘externally supportive’ because manufacturing capabilities lead the choices made by the company.

Eventually, Mill, Platts and Gregory (1995) have proposed also some other major generic manufacturing strategies developed. In 1983, Stobaugh and Telesin highlighted the existence of three strategies: cost-driven, market-driven and technology-driven. Also Roth and Miller (1989) and Edmondson and Wheelwright (1989) identified three strategic behaviors. The former approach talked about being caratekers, marketers or innovators whereas the latter has focused on the response mode to challenges. The first mode is called quick relief; the second refers to the use of organizational tools and the development of a competitive edge through manufacturing.

### 3.3 Dataset and Econometric Model

The following paragraphs will give an overview of the dataset used, in order to accomplish to the analysis, and the econometric model on which the analysis is built on.

#### 3.3.1 The Dataset

The dataset is based on data referred to the year 2005 and was built, initially, with the aim of identifying the importance of the Research and Development (R&D) activity in relation with the other strategic variables and the goals of the Small and Medium Enterprises (SMEs) in the province of Bergamo. This dataset is geographically focused on this only province situated in the north of Italy: one of the most industrialized areas in Europe with a high vocation for entrepreneurship, very dynamic and still very involved in the manufacturing industry. To accomplish to the study presented in this paper, it has been necessary to update the database with information (still referred to the year 2005) about some other characteristics of the companies. In this last part of work, some large companies have been added to the dataset in order to have a sample closer to the real situation of the province.

Therefore, the survey has been accomplished in two periods and it has taken several months. The choice of the companies in the sample has been made randomly among those with the characteristics researched. The survey has been mainly realized through interviews made at the telephone (about 40 minutes for each interview realized after having called, in order to verify the willingness to reply to the survey, and having sent the survey) and in few situations directly during a meeting with the directors of the human resource department of the companies interested in it.

The final dataset is made up by 225 companies (142 small, 69 medium and 14 large) which have been chosen looking at the real distribution (in terms of size and industry) of the companies in the province investigated. An exact picture of the real situation would have required few more companies.

The companies belonging to this study comes, in large part, from the manufacturing industry: the one that gives occupation to the largest part of the population in Bergamo. In 2001 (ISTAT data) in this industry, there were 12358 companies and 164844 people employed (46 percent of the total) whereas, in the whole province, there were 77928 businesses and 364228 people employed. Before taking a look at the companies' distribution in terms of size, it is needed an introduction on the definition used in order to classify the companies. A company is called:

- "Micro" when there are less than 10 employees;
- "Small" when employs from 10 to 49 people;
- "Medium" when there are from 50 to 249 workers;
- "Large" when at least 250 people are employed.

On average, micro companies represent the 92.8 percent of all the companies in the province and give work to the 39.8 percent of the whole workforce: these data are quite similar to those given at regional and national level, even if the former is a little bit lower and the latter is in between of the regional and the national value. Micro companies are more of the 90 percent of the companies in almost all the economic sectors except for the industries of construction, manufacturing and production and distribution of electricity, gas and water (public utilities). These three industries are also those where the small companies reach the highest percentages with the first one at the 46.7 percent, the second at the 22 percent and the last one at the 25 percent. Medium companies are just the 0.8 percent of the total and are more present both in terms of number of companies and occupation in the industries of extraction, manufacturing, and transportation and communication whereas are absent in several sectors. Eventually, the large companies ensure the 19.6 percent of the workplaces and the biggest contribution in this respect comes from the companies operating in the sector of public utilities (2.5 percent of the total of the sector and the 59.6 percent of the workers), manufacturing (0.5 percent of the companies but the 26 percent of the workforce), financial brokering (0.2 percent of the companies and the 64.8 percent of the employed in the sector), transportation (0.1 percent of the companies and 15.6 percent of the workers), health and social services (0.1 percent of the companies and the 25.2 percent of the workforce), and the real estate and renting (0.1 percent of the companies and the 21.9 percent of the people employed in the sector). To be noted the absence of large companies, in the province of Bergamo, in the sectors of leather and shoe manufacturing, manufacturing of coke and oil refinery, manufacturing of radio and TV devices, manufacturing of medical products and optical instruments, fabrication of transportation vehicles other than cars, recycling, informatics and research and development.

It emerges the major role played by micro and small companies in the economic system of the province of Bergamo, which is more relevant than what happens at regional level, and the smaller importance of the large companies. Instead, there is no difference both in terms of number of companies and people employed with the distribution of the companies in Italy.

In conclusion, comparing just the manufacturing sectors among the province of Bergamo, the Lombardy region and Italy, it emerges the minor relevance of micro companies both in terms of absolute numbers as well as workplaces generated whereas the small and the medium companies play a much bigger role in both the terms. There are no significant differences when comparing large companies even if the province of Bergamo is characterized by their role in the textile and transformation of mineral (not metal) industries.

As written above, the data have been collected during the year 2006 and refer to the year 2005. These years, especially 2006, have been characterized by the return to the economic growth after almost five years of stagnation.

The good moment is confirmed by the data about the positive birthrate of the companies (calculated as the difference, between new and closed companies, divided by the total amount of companies) which is higher than the regional value.

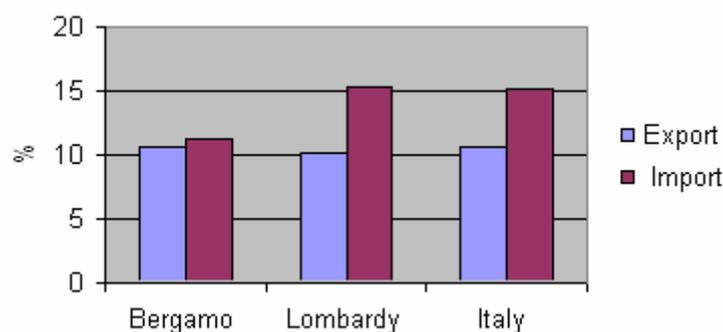
In the first semester of 2006, the birthrate has reached a positive value for the first time since 1990. This is a very important sign of industrial recovery because in the past, also during periods of economic growth, the birthrate was negative.

Looking at the period 1991-2001, in the province of Bergamo, it is possible to point out that just the sector of mining has lost both companies and employees. Differently from the regional and the national environment, manufacturing sector has increased its employees even if the productive base is diminished.

The growth has interested the whole country and has happened in coincidence with the cyclic inversion of the Euro zone: particularly, the results are tightly related to the positive performances in the German industry and this fact is even more important for the Italian companies since Germany is the main market for its exportations.

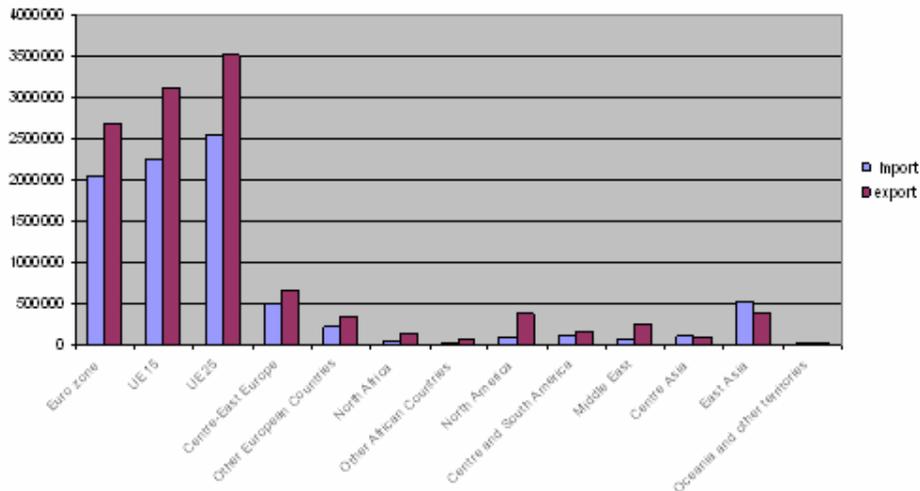
Manufacturing companies in Bergamo have gained advantage not just from their special vocation toward exportation but also from the internal demand of semi-processed products. Furthermore, the companies have benefited from the specialization of the local industry in the investment goods whose have had a more dynamic demand than the consumer goods. Eventually, the growth has benefited from the strength of entrepreneurial base of the province (growth rates of the province are higher than those of the country per each productive sector): this is a signal of the vitality of the production system and its competitive capacity.

The good performances of exportation in the province of Bergamo are testified by the data from the Chamber of Commerce of Bergamo:



**Figure 3.4 - Import and Export of Manufacturing and Public Utilities by territorial system**

Import and export activities are especially concentrated with the European countries with whose are exchanged about the 81 percent of all the imported goods and the 80 percent of all the exported goods.



**Figure 3.5 - Import and Export in the province of Bergamo at the first semester 2006**

The previous brief introduction on the economic situation of the province has pointed out the importance of the manufacturing industry and the major role played by small and medium companies. Moreover, there is the relevance of the entrepreneurial activities in several sectors belonging to the manufacturing industry: constructions, textile, manufacturing of products made up with rubber or plastic, metals production, fabrication of electric machines and devices, chemical products and synthetic fibers, metal products processing, mechanical machines and equipment, recycling.

Known the economic scenario in the province of Bergamo, it is possible to describe the sample of companies on which the dataset is based on. The database has been built with the objective of analyzing the criticalities of the research and development activities and it is focused on the manufacturing industry (more relevant than services and the primary ones in this respect) and includes another sector from services: informatics.

The final sample is a photograph of the manufacturing sector for what concerns with the small, medium and large companies in the province of Bergamo and the companies have been chosen randomly among those with the right dimensions (number of employees) and the economic sector of activity (classified by the ATECO code). The final sample investigated is made up with the following companies:

<b>ATECO Code and Economic Section Description</b>	<b>Small companies</b>	<b>Medium companies</b>	<b>Large companies</b>	<b>Total</b>
15 – Food and Drink Industries	4	2	1	7
17 – Textile Industries	10	2	4	16
18 – Tailoring and furs dyeing	12	3	0	15
19 – Leather tanning, products for traveling, bags, shoes	2	0	0	2
20 – Wood and wooden products, cork, straw, except furniture	6	2	0	8
21 – Fabrication of pulp, paper and paper products	2	2	0	4
22 – Publishing, printing and reproduction of recording	5	2	0	7
24 – Fabrication of chemical products and synthetic and artificial Fibers	5	3	1	9
25 – Fabrication of rubber and plastic materials	11	7	1	19
26 – Fabrication of products for processing not metallic minerals	5	4	0	9
27 – Metal and alloy production	5	2	0	7
28 – Fabrication and manufacturing of metallic products (except machines and plants)	34	12	1	47
29 – Fabrication of machines and mechanical products, installation and repairing	14	12	3	29
31 – Fabrication of machines and electric devices [N.C.A.]	6	6	2	14
32 – Fabrication of products for radio, television and Communication	4	2	0	6
33 – Fabrication of medical and precision equipment, optical instruments and watches	5	2	0	7
34 – Fabrication of motor vehicles, trailers and semi-trailers	1	2	1	4
35 – Fabrication of other transportations	1	0	0	1
36 – Fabrication of furniture; other manufacturing industries	6	3	0	9
72 – Informatics	4	1	0	5
<b>TOTAL</b>	<b>142</b>	<b>69</b>	<b>14</b>	<b>225</b>

**Table 3.1 – Composition of the final sample under investigation: Industry and Size**

These companies can be also described through their technology level. According to the classification of technology given by OECD in 2003, manufacturing sectors can be classified in four categories depending on their technology level: low, medium-low, medium-high and high.

<b>Technology level</b>	<b>Small companies</b>	<b>Medium companies</b>	<b>Large companies</b>	<b>Total</b>
Low	47	16	5	68
Medium-Low	55	25	2	82
Medium-High	32	25	7	64
High	8	3	0	11
<b>TOTAL</b>	<b>142</b>	<b>69</b>	<b>14</b>	<b>225</b>

**Table 3.2 – Composition of the final sample under investigation: Technology level and Size**

On average, small companies have 22.51 employees whereas medium companies count 85.72 employees and the large ones 807.21. Looking at the technology level, the average number of employees is highest for the companies with a medium-high technology level (180.56). They are followed by the low technology companies (64.44), medium-low (49.84) and high (35.18).

It is easy to imagine the relation between the age of the company and its dimension: on average the oldest are the large companies (54.21 years old) followed by medium (32.70) and small ones (28.40). On the technology side, the low technology companies are the oldest with 34.28 years old, followed by the medium-high ones (32.48), the medium-low (29.51) and high (19.82): this is a fact in accord with the observation from the literature.

Talking about the legal form of the companies in the sample, it is possible to point out the large share of the S.r.l. companies (Limited Companies) with the 46.67 percent. The second most present legal form is the S.p.A. (Limited Liability or Incorporated) with the 34.7 percent and it is followed by the sum of S.a.s. and S.n.c. companies (limited partnership and general partnership) with the 14.67 percent. Individual and artisan companies represent just the 4 percent of the companies in the sample.

		Type of legal form			
		Individual company or artisan	S.a.s. or S.n.c.	S.r.l.	S.p.A.
	(%)				
Size	Small	6.34	22.53	56.34	14.79
	Medium	0	1.45	34.78	63.77
	Large	0	0	7.14	92.86
Technology Level	Low	5.88	19.12	41.18	33.82
	Med-Low	4.88	17.07	52.44	25.61
	Med-High	0.00	7.81	45.31	46.88
	High	9.09	9.09	45.46	36.36
All companies		4.00	14.67	46.63	34.70

**Table 3.3 – Composition of the final sample under investigation: Size, Technology level and Legal form**

Small companies prefer the Limited form (56.34%) whereas, the medium and the large ones are mostly Incorporated companies (63.77% and 92.86% respectively). Also looking at the relation between the technology level and the legal form, the Limited and Incorporated forms result to be the most popular. Particularly, the Limited form is the most common among the low, medium-low and high technology levels (41.18%, 52.44% and 45.46% respectively) whereas the companies with medium-high technology level have almost the same distribution of Limited (45.31%) and Incorporated (46.88%) companies.

Another fundamental variable used in order to describe a company is its turnover. It is easy to foresee its relation with the size and, in fact, the larger is the company and on average the larger is the turnover as shown in the next table.

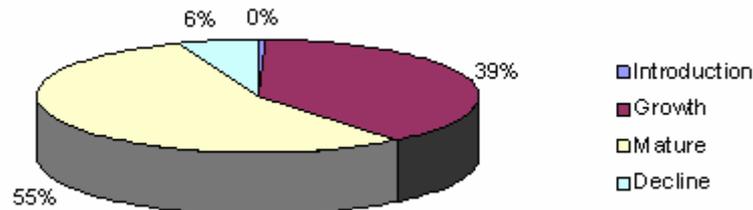
		<b>Turnover</b>			
(%)		Less than 2 millions	From 2 to 10 millions	From 10 to 50 millions	More than 50 millions
<b>Size</b>	<b>Small</b>	35.00	60.00	3.57	1.43
	<b>Medium</b>	2.90	57.97	36.23	2.90
	<b>Large</b>	0.00	0.00	42.86	57.14
<b>Technology Level</b>	<b>Low</b>	29.41	60.29	4.42	5.88
	<b>Med-Low</b>	28.75	52.50	16.25	2.50
	<b>Med-High</b>	6.78	61.02	32.20	0.00
	<b>High</b>	36.36	45.46	9.09	9.09
<b>All companies</b>		22.87	55.61	16.14	5.38

**Table 3.4 – Composition of the final sample under investigation: Size, Technology level and Turnover**

The majority of all the companies in the sample, whatever the technology level is, has a turnover comprised to 2 and 10 millions: this kind of results are, anyway, closely related to the distribution of the companies' size in the sample.

There are some other notable descriptive statistics that need to be pointed out. As noted above, the manufacturing firms in the province of Bergamo take advantage from their attitude toward exportation. Data from the sample show that the larger is company and the more it exports (large companies realize the 42% of their turnover selling outside Italy, medium one the 36.07% and the small ones just the 17.68%). The technology level of the exportation is at least medium-high in the 56.44 percent of cases. The level of exportation is related to the kind of production: the original equipment manufacturers (OEMs) show a bigger attitude toward exportation. On average, the larger is the company, the higher is the technology level and more frequently they are OEMs.

According to the observations given in the first part of the paragraph, the majority of the entrepreneurs and of the managers interviewed feel that their company is in a mature stage (independently from the size) whereas just in the medium-high technology level companies show a higher percentage of companies in a growth stage. Taking a look at the overall situation:



**Figure 3.6 – Composition of final sample under investigation: Stage of Companies' Life Cycle**

From the theory of the life cycle, it is known how the companies tend to invest during the different stages. From the sample, it is possible to point out how much the companies invest depending on their size and their technology level.

	Small	Medium	Large
<b>R&amp;D intensity by size (%)</b>	11.342	8.861	6.808
<b>Physical investment per employee and size (€)</b>	40661.02	37738.9	66485.53

**Table 3.5 - Investments related to innovation by companies' size**

Small companies declare to invest a higher percentage of their turnover in R&D than the others and this is an observation in accord with the part of the literature that talks about the need of substantial investment for developing the R&D activities.

Looking at the relation between the physical investments per employee with the size of the companies emerges that the large companies have a much higher value if compared to the small and medium ones.

More mixed are the statistics concerning with the technology level: on average, high technology companies invest more than the 12 percent of their turnover in R&D and are surprisingly followed by low technology ones (11.86 percent), medium-high technology (11.36 percent) and medium-low (8 percent).

Talking about investment and innovation, the relation is not so clear between the technology level and the average physical investment per employee:

	Low	Med-Low	Med-High	High
<b>R&amp;D intensity by size (%)</b>	11.858	8.005	11.336	12.182
<b>Physical investment per employee and size (€)</b>	42152.7	45971.18	36003.64	37071.47

**Table 3.6 - Investments related to innovation by companies' technology level**

In 2004, as found by ISTAT at a country level, large companies contributed almost for the 50 percent of the total investment in innovation even if they represent just the 1.9 percent of all the companies. The relation between the investment per employee and the size of the company follows the mixed results obtained in our analysis about the physical investment per employee: ISTAT found that large companies invest 10200 euros per employee, small companies 9500 euros and the medium one just 8100 euros.

Another sign of the investments in R&D is the presence of a proper R&D lab in a company. As expected, the vast majority of large companies have one (78.57 percent) and it is more present in the high technology companies (45.45 percent) than in the others. High technology companies have also the largest percentage of workers employed in R&D activities (17.10 percent) as well as the highest percentage of personnel graduated in the whole company (6.8 percent), whereas the highest percentage of personnel graduated dedicated to the R&D is in the medium-high technology companies (31.38 percent).

		% R&D personnel	% Personnel graduated	% R&D Personnel graduated
<b>Size</b>	<b>Small</b>	10.2	3.2	12.67
	<b>Medium</b>	8.3	5.8	26.28
	<b>Large</b>	6.0	4.9	37.50
<b>Technology Level</b>	<b>Low</b>	9.1	2.8	10.62
	<b>Med-Low</b>	8.6	1.8	13.65
	<b>Med-High</b>	9.2	6.3	31.37
	<b>High</b>	17.1	6.8	26.18

**Table 3.7 - Personnel description by size and technology level**

The previous graph underlines the high percentage of graduated personnel in the R&D in the large companies (37.50 percent).

Recently, a report by the Chamber of Commerce of Bergamo has highlighted that the hiring of experienced human resources is a criticality probably due to two different reasons. On one side, there is a negative demographic tendency that reduces the entity of the potential workforce (not always re-equilibrated in the short run by the

immigration) and the young workers tend to prefer the tertiary sector instead of the manufacturing one. On the other side, companies (especially if they are small) do not want to invest in training of the employees in the long run since a skilled worker will look for the higher salary offered by larger companies. Companies do not signal particular difficulties when need to hire graduated personnel with some technical background whereas the suppliers of OEMs signal some difficulties when need to hire R&D personnel.

Looking at our sample, it emerges a generalized need of certificated technicians (45 percent of the whole sample) both if companies are considered in terms of size and in terms of technology level. Actually, large and medium-high technology companies have a bigger need of graduated technicians than the other profiles.

		<b>General Worker</b>	<b>Certificated Technician</b>	<b>Certificated Economics</b>	<b>Graduated Technician</b>	<b>Graduated Manager</b>
<b>Size</b>	<b>Small</b>	4.65	51.16	8.53	21.71	13.95
	<b>Medium</b>	1.69	35.59	15.25	33.90	13.56
	<b>Large</b>	0	25	16.67	50	8.33
<b>Technology Level</b>	<b>Low</b>	5.08	52.54	13.56	22.03	6.78
	<b>Med-Low</b>	5.63	47.89	14.08	22.54	9.86
	<b>Med-High</b>	0	33.90	5.08	37.29	23.73
	<b>High</b>	0	45.45	9.09	27.27	18.18

**Table 3.8 - Most difficult personnel profile to find in the market by size and technology level**

The report published by the Chamber of Commerce of Bergamo already cited few lines above points out also another couple of criticalities: the high prices of raw material worldwide and the fears for the reflexes of a crisis in a sector (i.e. textile sector). By the way, it is somehow surprising that the entrepreneurs in Bergamo consider marginal or not critical several characteristics often studied in the literature. Just limiting our look at the innovation side, it emerges the non criticality of aspects as the protection of the intellectual property, the activity of R&D and the product innovation. Instead, entrepreneurs in Bergamo are more sensitive to the process innovation even if it does not represent a revealing criticality.

Taking a look at these aspects through the companies in our sample, it is possible to point out that to have some kind of protection is very important for the majority of the companies (almost the 53 percent): in particular, companies are more sensitive to the matter as they increase their size and as their technology level is at least medium-low (just in the 39.71 percent of the low technology companies, entrepreneurs think that protection is very important). In order to protect their innovations, companies in the province of Bergamo use different solutions. In term of size the preferences are quite well defined: small companies mainly choose to have no protection (66.18 percent) whereas patent and industrial secret are almost at the same level (about 15 percent). The bigger is a company and the more tend to patent: medium companies firstly choose no protection (47.83 percent) and secondly to patent (27.54 percent)

whereas large companies prefer to patent (35.71 percent) and to find agreements with partners (28.57 percent).

	(%)	Patent	Industrial agreement	Agreements with partners	No protection
Size	Small	14.79	15.49	2.11	66.20
	Medium	27.54	15.94	4.35	47.83
	Large	35.71	14.29	28.57	21.43
Technology Level	Low	14.71	19.12	4.41	60.29
	Med-Low	12.20	13.41	3.66	28.30
	Med-High	37.50	15.63	3.13	42.19
	High	9.09	9.09	18.18	54.54

**Table 3.9 – Preferred form of innovation protection by size and technology level**

Classifying the companies depending on their technology level, it is not possible to obtain results so clear but it is evident the general inclination for having no protection: just when the technology is medium-high, companies place a more similar amount of preference for having no protection (42.19 percent) or fixing agreements with partners (37.50 percent).

Innovation can also be seen as one of the most important strategic variables that one company may decide to use. About the 40 percent of all the companies in our sample have chosen the low cost of labor as competitive variable, whereas innovation is the second most popular competitive variable among the companies in the sample (31.56 percent). The 15.11 percent of the companies chooses to compete on the base of an efficient distribution and post-selling assistance whereas the 4.44 percent capitalizes on the advantageous exchange rate and the 1.78 percent competes lowering the expenses for personnel protection.

	(%)	Low labor cost	Efficient distribution and post selling service	Less expense for personnel protection	Advantageous exchange rate	Innovation	Other
Size	Small	44.37	18.31	1.41	3.52	24.65	7.75
	Medium	34.78	8.70	2.90	5.80	40.59	7.25
	Large	21.43	14.29	0	7.14	57.14	0
Technology Level	Low	47.06	17.65	0	4.41	22.06	8.82
	Med-Low	40.24	17.07	3.66	3.66	29.27	6.10
	Med-High	34.37	10.94	0	6.25	42.19	6.25
	High	27.27	9.09	9.09	0	45.45	9.09

**Table 3. 10 - Favorite competitive variable by size and technology level**

Considering the classification of the companies both in terms of size and technology level, it is possible to point out that there is an inverse relation between these characteristics and the choice of low cost of labor as competitive variable (44.37 percent of the small companies, 34.78 percent of medium companies and the 21.43

percent of large companies; from the 47.06 percent of low technology level and 27.27 percent of the high technology companies). On the other side, as the size and technology level increase, there is a higher recourse to the innovation as competitive variable (from the 24.65 percent of the small companies to the 57.14 percent of the large companies; from the 22.06 percent of the low technology companies to the 45.45 percent of the high technology ones).

A country level overview about innovation has been given recently by the national Institute of Statistics (ISTAT) which has pointed out the results of a survey on companies with at least 10 employees. Manufacturing companies are, on average, more innovative than the service ones even if the overall investment in R&D is decreased of the four percent from the year 2000 to the 2004 (the investment per employee has remained constant though). This survey confirms our data about the higher percentage of large companies to introduce innovations than small and medium companies. Just looking at the manufacturing industry, it is possible to emphasize the composition of innovations in the companies. Small companies have mainly just process innovations (more than the 50 percent) whereas medium (about the 45 percent) and large companies (more than the 59 percent) tend to have both process and product innovations at the same time.

In our sample, all kinds of innovations have been considered: product innovations, process innovations and non-technological innovations (i.e. organization, marketing). On a country level, the 56.30 percent of the manufacturing companies have introduced both technological and non-technological companies: the 49.50 percent has adopted new managerial techniques or new organizational forms or new ways to relate with its stakeholders and the 32.10 percent has implemented new marketing strategies. The report by ISTAT points out the preference for organizational innovations, instead of marketing ones, also among the companies that have not introduced any technological innovation in the previous three years. By the way, as showed by ISTAT and according to our data, large companies adopt more frequently both technological and non-technological innovations than the small companies.

Innovations are stimulated by information and companies can receive them from several sources. In the period 2002-2004, as well as from 2000-2002, ISTAT has verified the strategic importance of the internal resources (76.50 percent in the manufacturing industry) whereas, from the external side, other important roles are played by suppliers (68.10 percent) and clients (43.20 percent). The 41.20 percent of the Italian manufacturing companies highlights also the importance of meetings, workshops and fairs as well as consultants, research institutes and private laboratories. Just marginal the role of Universities and public Institutes of Research since just the 3.10 percent of the manufacturing companies believes it is of fundamental help when developing innovations. Looking at our sample, it is possible to find several similarities with the previous data. Entrepreneurs and managers, operating in the province of Bergamo, have indicated in the collaboration with few key clients the favorite way for promoting innovations into their companies (67.34 percent of the whole sample). This is true on average independently from the way the companies are classified: by size or by the technology level.

	(%)	Collaboration with few key clients	Monitoring competitors	Using innovations from other sectors	Collaboration with suppliers	Through external consultants	Collaboration with Universities and research centers	Hiring people with innovative ideas
Size	Small	67.46	3.97	7.14	18.25	0	0	3.17
	Medium	68.25	9.52	3.17	17.46	0	0	1.59
	Large	60.00	0	10.00	20.00	0	0	10.00
Technology Level	Low	73.77	3.28	8.20	13.11	0	0	1.64
	Med-Low	61.33	8.00	6.67	20.00	0	0	4.00
	Med-High	67.31	1.92	3.85	23.08	0	0	3.85
	High	72.72	18.18	0	9.09	0	0	0

**Table 3. 11 - Favorite way to promote innovation inside the company by size and technology level**

The second most common source of innovation is the collaboration with suppliers which is always around the 20 percent for all companies except for the high technology ones. Monitoring competitors, as well as using innovations from other fields and hiring people with innovative ideas are generally just marginal solutions. The impressive result, instead, is the absolute missing of Universities, Public Research Centers and external consultants as important sources of innovation.

In order to sustain the complexity of the innovative phenomena, companies need to cooperate for managing innovation processes but cooperation does not happen very frequently. ISTAT has pointed out that just the 11.30 percent of manufacturing companies in Italy had defined cooperation agreements in the period of their survey. Among them, they underlined that the 56.3 percent of this kind of agreements were with suppliers, 51.5 percent with consultant agencies, 39.4 percent with clients, 39 percent with the Universities and the 20.7 percent were alliances inside.

The analysis of our sample has pointed out what happens in the province of Bergamo. An important data is the high percentage of innovative and non-innovative companies that collaborate with clients (more than 72 percent) whereas is much lower the collaboration with the University (21.78 percent).

Looking at the companies in terms of size, it is possible to note how they tend to have more collaborations with Universities and clients as they get larger (large companies collaborate with clients in the 78.57 percent of the cases and with Universities in the 100 percent of cases). Not so well defined the relation between the technology level and these kinds of collaborations, even if, data show how medium-high and high technology companies are involved more frequently in collaborations with Universities and clients. Collaborations with clients are more frequent and companies, whatever their size and technology level is, have been involved in at least one during the last three years. Also in this case, the percentages about the involvement are higher when size gets larger and technology is medium-high or high: during the last three years, the 92.86 percent of the large companies and more than the 72 percent of the high or medium-high technology companies have been involved in, at least, one of these collaborations.

	(%)	Not necessary	Potential damage to the company	Helpful for market and production	Helpful in stabilizing sales and relationships with suppliers
<b>Size</b>	<b>Small</b>	28.87	63.38	4.23	3.52
	<b>Medium</b>	21.74	71.01	5.80	1.45
	<b>Large</b>	0	92.86	7.14	0
<b>Technology Level</b>	<b>Low</b>	30.88	61.76	2.94	4.41
	<b>Med-Low</b>	26.83	63.41	7.32	2.44
	<b>Med-High</b>	17.19	78.12	4.69	0
	<b>High</b>	18.18	72.72	0	9.09

**Table 3. 12 – Entrepreneurs’ opinion about the usefulness of collaborations with clients**

Not so well seen by the companies, especially the smaller ones, it is the possible collaboration with the universities. Large companies see just opportunities from this kind of interactions but they point out the need for incentives in order to develop them.

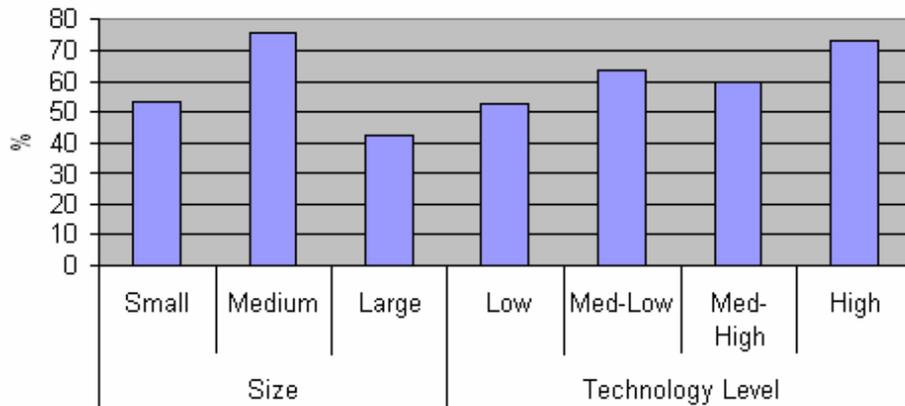
	(%)	Companies and Universities belong to two different worlds	Collaborations are possible but incentives are needed	Collaborations could help to patent
<b>Size</b>	<b>Small</b>	64.08	26.06	9.86
	<b>Medium</b>	49.28	33.33	17.39
	<b>Large</b>	0	50.00	50.00
<b>Technology Level</b>	<b>Low</b>	58.82	27.94	13.24
	<b>Med-Low</b>	62.19	32.93	4.88
	<b>Med-High</b>	45.31	29.69	25.00
	<b>High</b>	45.46	18.18	36.36

**Table 3. 13 - Entrepreneur's opinion about collaborations with Universities**

Again, the majority of low (58.82 percent) and medium-low (62.20 percent) technology companies do not believe in the possibility of a successful collaboration whereas more than the 54 percent of high and medium-high technology ones are more positive.

According to ISTAT, the majority of Italian manufacturing companies have a slower innovation activity because of the economic and financial matters. ISTAT underlined, as major constraints of these problems in the period 2002-2004, the too high innovation costs and the missing of intern financial resources or other financial

sources. Data from our survey, about the access to external sources of financing, give some mixed evidence.



**Figure 3. 7 - Companies' access to external financing in the last three years**

Anyway, often, also when financing have been received they were told to be not enough for developing an innovation. The highest percentages of companies which have received some kind of financing have been the high technology ones.

Another source of disadvantage for some entrepreneurs is also the geographical location. A wide majority (81.18 percent) considers, anyway, the geographical belongingness to the province of Bergamo an advantage. This is a data signaling the path dependency of these companies. Whereas path dependency, according to our data, decreases when the companies get larger, no clear relations emerge when companies are classified by technology level.

Being in Bergamo is generally considered an advantage for a couple of reasons: innovations are facilitated by the local industrial culture for the 74.07 percent of the companies and there is the existence of companies that let to share information (20.83 percent). Among who declares that being in Bergamo is a disadvantage, the 43.24 percent identify the reason with the small dimensions of the local operative system, the 32.43 percent says that the sectors are already mature and the 24.33 percent believes that the local system is not able to attract the needed financial resources.

### 3.3.2 The Econometric Model

The objective of this research consists in identifying the strategy adopted by the manufacturing companies that constitutes the database. In order to come to a final result free from subjective decisions, the analysis has been taken out through a couple of different operations.

The first one is a cluster analysis which will let to identify groups of companies with similar strategic patterns: companies with similar characteristics will be identified endogenously. It will be created a new variable that will be studied through a multinomial logit regression.

The combinations of the two methods will let to understand the strategic behavior of the companies under investigation.

#### 3.3.2.1 Cluster Analysis

The choice of the method to be utilized in order to accomplish to the research has been a direct consequence of the type of analysis needed and kind of data available.

Cluster analysis is the art of finding groups in data (Leonard Kaufman and Peter J. Rousseeuw, 1990) and it is a method also known as numerical taxonomy, automatic data classification, Q analysis, unsupervised pattern recognition, segmentation, botryology (Good, 1977), or also typological analysis (Chandon and Pinson, 1981) depending on the field on application.

One of the ancient and well known examples of classification refers to the biological investigation accomplished by Aristotle. He classified the animals in two big groups depending on the presence of red blood in them and he further subdivided the two groups depending on the way they generated young animals. On the example given by Aristotle, several other scientists started classifying the elements belonging to the fields of biology and zoology. However, classification has been important also in other fields of science as testified by the periodic table produced by Mendeleev in 1860 (it helped in understanding the structure of the atom) or also by the classification of stars in astronomy (dwarf stars distinguished by giant stars through the Hertzsprung-Russell plot of temperature against luminosity).

Everitt, Landau, and Leese (2001) defined the activity of grouping data as one of the most basic abilities of living creatures and Leonard Kaufman and Peter J. Rousseeuw (1990) consider it an important human activity that is part of the everyday life and of the learning process.

Biologists and social scientists began to look for systematic ways to group data since the 1960s. This is important because the results of these researches let to avoid the subjectivity of the clustering performed in the past by the researcher and just relying on his perception and judgment. Nowadays, it is possible to rely on a wide variety of algorithms and computer programs and Kaufman and Rousseeuw (1990) have identified two main reasons for justifying it. One reason is related to the automatic classification procedures whose are needed for classifying cases in more than three dimensions. The second reason is that there exists no general definition of a

cluster (i.e. spherical, drawn-out, linear, etc.) and different applications make use of different data types (continuous or discrete variables, similarities and dissimilarities).

Several definitions of the word 'cluster' are used and many authors agree in defining it in term of internal cohesion (homogeneity) and external isolation (separation).

Variables used in a study can be of various types but the way they are stored is one of the two input structures described by Kaufman and Rousseeuw (1990). Supposing to have  $n$  objects to be clustered (i.e. persons, animals, plants, etc.), the first input structure gives a representation of the objects by means of  $p$  measurements or attributes (i.e. height, weight, sex, etc.). The resulting objects-by-variables matrix is an  $n$ -by- $p$  matrix where the  $n$  rows correspond to the objects and the  $p$  columns correspond to the variables:

$$\begin{bmatrix} x_{11} \dots x_{1j} \dots x_{1p} \\ \dots \dots \dots \\ x_{i1} \dots x_{ij} \dots x_{ip} \\ \dots \dots \dots \\ x_{n1} \dots x_{nj} \dots x_{np} \end{bmatrix}$$

The second input structure has been described as a collection of proximities that must be available for all pairs of objects (Kaufman and Rousseeuw, 1990) and will constitute a so-called one way matrix ( $n$ -by- $n$  table) because rows and columns contain the same set of objects.

It is possible to point out at least five types of variables that are most commonly used. When measurements are continuous variables (i.e. age, height, cost, temperature, etc.), they are called inter-scaled variables and assumes positive and negative real values. In this respect, it is important to pay attention to the measurement units adopted because they could lead to very different clustering structures. In order to avoid the dependence on the choice of measurement unit, it is possible to decide to standardize the data. Standardization is a way for trying to obtain objectivity giving to all variables the same weight. This is done by calculating the mean value for each variable ( $m_j$ ), the mean absolute deviation ( $s_j$ : it is not too sensitive to outliers) and, therefore, calculating the operation of standardization ( $z_{ij}$ ):

$$z_{ij} = \frac{x_{ij} - m_j}{s_j}$$

However, standardization is not beneficial in all situations. It can be an useful option but, in some cases, standardization dampens a clustering structure by reducing the large effects because the variables with a big contribution are divided by a large value of the mean absolute deviation ( $s_j$ ).

The subsequent step is about computing distances between the objects in order to quantify their degree of (dis-)similarity. Well known measures are the Euclidean distance and the Manhattan Distance that can be both generalized in the Minkowski distance.

It will not be discussed further the calculation and the clustering related to this kind of variables. Moreover, also other three kinds of popular variables as Nominal (variables assume a number of states:  $1 \dots M$ ), Ordinal (like a Nominal variable but the  $M$  states are ordered in a meaningful way) and Ratio (always positive measurements that can be treated in three possible ways: to treat them as if they were on a interval scale; to begin with a logarithmic transformation and treat them as interval-scaled; to treat them as continuous ordinal data and switch to their ranks).

The variables constituting the database of our study belong to another type: they are binary. According to Gower (1970) and Bock (1974), binary variable can be further distinguished in two kinds depending on the particular application: symmetric (when there is no preference about which outcome should be coded as 0 and which as 1) and asymmetric (outcomes are not equally important: i.e. presence of the rare bloody type AB). Binary variables have only two possible states (i.e. male/female, yes/no, etc.) and should be treated with special cluster algorithms. Nevertheless, sometimes people treat them as if they were interval-scaled variables (applying Euclidean or Manhattan distance formulas) and obtain decent results.

The methods specifically studied for binary variables are two. One is called Monothetic analysis technique: the algorithm operates directly on the matrix, by dissecting the data according to a well-chosen variable. The other solution consists in computing a (dis-)similarity matrix from the binary variables and operates on that with one clustering algorithm.

In order to accomplish to the analysis needed for analyzing the companies in the database, it is major to note that the variables considered for the clustering analysis are all binary and all have the same weight.

Keeping on following the approach by Kaufman and Rousseeuw (1990) the next steps to do consists in calculating  $s(i,j)$  or a dissimilarity  $d(i,j)$  between the two objects  $i$  and  $j$ . In order to do it, it will be drawn a 2-by-2 contingency table (or association table) containing the values:  $a$  (number of variables that equal 1 for both objects),  $b$  (number of variables  $k$  for which  $x_{ik}=1$  and  $x_{jk}=0$ ), and so on. The sum of the coefficients in the matrix will equal the total number of variables if there are not missing values ( $a+b+c+d=p$ ). In case of missing values,  $p$  will be diminished by that number.

		Object j		
		1	0	
Object i	1	a	b	a+b
	0	c	d	c+d
		$a+c$	$b+d$	$p$

**Figure 3. 8 - Example of contingency table**

In case of variables more important than others, weighted sums could be used.

The last step before the cluster identification consists in the calculation of a coefficient (using the value as a, b, c and d) that will describe to what extent the objects i and j agree with regard to the collection of binary variables.

This coefficient will be calculated depending on the symmetry type of binary variables.

Symmetric variables are the most common, 'a' and 'd' play the same role and the coefficients will just depend on the number of agreements (a+d) and the number of disagreements (b+c) when comparing the objects 'i' and 'j'. In this case, it is natural to work with invariant similarities because the result must not change when variables are coded differently.

Three main ways to calculate these coefficients are available: simple matching coefficient (Zubin, 1938; Dumas, 1955; Sokal and Michener, 1958; Sneath, 1962; Hill et al., 1965), Rogers and Tanimoto formulas (1960), Sokal and Sneath formulas (1963). Even if all the three approaches often come to the same results (there is a simple monotone relation between them), the simple matching coefficient (also called M-coefficient or affinity index) is the most used because it is simple and intuitive. Simple matching coefficient formulas are:

$$s(i, j) = \frac{a + d}{a + b + c + d} \quad d(i, j) = \frac{b + c}{a + b + c + d}$$

Instead, asymmetric binary variables need to be treated with other proximity coefficients. The case of our analysis and, by convention, the most important outcome should be coded by 1 (i.e. in our analysis, when companies pursue an innovation driven strategy are coded by 1). The agreement of two 1s (positive match) and it will be considered more significant than the agreement of two 0s (negative match). Therefore, considering the coefficients of the contingency table (a, b, c, and d), the coefficient a will be more important than the coefficient d. Several methods have been developed for calculating the coefficients and debate about whether the coefficient should be counted at all has arisen.

The most used coefficients are expressed by the Jaccardian formulas. It is the most famous non-invariant coefficient as well as the oldest one since was developed by Jaccard in 1908:

$$s(i, j) = \frac{a}{a + b + c} \quad d(i, j) = \frac{b}{a + b + c}$$

The coefficient (also called S-coefficient) looks like the simple matching coefficient seen before except for leaving out d entirely.

Eventually, according to Everitt, Landau and Leese (2001), binary data can be analyzed through four major clustering methods. Hierarchical or partitioning methods

using appropriate proximity measures, monothetic divisive method, latent classes of grade of membership (GOM), and hierarchical classes. Each method is favored respect to the others in some particular cases. The first one has some special proximity measures available for categorical data and requires that negative match issues are considered. The second has showed to be useful for developing diagnostic keys whereas the third is often used in health applications (these are the fuzzy methods). Hierarchical classes' method is especially useful for psychological data, and it is characterized by overlapping clusters as well as both objects and variables clustered.

From this short review, it is possible to understand how the use of cluster analysis is not just the application of a technique but rather a series of steps. From one step depends the following one and, therefore, it is not possible to anticipate a priori the final choices about the combination of variables, similarity measures and clustering techniques.

In our case, the objects to cluster have been chosen from dataset built on a survey about manufacturing companies (as requested in cases of generalization to a larger population, observations are randomly sampled). Variables to be used have been chosen including just those very relevant to the analysis and leaving out those irrelevant or masking. Given the nature of the variables, standardization was not needed and taking a look at previous studies that had to cope with that kind of data it has been decided to refer to Jaccardian similarity measure and using a non-hierarchical clustering method. The last part of the work has been about identifying the number of clusters. Everitt, Landau and Leese (2001) describe it as "one of the most difficult decisions to make" and suggest that, "where different stopping rules suggest different numbers, the highest should be taken for safety".

The stopping rule followed in our analysis (Calinski and Harabasz, 1974) is also one of the two top performers indicated by Milligan and Cooper's study. It is a measure dependent on the traces of the matrixes determined by the groups and the suggestion is to take the number of groups corresponding to the maximum value of the Calinski and Harabasz coefficient.

The construction of clusters has been guided by the findings from the literature review on strategic management. It has been noted that it is possible to characterize the strategic behavior of a band by three main dimensions. Applying these considerations to the data in our database, it has been possible to point out the following three classes of variables.

The first one refers to the most relevant factor (as judged by the entrepreneur or the manager) in the strategy pursued by the company. Possible answers were about a Low production cost (Lwcost), very efficient Distribution (Disteff), Innovation (Inn), Product efficiency (Prodeff), superior Quality of the products (Quality), exploitation of a favorable Exchange rate (Favexcr) and less expenses for the personnel (Lesspp).

The second dimension is about the market position and in this respect the variable utilized refer to the frequent introduction of new products (freqnewprod), the low cost of products (lowcostprod), the high quality of the products (hqproducts), to be a leader in introducing innovative products (leadinnprod), other factors (other).

The last dimension is about the objective of the R&D activity. Entrepreneurs (or managers) had to choose among variables as the willingness to gain an advantage on the competitors (Advcomp), to imitate competitors (Imitcomp), just staying on the market (staymarket), to produce products with better quality than the competitors (Betterq), to reduce costs (Redcost), to improve the customer satisfaction level (Custsat).

As it emerges from the theory on cluster analysis, with binary data it is suggested the use of kmeans (or kmedians) methods and of the Jaccard (dis)similarity measure:  $a/(a+b+c)$ . The result of this analysis is summarized in the following table:

Number of Clusters	Calinski/Harabasz pseudo-F
2	29.47
3	40.19
4	33.23
5	31.22

**Table 3. 14 - Results of the cluster analysis by Jaccard (dis)similarity measure**

It emerges that the number of clusters identifiable in the dataset is 3. In fact, according to the theory, for this number the Calinski/Harabasz coefficient is highest.

Scholars suggest to do not rely just on a single dissimilarity measure. Using the Russell (dis)similarity measure [  $a/(a+b+c+d)$  ] the results are the same obtained by the Jaccard dissimilarity measure:

Number of Clusters	Calinski/Harabasz pseudo-F
2	29.29
3	40.19
4	33.23
5	25.61

**Table 3. 15 - Results of the cluster analysis by Russell (dis)similarity measure**

Also in this case, the coefficient assumes the maximum value when the number of clusters is equal to three.

The result of the cluster analysis is a vector which associates a number to each observation a value (1, 2 or 3) depending on the cluster the company has been classified in.

### 3.3.2.2 Multinomial Logit Regression

Once the clusters are identified and therefore a new variable will have been created, the analysis will continue through with a multinomial logit. I am not going to give too many details about the theoretical background about logistic regressions because they will be given later (in the third part of my work).

However, just to clear in mind what a multinomial logit regression is, it is better to start giving some first definitions about the different kind of existing logistic regressions.

Logistic regressions are characterized by dependent variables that assume just discrete values whereas continuous variables can just be used as dependent variables. The name of these regressions is directly related to the type of dependent variable is utilized. When the dependent variable assumes just the values 1 and 0 and the independents are of any type, the regression is called *Binomial (or binary) logistic regression*. A generalization of the previous case happens when the dependents have more nominal classes than two: the new regression will be called *Multinomial logistic regression*. Eventually, there is the *ordinal logistic regression* which is preferred to multinomial logistic regression when multiple classes of the dependent variable can be ranked.

Multinomial logit can be expressed as:

$$\Pr(y_i = j) = \frac{\exp(X_i \beta_j)}{1 + \sum_j \exp(X_i \beta_j)}$$

and

$$\Pr(y_i = 0) = \frac{1}{1 + \sum_j \exp(X_i \beta_j)}$$

where for the  $i$ -th individual,  $y_i$  is the observed outcome and  $X_i$  is a vector of explanatory variables.

Who already knows OLS regressions may find many similarities with logistic regressions. Just looking at the model, it is possible to note the similarity of the two expressions: logit coefficients correspond to  $b$  coefficients in the logistic regression equation and the standardized logit coefficients correspond to beta weights. Moreover, also a pseudo  $R^2$  statistic is available to summarize the strength of the relationship. It is major in this respect, to note that the analogy is not widely accepted

because of the nature of the dependent variables and that  $R^2$ -like measures cannot be considered goodness-of-fit tests.

By the way, logistic regression has several differences when compared to OLS regression because the former “does not assume linearity of relationship between the independent variables and the dependent, does not require normally distributed variables, does not assume homoskedasticity, and in general has less stringent requirements” (Garson, website).

Another difference with OLS regressions is given by the way coefficients are calculated: OLS stands for ordinary least squares, and that is the way of estimation, whereas a logistic regression uses coefficients  $\beta_j$  calculated with a method called Maximum Likelihood Estimation (MLE). OLS consists in minimizing the sum of squared distances of the data points to the regression line. The MLE is based on an iterative algorithm that verifies how likely it is (the odds) that the observed values of the dependent variable may be predicted from the observed values of the independents: this is done through the maximization of the log likelihood.

Eventually, OLS guarantees more power than logistic regression with a multinomial dependent when all the assumptions are met: it is a big advantage of OLS regression in these particular conditions because it lets to reduce Type II errors (thinking there is no relationship when there actually is).

A rule of thumb given by researchers when using a logistic regression is to choose no more than one independent variable for each ten cases in the sample and the rule is even stricter when these variables are categorical independents (i.e. a sample with 100 observations, for a dichotomy variable with 30 1's, will admit 3 independents in accord with the rule of thumb 1:10).

Before looking at the significant results given by the study, in the next lines it will be given a presentation of all the variables taken into account. They have been chosen upon the review of the relevant literature regarding the strategic management of a firm as well as the role of innovation.

The objective independent variable, obtained through the cluster analysis, is a vector which associates a number to each observation a value (1, 2 or 3) depending on the cluster of belongingness. This classification has allocated 67 companies in cluster 1, 83 companies in cluster 2 and 75 in cluster 3. It has to be noted that the variables are not mutually exclusive when considered inside each of the three dimensions identified before.

The choice of the independent variables has been done considering just objective variables that can help in accomplishing to the taxonomy of strategy adoption. According to the data available in our initial database and those available through other sources (Chamber of Commerce, AIDA and further interviews), it has been possible to choose from the literature and from some other personal independent considerations the following independent variables:

- **Age:** it is a widely studied variable in literature and previous works have emphasized its ambiguous role as determinant of innovation. It is measured as the difference between 2006 and the year of foundation of the company (AGE);

- **Size:** as the previous one, this variable has been investigated in several studies but results do not show a clear impact on innovation. Anyway, it is often assumed to have a positive relationship since the presumed existence of economy of scale on R&D expenditures. This variable is measured by the number of employees (SIZE);
- **R&D Laboratory:** this could be considered as another indicator of size (usually, just large companies have it) as well as of innovative behavior. This is a dummy variable set at 1 if the company has it (RD\_LAB);
- **R&D employees:** it refers to the number of employees dedicated to the R&D activity. A positive relationship is expected since the higher is this number, the higher should be the innovative level of the company: it is measured as the percentage of the people employed in the R&D activity divided by the total number of employees (RD\_TOT);
- **Percentage of graduated employees:** this is another variable expected to be positive related to the innovative behavior (GRAD\_TOT);
- **Percentage of graduated employees in the R&D activity:** it is a variable characterized as the previous one. The higher is the education level, the higher is the innovative behavior expected (GRAD\_RD);
- **Collaboration:** this is a dummy variable referred to the suggestions coming from the theory about systems of innovation and it is set at 1 when a firm has collaborated with at least one between clients and Universities. Collaborations are considered an important factor that helps in being innovative (COLL);
- **Patenting activity:** this is a variable indicating the presence of patenting activity in the company. Patenting is a possible way for protecting the results of the innovative activity. This dummy is set at '1' when the firm patents (PATENT);
- **Use of financing measures:** if the company has been able to have access to some kind of financial support (i.e. banks or some other kind of public funds), this dummy variable is set at 1 (FINANCING);
- **Type of production:** this is a dummy variable indicating if the company is a "specialized supplier" for another company (as named by Pavitt, 1979) or produce per itself (Original Equipment Manufacturer). Therefore, the dummy is set at 1 when the company produces for itself (PRODUCTION);
- **Corporate structure:** it is a dummy variable indicating if the company is part of a group. The variable is set at 1 if the company is part of a group (CORP);

- **Location:** this variable indicates the belongingness of a company to a local productive cluster called “Distretto”. This is a dummy variable defined on the basis of the data given by the Regional Chamber of Commerce which has identified the existence of three clusters in the province of Bergamo: one regarding the textile sector for Valle Seriana, another one about Clothing and Furniture in Valle Cavallina and the last one about rubber and plastic products in the extremely east side of the province (Sebino). Districts have been defined according to what was deliberated by the Regional Council on the 16<sup>th</sup> of March 2001. This is a definition based on an analysis of all the territory of the region, on the twenty-two divisions of the manufacturing industry as described by the ATECO definitions of the different activities (from 15 to 37) and on the evaluation of the:

- o *Industrialization rate:* measured as the total number of people employed in the manufacturing industries divided by the number of inhabitants;
- o *Specialization rate:* measured as the total number of people employed in a sector of the manufacturing industry divided by the number of inhabitants.

Districts have been defined aggregating the adjacent towns with an industrialization rate higher than 18.5% (this is the mean value of this measure on regional basis augmented of its 30%) and, at the same time, a specialization rate higher than the 20% of the regional mean value. It has to be pointed out the existence of areas with a lower industrialization rate respect to the regional mean value. These are the provinces of Pavia, Lodi, Cremona and Sondrio: for them, it has been taken into account the mean regional value of 14.2% without the addition of its 30% (CLUSTER);

- **Linkage to the local territory:** a variable indicating if the company considers being an advantage the belongingness to the system of the province of Bergamo. It is a clear signal of what, in literature, it has been defined Path Dependence (a lock-in phenomenon. Therefore, this is another dummy variable set at 1 when the company considers an advantage this belongingness (PATH\_DEP);

- **Export:** this is a characteristic taken into account in the analysis of determinants of innovation mainly in the last years. According to literature findings, it is expected to be positively related to innovative behavior. It is measured by the percentage value of sales realized outside Italy (EXP);

- **Investment in R&D:** this is the so called R&D intensity which measures the efforts of a company in the innovative activity. It is measured as the percentage of sales invested in R&D (RD\_INT);

- **Variation in the R&D investment:** a dummy which simply indicate if, in the last three years, there has been a variation in terms of R&D expenditure. 1 indicates a raise in such value (VAR\_INV+);
- **Level of technology:** again depending on the ATECO sector but also from the OECD (2003) classification, the different activities have been divided in two groups: low and medium-low, and medium-high and high technology. Therefore, the level of technology is described through a dummy variable set at 1 when the technology level is at least medium-high and at 0 otherwise. The higher is the technology level, the higher should be the innovative behavior (MED\_H\_T);
- **Physical capital per employee:** this is another variable already studied in the literature and it is measured as the total physical capital divided by the total number of employees. It is expected that the higher the investments, the higher the level of innovation in the company (INV\_PER\_EMP).

### 3.4 Results

The previous composite analysis lets to accomplish to the description of companies strategic behaviors on the basis of the three dimensions identified in the review of the literature and, eventually, to related them to their involvement with innovation.

Taking a look at the single variables and the distribution of companies among the different clusters, it is possible to point out some major patterns of strategic behavior. The results can be summarized as in the Table 3.16.

Companies in cluster 1 indicate as the three most relevant factors for coping with competitors the capacity of being innovative as well as the low cost of labor and an efficient distribution. In the same cluster, companies tend to favor a market position based on the frequent introduction of new products and having as major objectives of their R&D activity to obtain an advantage on the competitors, improve the quality of their products and, for some of them, just survive on the market.

The companies in the second cluster are the most involved in innovative activities and are involved also in reaching an efficient distribution. These factors are chosen with the objectives of producing high quality products and being leaders in introducing products radically new. The importance of obtaining better quality products is confirmed by the stated objectives of their R&D activity whose are also related to the achievement of a competitive advantage as well as the customer satisfaction.

The third cluster contains companies that compete on the markets giving importance almost just to the low cost of labor. This is in accord with the market positioning since a lot of these companies strive to sell low cost products whereas another large part of them affirms to look for selling high quality products. The objectives of R&D activity are not focused on few choices but it is possible to point

out bigger orientation for just staying on the market than the companies in the other two clusters.

The vector determined with the cluster analysis has been used in the second step of the analysis as dependent variable of the multinomial logit. The following regressions will help in improving the knowledge of the companies belonging to the different clusters. The analysis consists in the comparison of the companies through the regressions.

		Cluster 1	Cluster 2	Cluster 3
<b>Most relevant factor</b>	<b>Lwcost</b>	20	0	70
	<b>Disteff</b>	10	20	5
	<b>Lesspp</b>	1	3	0
	<b>Favexcr</b>	2	8	0
	<b>Inn</b>	28	43	0
	<b>Prodeff</b>	2	1	0
	<b>Quality</b>	3	8	1
<b>Market position</b>	<b>freqnewprod</b>	67	0	0
	<b>lowcostprod</b>	0	3	33
	<b>hqproducts</b>	0	63	35
	<b>leadinnprod</b>	0	13	4
	<b>Other</b>	0	1	3
<b>R&amp;D activity objective</b>	<b>Advcomp</b>	26	25	15
	<b>Imitcomp</b>	1	0	1
	<b>staymarket</b>	14	8	18
	<b>Betterq</b>	15	22	19
	<b>Redcost</b>	4	9	12
	<b>Custsat</b>	7	17	11

**Table 3. 16 - Belongingness to cluster by the strategic dimensions**

The first regression has taken into account cluster 1 and cluster 2 (Table 17) and it emerges that the number of people employed in research and development activities on the total (rd\_tot) is a variable which assumes higher values in cluster 2 with respect to cluster 1 whereas the path dependency (Path\_dep) results to be more present in cluster 1 than in cluster 2.

## Issues on Entrepreneurship

	Cluster 2 vs. cluster 1	Std. Error
<b>Constant</b>	0.408744 (0.482) 0.631	5.894444444
<b>Size</b>	0.00129651 (0.906) 0.366	0.00143
<b>Age</b>	-0.000388155 (-0.0459) 0.963	0.00846
<b>Exp</b>	0.000285330 (0.0409) 0.967	0.00698
<b>Corp</b>	-0.270487 (-0.515) 0.608	3.650694444
<b>Production</b>	0.119691 (0.253) 0.800	3.28125
<b>Med_h_t</b>	-0.603373 (-1.34) 0.183	3.134027778
<b>Grad_tot</b>	0.0129897 (0.618) 0.537	0.02101
<b>Grad_rd</b>	0.00361478 (0.566) 0.572	0.006385
<b>rd_int</b>	-0.0128680 (-0.864) 0.389	0.01489
<b>var_inv+</b>	-0.199114 (-0.501) 0.617	2.757638889
<b>rd_lab</b>	0.196217 (0.433) 0.666	3.147916667
<b>rd_tot</b>	0.0369598 (2.03)** 0.045	0.01825
<b>inv_emp</b>	-3.27E-01 (- 1.05) 0.296	3.12E-03
<b>Coll</b>	0.772746 (1.50) 0.136	3.579861111
<b>Financing</b>	0.278740 (0.684) 0.495	2.829861111
<b>Cluster</b>	-0.356891 (-0.473) 0.637	5.236805556
<b>Path_dep</b>	-125.255 (-2.19)** 0.030	3.976388889
<b>Patent</b>	-0.191197 (-0.414) 0.679	3.203472222

Table 3. 17 - Multinomial regression with clusters 1 and 2

	Cluster 3 vs. cluster 1	Std. Error
<b>Constant</b>	297.630 (3.27) 0.001	6.320833333
<b>Size</b>	0.00105335 0.537 0.592	0.001962
<b>Age</b>	-0.0326654 (-2.46)** 0.015	0.01328
<b>Exp</b>	0.00711019 (0.962) 0.337	0.007390
<b>Corp</b>	-0.961589 -1.43 0.155	4.66875
<b>Production</b>	-0.0783079 (-0.170) 0.865	3.203472222
<b>Med_h_t</b>	-0.580337 (-1.18) 0.239	3.413194444
<b>Grad_tot</b>	0.00535313 (0.200) 0.842	0.02678
<b>Grad_rd</b>	0.00401467 (0.557) 0.579	0.007213
<b>rd_int</b>	-0.0356452 (-2.06)** 0.041	0.01730
<b>var_inv+</b>	-0.988573 (-2.36)** 0.020	2.911805556
<b>rd_lab</b>	-105.780 (-1.84) 0.067	3.982638889
<b>rd_tot</b>	-0.002368 (-0.109) 0.914	0.02178
<b>inv_emp</b>	-2.83E-01 (-0.623) 0.534	4.54E-03
<b>Coll</b>	-0.153368 (-0.316) 0.752	3.368055556
<b>Financing</b>	0.500674 (1.17) 0.244	2.971527778
<b>cluster</b>	-0.499733 (-0.638) 0.524	5.4375
<b>Path_dep</b>	-0.711103 (-1.11) 0.268	4.442361111
<b>patent</b>	-147.177 (-2.37)** 0.019	4.311111111

Table 3. 18 - Multinomial regression with clusters 1 and 3

Note: variable relevance at \* 10% \*\* 5% \*\*\* 1%

In Table 18, the regression considers also cluster 3 which it has been compared to cluster 1. Several variables in cluster 3 show inferior values than those obtained in cluster 1. Specifically, age of the firm (age), the intensity of the research and

development activity (rd\_int), the increase of investments in research and development (var\_inv+) and patenting activity (patent).

The third possible regression is superfluous but it will be showed just in order to confirm the previous results:

	Cluster 3 vs. cluster 2	Std. Error
<b>Constant</b>	256.756 (3.03) 0.003	5.89375
<b>Size</b>	-0.00024316 (-0.135) 0.893	0.001799
<b>Age</b>	-0.0322773 (-2.45)** 0.015	0.01317
<b>Exp</b>	0.00682486 (0.954) 0.341	0.007152
<b>Corp</b>	-0.691102 (-1.03) 0.304	4.654166667
<b>Production</b>	-0.197999 (-0.427) 0.670	3.220833333
<b>Med_h_t</b>	0.0230356 (0.0471) 0.963	3.3972222
<b>Grad_tot</b>	-0.00763658 (-0.314) 0.754	0.02435
<b>Grad_rd</b>	0.000399894 (0.0570) 0.955	0.007015
<b>rd_int</b>	-0.0227772 (-1.23) 0.220	0.01849
<b>var_inv+</b>	-0.789459 (-1.91)* 0.057	2.865277778
<b>rd_lab</b>	-125.402 (-2.27)** 0.024	3.833333333
<b>rd_tot</b>	-0.039328 (-2.21)** 0.029	0.01782
<b>inv_emp</b>	4.43E-02 (0.0969) 0.923	4.58E-03
<b>Coll</b>	-0.926114 (-1.74)* 0.084	3.704166667
<b>Financing</b>	0.221934 (0.518) 0.605	2.973611111
<b>cluster</b>	0.541452 (0.988) 0.325	3.806944444
<b>Path_dep</b>	-0.142842 (-0.179) 0.859	5.55625
<b>patent</b>	-128.057 (-2.10)** 0.038	4.241666667

**Table 3. 19 - Multinomial regression with clusters 2 and 3**

Note: variable relevance at \* 10% \*\* 5% \*\*\* 1%

As expected, the relevant variables are those already highlighted before. In particular, it is confirmed the role of age of the firm (age), the increase of investments in research and development (var\_inv+) and patenting activity (patent). It is no more significant the intensity of the research and development activity whereas importance is gained by collaboration (coll), the percentage of employees dedicated to the research and development activity (rd\_tot). All the previous significant variables have a negative sign and, therefore, those value related to variables in cluster 3 are inferior to those of variables in cluster 2.

### 3.5 Conclusions

The analysis of the data and the results of our model give back a clear picture of the manufacturing industry in Bergamo. The results are close to those pointed out by the recent reports by ISTAT and the Chamber of Commerce of Bergamo.

Innovation is considered the most important competitive variable just for a minority of companies. As pointed out by our statistics, there is an inverse relation between dimensions and technology level and the recognition of innovation as strategic variable. This is an observation that confirms the results from a report on the SMEs by Unioncamere-Lombardia about the need of innovation, internationalization and repositioning on the global market. This fact would imply a change in the way activities are developed day by day.

In manufacturing companies, especially the smaller ones, there is no need for graduated employees and it is not recognized the source of idea that may come from the Universities: given the percentage of small companies in the economic system and their belongingness, in major part, to sectors with low or medium-low technology levels, it is evident the importance of a change in this respect. SMEs tend to be less innovative and to realize just incremental innovations but, often, believe to have already all the competences to develop innovations or do not take care of this aspect: this is the reason why competitiveness can be increased changing their point of view and embracing the international scientific community.

In particular, SMEs do not show signs of opening for future collaborations with universities: this position has been expressed through the low consideration of researches made by Universities as well as the approach to graduated people (also for the R&D activities).

As done by successful companies in the leading countries (USA and Japan), as well as suggested by policy makers of the EU (Lisbon Agenda), investing in R&D activities and personnel formation lets the companies to be more innovative. This is a data that found confirmation in our regression where the variable related to an

increased investment in R&D activities is strongly and positively related to innovation.

Also the second more influent variable in our model, collaboration, is positively related to innovation and points out another of the weaknesses of the manufacturing SMEs in Bergamo. These companies underestimate the importance of collaborations in order to achieve innovation. Our variable encompasses both collaborations with clients and universities but the good result could be extended to other forms of collaboration (i.e. joint-venture, cooperation and partnerships).

Another significant variable with a positive, even if just lightly, influence on innovation is the percentage of personnel dedicated to the R&D activities. This result could be interpreted once again as the need of a certain critical mass in order to succeed when trying to innovate.

The limits of the manufacturing companies in the province of Bergamo are confirmed by the descriptive statistics about their preference for low labor cost as strategic variable to hit the market. This is a choice in accord with the low technology level of their sectors and with their attitude of being followers rather than leaders: this due to their short run view of the business. Entrepreneurs in the province of Bergamo, but the observation could be probably extended to the country, are not fully aware of the role played by knowledge and undervalue the importance of investing in personnel formation and physical investments. Moreover, just the 19.11 percent of the companies has received money through a public financing program in the last three years and has succeeded in accomplishing to an innovation whereas a number of companies even avoid looking for this form of financing because of their bureaucratization and time requested to get them.

The result of these observations is the research for incremental innovations: another choice that points out the short run horizon of a high percentage of small and medium enterprises in the province of Bergamo.

From the data analysis realized through the cluster analysis and the consequent multinomial logit, it is possible to point out the existence of three clusters whose show different approaches both in terms of strategic behavior as well as involvement in innovation-related activities.

From the multinomial logit analysis, it has emerged that companies in:

- Cluster 1 have got a relative lower percentage of employees dedicated to the R&D activity and less path dependency (with respect to cluster 2). They are relatively older, have a higher R&D intensity, are more likely to have increased their investment in R&D in the last three years and are more likely to have patented than the companies in cluster 3;
- Cluster 2: these companies have the highest percentage of personnel dedicated to the R&D activity and have a higher path dependency than the companies in cluster 1. They are more likely to be older, have increased their investments in R&D during the last three years, more likely to have patented and more likely to collaborate with universities or clients than companies in cluster 3;
- Cluster 3: it contains the youngest companies as well as those less likely to have increased the investment in R&D during the last three years and less likely to have patented. Moreover, these companies have a lower percentage of employees involved in the R&D activity and less likely to collaborate with

clients or Universities than the companies in cluster 2. Eventually, companies in cluster 3 have a lower R&D intensity than those in cluster 1.

Integrating the previous considerations with the results of the cluster analysis and the evaluation of the single variables constituting the three dimensions used in order to describe a strategy, it is possible to get a better understanding of the three clusters.

Companies in cluster 1 indicate as the three most relevant factors for coping with competitors the capacity of being innovative as well as the low cost of labor and an efficient distribution. In the same cluster, companies tend to favor a market position based on the frequent introduction of new products and having as major objectives of their R&D activity to obtain an advantage on the competitors, improve the quality of their products and, for some of them, just survive on the market. These companies are highly involved with innovation activities, with smaller dimensions than those in cluster 2 and less suffering of path dependency (the linkage to the local community).

Companies in the second cluster are the most involved in innovative activities and are involved also in reaching an efficient distribution. These factors are chosen with the objectives of producing high quality products and being leaders in introducing products radically new. The importance of obtaining better quality products is confirmed by the stated objectives of their R&D activity whose are also related to the achievement of a competitive advantage as well as the customer satisfaction. These companies are larger and older (than those in the other 2 clusters) and have a more structured activity of research and development sustained by collaborations with external stakeholders as the universities or the clients.

The third cluster contains companies that compete on the markets giving importance almost just to the low cost of labor. This is in accord with their market positioning since a lot of these companies strive to sell low cost products whereas another large part of them affirms to look for selling high quality products. The objectives of R&D activity are not focused on few choices but it is possible to point out bigger orientation for just staying on the market than the companies in the other two clusters. The companies in this cluster are young, less focused on innovation and less likely to have external collaborations.

Looking at the literature review on strategic management of manufacturing companies, it is possible to recognize results that recall Roth and Miller (1989) and their manufacturing strategies related to the companies behaviors' as marketers, innovators and caretakers:

- Marketers are the companies involved with innovation activities that suffer less of path dependency. From the previous analysis they result to be also smaller than the companies in cluster 2;
- Innovators belong to the second cluster and with this term it is referred to companies usually larger and older than the others that have a more structured research and development activity. Innovation is fostered not just by the presence of laboratory for research and development but also by collaborations with clients and/or universities;

- Eventually, there are the caretakers: young companies that do not rely on innovation. These companies are less likely to have external collaborations.

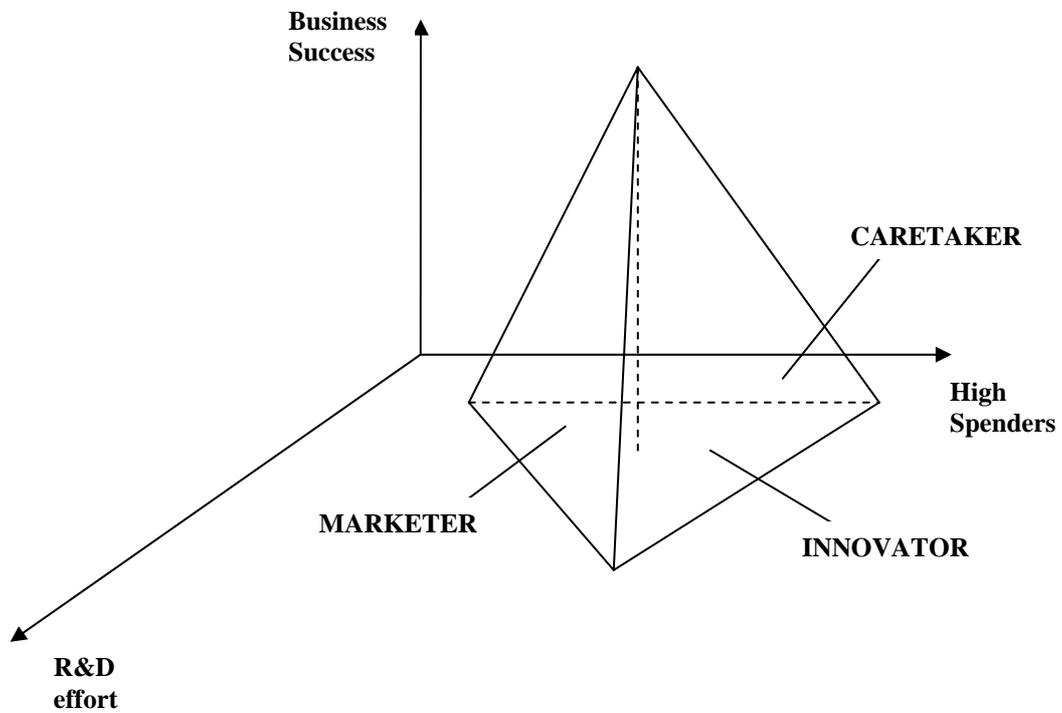
From the previous observations can be underlined some points. Path-dependency has a negative impact on innovation, especially in small companies, because companies will find themselves locked-in in their local economic system. Furthermore, the low consideration given to the protection of innovation contributes in favoring the path-dependence. In the short run, in this context characterized by a wide base of SMEs, just a strong exogenous shock will be able to escape from this situation.

In order to summarize the results of this research, I am going to propose a graphical representation that integrates the three strategic approaches identified with the company's market orientation, its involvement in research and development activity and the achievement of business success.

The representation is a pyramid with triangular base as in Figure 3.9.

Whatever the chosen strategy is, a company can reach the top of the pyramid and maximizes its success (i.e. profit). The choice of a certain strategy, rather than another one, is just a choice that must be pursued through the adoption of the right tactics whose lead to the intermediate results that will need to be constantly monitored in order to correct the possible mistakes brought into practice.

In Figure 3.9, it is possible to stress out the different approaches to market used by manufacturing companies in relation to their efforts in research and development activities. The companies most involved in those activities belong to the marketer and innovator profiles. Whereas the former companies are more involved in product innovation and look more at incremental innovations, the latter are companies that strive for innovating radically and therefore, being the first on the market, can look for high spenders or having returns for a longer time. Caretaker companies are managed with the major objective of lowering the costs of production: they will reach all the customers even if their core is not with the high-spenders and will not invest too much in research and development activities. These positions are descriptive of the most diffuse behaviors inside the clusters even if there could be companies that, inside a cluster, may take decisions a little bit different from the majority (i.e. marketer companies looking for high spenders or caretakers more involved in innovation and looking for process innovation).



**Figure 3.9 – Pyramid of business success with respect to strategic positioning**

Improvements to this work could come from the use of a wider sample as well as having a dataset with company specific data. These kind of data are, anyway, difficult and/or costly to be obtained.

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Camera di Commercio di Bergamo	<a href="http://www.bg.camcom.it">www.bg.camcom.it</a>



## Chapter 4

### Determinants of Credit Denial for U.S. SMEs

#### 4.1 Introduction

*“Education is the foundation of success. Just as scholastic skills are vitally important, so are financial skills and communication skills.”*

- Robert Kiyosaki -

SMEs stand for Small and Medium sized Enterprises, the bread and butter of almost all the countries economies as it is often argued. Small companies are often regarded with special interest because it is widely recognized their role in economic growth, through the creation of a disproportionate share of new jobs, and innovation in all types of economies - developed, developing and transitional - (Brown, Earle and Lup, 2004). Furthermore, much interest has been shown in the role SMEs have been playing in shaping national economies given their influence on political decisions as it happens in the USA (Birch, 1979; Brown, Hamilton and Medoff, 1990; Acs et al., 1999). This is the reason why, in the USA, several states and the federal government are currently prompting self-employment as a way to leave the welfare and unemployment insurance rolls (Fairlie and Robb, 2003).

Despite of this hype, there is no single definition for a SME either nationally or internationally (University of Strathclyde Library). An example is what happens in Europe where there are different definitions:

- The European Commission, in order to improve the consistency and the effectiveness of the policies adopted Recommendation 2003/361/EC on 6th May 2003, to take effect from 1st January 2005 (published in OJ L 124 of 20.5.2003, p.36). Besides the definitions of Small enterprise (less than 50 employees and a turnover, or balance sheet, under €10 million) and Medium enterprise (headcount of less than 250 and a turnover of not more than €50 million or a balance sheet of not more than of €43 million), it was introduced the definition of Micro Enterprise (less than 10 employees and a turnover of not more than €2 million);

- Each country can adopt its own definitions and in UK they are officially explained in The Companies Act 1985 (Accounts of Small and Medium-sized Enterprises and Audit Exemption (Amendment) Regulations, 2004). Here, there is a distinction just between small companies (those with a turnover of not more than £5.6 million, a balance sheet total of not more than £2.8 million and not more than 50 employees) and medium-sized companies (turnover of not more than £22.8 million, a balance sheet total of not more than £11.4 million and not more than 250 employees);
- Not everyone in UK adopt these definitions. The British Bankers Association (BBA) embeds its own definition within the introduction of its voluntary code. In The Business Banking Code (March 2005) the small business customers are defined as sole traders, partnerships, limited liability partnerships and limited companies with an annual turnover of under £1 million, as well as associations, charities and clubs with an annual income of under £1 million (if the business account is a group of businesses, the turnover threshold applies to the combined turnover of a group of limited companies and not individual companies within the group).

In the USA, the definitions have been set by a government department called the Small Business Administration (SBA) Size Standards Office. Differently from the previous ones, the US classification varies depending on the industries and is explained using the term “size standards” in order to better reflect industry differences. The most common size standards are:

- 500 employees for most manufacturing and mining industries;
- 100 employees for wholesale trade industries;
- \$6 million of annual receipts for most retail and service industries ;
- \$28.5 million of annual receipts for most general and heavy construction industries;
- \$12 million of receipts for all special trade contractors;
- \$0.75 million of receipts for most agricultural industries.

Approximately, one quarter of industries have a size standard that is different to those listed above.

Anyway, general statistics indicate that the typical influence of SMEs in industrialized countries accounts for more than 90 percent of all firms giving employment to the two-thirds of the workforce: it means about the 50 percent of the value added in non-agricultural production (Baas and Schrooten, 2006). This is why such an important role is often attributed to SMEs with respect to growth promotion and poverty reduction (World Bank, 1994, 2002, 2004; Beck et al., 2003; Wagenvoort, 2003).

Focusing on the USA, the SBA defines for research purposes the SMEs as companies with fewer than 500 employees. Referring to the updates given by the SBA in June 2006, it is possible to point out the relevance SMEs have in US economy. Whereas in 2005 the Office of Advocacy estimated the existence of 25.8 million businesses in the United States, based on data from 2003 the SBA reported that SMEs represent 99.7 percent of all employer firms (97 percent of all the

identified exporters whose produce the 28.6 percent of the known export value in 2004) and employ about the 50 percent of all the private sector workforce (41 percent of the high tech workers) generating from 60 to 80 percent of net new jobs annually during the last ten years (1,990,326 employees in 2003) and more than the 50 percent of non-farm private gross product (GDP). As cited above, SMEs are also very important in terms of innovative capacity. In fact, they produce 13 to 14 times more patents per employee than large patenting firms whose quality is testified by the number of citation they receive (they are twice as likely as large firms patent to be among the one percent more cited).

A large role among the SMEs is played by the home-based businesses (53 percent of the SMEs) and a special mention is deserved by the family businesses. As the Family Firms Institute (FFI) points out, the greatest part of America's wealth lies with family-owned businesses whose survive into the second generation in more than 30 percent of cases, the twelve percent are still viable into the third generation and just the 3 percent reach at least the fourth generation. Data on the survival rate of small and medium businesses and referring to all new entrepreneurs firms show that the two-thirds of them survive at least two years and the 44 percent at least four years (SBA, 2006). It has been told about the relevance of small businesses in the US economy: data supporting this statement refers to the high percentage of family firms (from 80 to 90 percent) among the all business enterprises in North America contributing for the 64 percent of the GDP (Astrachan and Shanker, 2003). Moreover, in a study of S&P 500 firms by Anderson and Reeb (2003) it has been underlined that the family firms have better performances and their EVA is even greater (+5.5 percent, \$118.6 million on average) when founding families maintain an ownership stake. Right the ownership is a matter when the family businesses face the growth and then also when they have to decide the successors: in USA, the American Business Survey by the Raymond Institute/MassMutual in 2003 found that the just the 45 percent of family businesses with a CEO, close to his/her retirement, had chosen the successor but that the 85 percent of family-owned firms would have chosen him/her among the family members.

Small businesses have been argued to be very important for the economic growth because they bring to a more competitive economic environment. In 1990, M. Porter analyzed the degree of competitiveness in several countries, talked about "domestic rivalry" and indicated the oligopolistic competition as a desirable situation if compared to monopolies and oligopolies with few rivals. This thought has been emphasized by Elias Sanidas (2000) who talked about the importance of SMEs for reaching a more intensive competition through the example of the Japanese economic environment described by several researchers (Y. Miwa, 1994; M. Ito, 1994; Y. Watanabe, 1997; T. Fujimoto and A. Takeishi, 1997).

These matters will be better developed in the following pages through a review of the literature in the Section 1. It is a section focusing on the role of family businesses, minorities and financing: they constitute the core elements of this research. It will follow the Section 2 about the data and the model in use for studying the determinants of credit denial, the Section 3 where the results will be analyzed and the last section will be about the conclusions.

## 4.2 Review of the literature

In the introduction, it has been given an overview of the relevance of the SMEs in the world economy due to the increasing role they play in economic growth since the 1980s as shown by D. Storey (1994). Recent data from the U.S. Small Business Administration (2005) have reported of the return to the growth trend experienced during the 1990s in terms of new employer firms compared to the closures.

Therefore, research on the Small businesses is something quite recent whereas in the past scholars have focused on Large enterprises analyzing their role in the economic growth of nations like the USA and Germany and some specific industries (see for example: Schumpeter, 1950; Chandler, 1977 and 1990).

However, all these studies take the step from the concept of entrepreneur widely developed, at the beginning, by Schumpeter. Schumpeter (1934) as well as Baumol some years later (1968), after having described who an entrepreneur is, talked about his/her role in economic growth and innovation. This topic will not be reviewed in the following pages because space will be given to the topics on whose this paper is based on: family business, minority and the financing aspects. Anyway, it is major to point out the amount of different definitions of entrepreneurship existing in the literature and related to the topics of this research. The main difference in the definitions is between the approach of the applied economists that often identify entrepreneurship with self-employment (forgetting to consider the highly-entrepreneurial CEOs) and the management researchers that often focus on the founders (forgetting the first generation successors whose often obtain the highest growth rates). Therefore, it is better to adopt a definition that encompasses both the previous two points of view as well as both the aspects of the familiar distinction between the entrepreneur as defined by Kirzner (an opportunity-seeking individual oriented to small-scale businesses) and Schumpeter (large-scale innovations take the main stage). By the way, entrepreneurs should be recognized by their actions and not their characteristics (Virk, 2004), this is an approach that Gartner (1989) demonstrated to be more logical and consistent than the trait method. Contemporary authors have attempted to synthesize the broad school of thought about entrepreneurship (Day, Reynolds and Lancaster, 2006) giving a more complete definition of who an entrepreneur is (Casson, 1982), proposing an approach that adopts a Schumpeterian dimension but susceptible to the Austrian interpretation (Binks and Vale, 1990) and using the characterizing elements of these two schools to define the two dimensions of a grid that comes to the definition of the strategic behavior depending on the market conditions and its needs.

	Market Condition	
	Continuous	Discontinuous
Discovery	Traditional Marketing	Strategic Interface
Perceived Needs	Opportunistic Interface	Pure Entrepreneurism
Unperceived Needs		

Figure 4. 1 - The Omura grid with Kirznerian and Schumpeterian dimensions

In his general theory of entrepreneurship, Scott Shane (2006) talks about the Individual-Opportunity Nexus and bases his theory on the concept of entrepreneurship defined in terms of an individual's response to opportunity (Casson, 2005). This is a definition comprehensive of the points of view by Kirzner and Schumpeter and consistent with the way Shane structures the discussion around five key features of entrepreneurship: the process of generating opportunities, the personality factors, the assessment of risk, the organization of exploitation, the nature of innovation. In this way, the basic activities of an entrepreneur are comprised (discovery, evaluation and exploitation) and the performance of the venture depends on the success of the entrepreneur in accomplishing to them. The venture's success depends on the entrepreneurial ability (characterized by absorptive capacity, intelligence and cognitive abilities) to take advantage of the opportunities arisen from changes (technological; political and regulatory; social and demographic) in the environment. It is a matter of information that can be overcome through life experiences, social networks and search processes. Following the approach by Scott (2006), it is possible to evaluate the results of such activity using as measures of the venture success its survival, the growth of sales and employment, the profit and the completion of an Initial Public Offering (IPO).

The importance of self-employment has been recognized also by many academicians and policymakers whose view self-employment as a route out of poverty and as an alternative to unemployment or discrimination in the labor market (Glazer and Moynihan 1970, Light 1972, 1979, Sowell 1981, Moore 1983, and Bates 1997). As mentioned in the introduction, the US government is currently supporting self-employment but it has to be noted the reliance upon business ownership among minorities, women and other disadvantaged groups as a way to improve their situations through a plethora of governmental and private program. In fact, recent research suggests that the self-employed earn more on average than wage and salary workers (see, i.e. Borjas, 1999) even if Anderson and Reeb (2003) have found that Family firm CEOs earn on average nearly 10% less than their non-family counterparts.

The previous speech is useful in order to understand the following paragraphs because, as Robert Brockhaus (1994) has pointed out, the evolution of family business researchers has much in common with that of entrepreneurship researchers (first studies were prescriptive and then became well-designed research studies). Furthermore, issues about the information asymmetry and those referring to the access to the resources will be taken into account through the following three sections about the family business, role of minorities and the financing side.

The last topics have often been studied in relation to discrimination and it has been stressed out that if real discrimination occurs in the financial services market, one would expect businesses to receive less favorable treatment by lenders than other businesses, even when the quality of the business is the same (having to pay higher loan prices; being offered smaller loan amounts; being refused credit from a mainstream lender, making it necessary for the borrower to search for non-conventional lenders; or being offered only non-traditional debt instruments).

#### 4.2.1 Family Business

This paragraph is dedicated to one very important part of the small businesses, the family businesses. Even if there are no doubts about their relevance as contributors to the US economy both in terms of GDP and total wages (Glueck and Meson, 1980; Ibrahim and Ellis, 1994; Shanker and Astrachan, 1996; Ward, 1987; Winter, Fitzgerald, Heck, Haynes and Danes, 2003), it is missing an exact evaluation of their impact (Astrachan and Shanker, FFI website). Anyway, their doubtless relevance has brought an increasing number of researchers in coping with this topic since the beginning of the 1980s.

As written above, Astrachan and Shanker (2003) have found that the family firms are the 80 to 90 percent of the North American enterprises and the highest part of America's wealth resides in them. Among them, the oldest American family business started its operation some centuries ago (1623) in Constantinople and moved with the family to the USA in 1929: its name is Zildjian Cymbal Co. of Nordwood, MA (Family Business Magazine, 2001).

It is interesting to look at the way these businesses are run. There is a spread (60% of respondents to the American Family Business Survey 2003) perception of optimism about the company's future, even if just the 37 percent has written a strategic plan and the 19 percent of family participants have not completed any estate planning other than a writing will (Raymond Institute/MassMutual, American Family Business Survey, 2003). From the same study, some data about the management of the business come as well. An important aspect of being a family business is the collaboration of the family members and the study points out the presence of at least one female family member in the 52 percent of the cases whereas in the 34 percent of family firms next CEO will be a woman. The topic of succession is a very important one but the large majority of the family businesses seem to not have any doubts about it: in the 85 percent of the cases the successor will be a family member.

Several reasons could be found and not just pertinent to the financial side. It has been found that, among the S&P 500 firms, the family businesses lead by family have better performances than the non-family ones (both in terms of EVA (+5.5%) and ROA (+6.65%)) but CEOs earn the 10 percent less than those working in non-family businesses (Anderson and Reeb, 2003). What the family owners of the businesses really care, it is primary to transmit all the amount of values (encouraging their own money, philanthropy, charitable giving, and volunteering) surrounding the financial wealth to subsequent generations (Wealth with Responsibility Study/2000, Bankers Trust Private Banking, Deutsche Bank Group).

In the introduction, the statistics about the overall small businesses survival rate have been given: new businesses last more than three to five years just in a small proportion of cases. Anyway, especially in troubled economic times, it is the family business that survives (Winter, Fitzgerald, Heck, Haynes and Danes, 1998): this is mainly because of the family (Keough and Forbes, 1991). In a study on the data from the 1997 National Family Business Survey, it has been found that the effect of the family on business ventures is large. Particularly, the family supply of labor to the business has been found to be a key factor to its success and have a much larger effect on revenue than other variables (Olson, Zuicker, Danes, Stafford, Heck and Duncan,

2003). The importance of the previous data does not depend on how broadly or narrowly the family businesses are defined (Glueck and Meson, 1980; Ibrahim and Ellis, 1994; Shanker and Astrachan, 1996; Ward, 1987).

One of the main issues is about the definition of what a family business is. First of all, it is possible to highlight that “family business” is not synonymous with “small business” (Winter, Fitzgerald, Heck, Haynes and Danes, 1998): as remarked on the website of the US Small Business Administration, the vast majority of family businesses are small (operations with fewer than 20 employees) whereas there are some others that are large corporations.

From a historical point of view, the first attempt to define a family business can be dated back to 1964 with Donnelley. Following the approach by Handler (1992), it is possible to classify the different kind of definitions depending on the characteristics that are pointed out. A first group is about the Ownership and the Management. Here, the first definition can be dated back in the 1975 when Bany defined a family business as “an enterprise, which, in practice, is controlled by the members of a single family” (p. 42). One year after Barnes and Hershon (p. 106) widened the previous definition including the controlling ownership of an individual whereas, in 1982, Alcom proposed a more technical definition that described the family business as “a profit-making concern that is either a proprietorship, a partnership, or a corporation... if part of the stock is publicly owned, the family must also operate the business” (p. 23). Another couple of remarkable definitions came out in 1986, when Stern considered the family business as owned and run by members of one or two families (p. XXI) and Dyer pointed out the presence of a relationship to a family in both the ownership and the management aspects (p. XIV). In 1988, Lansberg, Perrow and Rogolsky preferred an approach closer to the legal side of the control over ownership (p. 2). Eventually, during the last years, several other researchers have used definitions based closely related to the same characteristics (Daily and Dollinger, 1992; Dunn, 1996; Sharma, Chrisman and Chua, 1997; Tagiuri and Davis (1996); Winter and Morris, 1996).

A second group of definitions is about the family involvement in the business, which is about interdependent subsystems. In 1983, Davis proposed a definition considering the interaction of two sets of organization (family and business) whose interact defining the business uniqueness (p. 47). In the same year, a more detailed definition was proposed by Beckhard and Dyer (1983) whose found four different subsystems: “the business as an entity, the family as an entity, the founder as an entity and linking organizations as the board of directors” (p. 6).

The third group is about an important part of a successful business: the succession. In 1987, Ward considered the passage of the business to the family’s next generation to manage and control (p. 252) and, in the same year, Churchill and Hatten meant for family business “either the occurrence or anticipation that a younger family member has or will assume control of the business from an elder (p. 52)”. A different approach was used by Fiegenger, Brown, Prince and File (1994) whose called family business a business owned and managed by a family that add the next leader, who is related to the incumbent leader and must be currently employed by the firm.

Eventually, the last group of definitions is the more articulated since endorses multiple conditions. In this respect, Donnelley (1964) defined a family business

“when it has been closely identified with at least two generations of a family and when this link has had a mutual influence on company policy and on the interests and objectives of the family” (p. 94). In 1985, Rosenblatt, de Mik, Anderson and Johnson defined family business “any business in which the majority ownership control lies within a single family and in which two or more family members are, or at some what were, directly involved in the business” (pp.4-5). More recently, Dannhaeuser (1993) has specified a definition where the family business “must be owned and managed by at least two or more members of the same family, serve as a major source of family income, and employ no more than 50 people”. Finally, Astrachan and Kolenko (1994) outlined several characteristics related to specific ownership percentages for public and private businesses.

Another classification among the definition of the family business is the one proposed by Astrachan and Shanker (1996) whose consider three different definitions distinguished by their level of inclusiveness.

They propose three definitions as part of a bull’s eye where the broadest one considers all the sole proprietorships and the sixty percent of partnerships and corporations. In order to introduce their choices, the authors cited as background knowledge the findings by Kirchoff and Kirchoff (1987) about the utilization of both unpaid and paid family labor especially at the starting out, studies by Burch (1972) and Jetha (1993) on the 500 Fortune businesses and McConaughy (1994) on the Business week 1000 list.

The first step inside their bull’s eye definitions brings to a more narrow definition. The reason is due to the missing of accuracy in the IRS information. Therefore, referring to the US Census Bureau and the National Federation of Independent Business, they introduced the “intention” of running a business in their definition. Despite of the elusiveness of such a characteristic, they introduced it through narrowing the field of businesses of interest applying the same formula of the broad definition to the universe of the sole proprietors considering the business their “principal occupation” and that is a primary source of income. Eventually, the narrow definition is about the employer firms where “more than one member of the owner’s family has significant management responsibility” and multiple generations of family members are involved into it.

The previous three definitions give a different universe of businesses whose are the more homogeneous the narrower is the definition. Astrachan and Shanker (1996) describe their findings both in term of overall business units and business tax returns in the United States. The broad definition finds a total of 24.2 million family businesses (89% of all 2000 business tax returns), whereas the middle definition indicates the presence of 10.8 million family business (39% of all 2000 tax returns and 89% of businesses defined as “principal source of income”) and the narrow definition finds a total of 3 million family firms (11% of all 2000 tax returns and 54% of all employer business).

Even if, the role of family members has been considered at various levels in the previous definitions, it has been argued that the structure and composition of the family as well as the residential location of family members are virtually ignored in the family business research literature (Winter, Fitzgerald, Heck, Haynes and Danes,

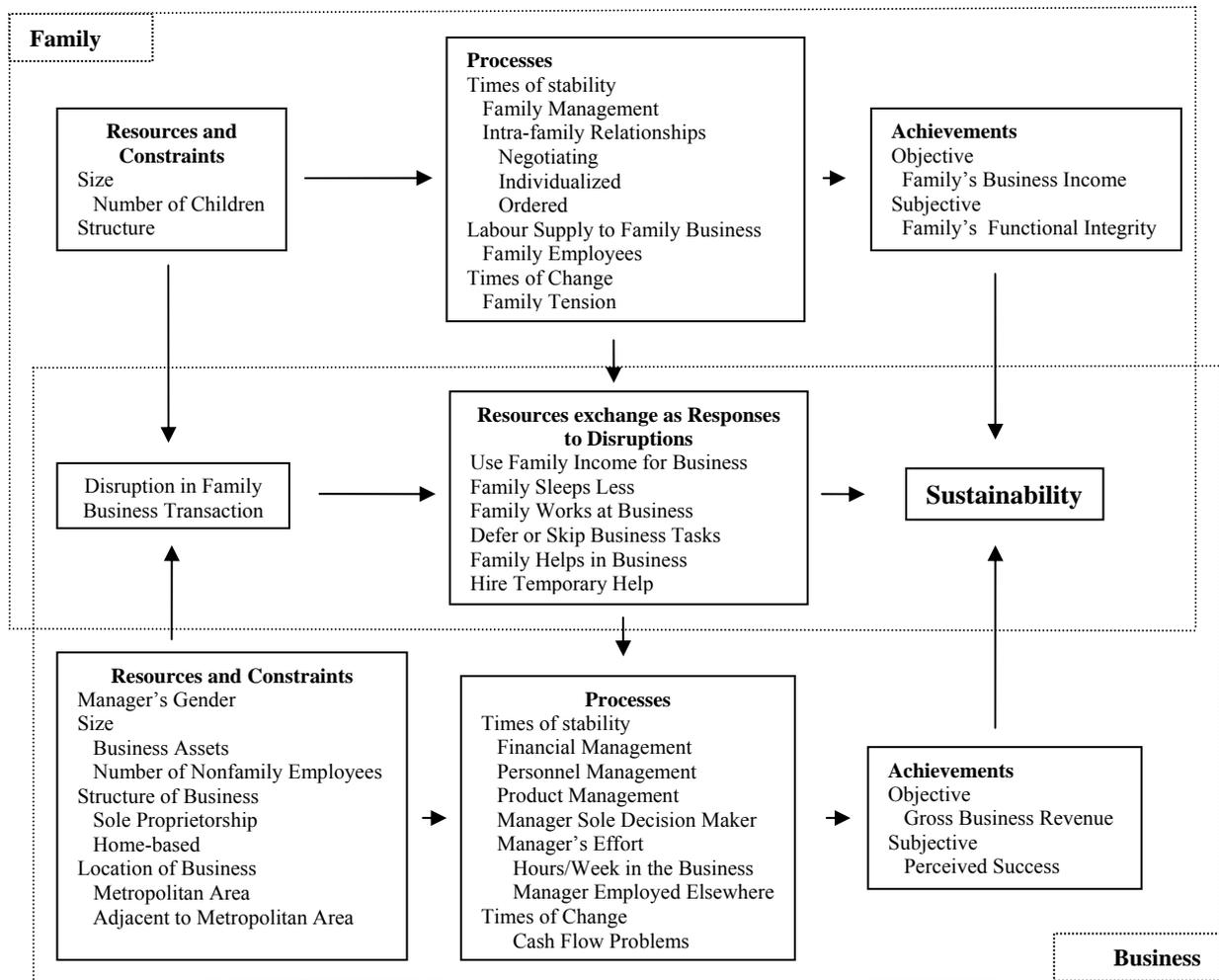
1998). Attempts of describing the internal dynamics of the family have been proposed though (Kaye, 1991; Kepner, 1983).

Further topics of research could be found in the emerging patterns regarding entrepreneurship. In fact, thanks to the support given by the government, family businesses are developing themselves through women, minority and veterans entrepreneurs. It will be discussed later about the role of minorities whereas here it could be interesting to consider some data about the other two categories. Women entrepreneurs are gaining interest among the researchers also because of the 6.5 million businesses owned by them that generated \$940.8 billion in revenues, employing 7.1 million workers and having a payroll of \$173.7 billion in 2002 (2002 Survey of Business Survey of Business Owners from the Census Bureau). Academic evidence about the rapid increase of levels of female self-employment has been given in several studies since the beginning of the 1990s (see Aronson 1991, Devine 1994 and Small Business Administration 1998 for example). On the other side, the male veterans have been characterized by self-employment rates higher than those of non-veterans from 1979 to 2004 (in 2003, rate for veterans was 13.7 percent whereas non-veterans reached just a 12.2 percent). The interest for researching on this part of entrepreneurs in the future could be supported by the data from the 2004: about the 22 percent of veterans in the U.S. household population were either at least considering to start a business, and almost the 72 percent of these new veteran entrepreneurs planned to employ at least one person at the outset of their new venture.

In the last years, an increasing number of studies on family businesses have set its foundation in the theory of the Sustainable Family Business (SFB) Model (Stafford, Duncan, Danes and Winter, 1999) as well as in the working theory of the Family FIRO (Fundamental Interpersonal Relationship Orientation) Model (Danes et al., 2002). Whereas the former has been appreciated for having underlined the dynamicity within the processes of a family business (this is the way they change in times of stability), the latter has been more precise in identifying social dynamics of changes and provides for setting priorities across a full range of family business changes (Danes et al., 2005).

The SFB Model considered by Trent and Astrachan (1999) as an “innovative approach to the study of family business”, is a dynamic theory where change is a major premise. This is a model based on the existence of the family and business systems whose have equal recognition and act independently but in conjunction with each other. This model is appreciated for being able to address the issues regarding both the two systems and underline their interplay in achieving mutual sustainability which is a function of both business success and family functionality (Stafford et al., 1999). Aldrich has given a major contribution on the topic of the business success, pointing out the problem of the traditional business performance literature about the underlying assumption that individuals make economic decision in a social vacuum (Aldrich and Zimmer, 1986; Cramton, 1993) whereas, on the side of the family business, he has emphasized the importance of the social network of these firms at the different stages of their lifecycles (Aldrich, 1999). The importance of the role of the network can be better understood through the following picture which summarizes the SFB model. Both the family and the business systems are characterized by three main elements (resources and constraints, processes and achievements) whose work in their

own system participating and interacting through in shaping the sustainability of the family business: their interaction brings to disruption in transactions which causes a resource exchange between the two systems and influences directly the sustainability of the family business. Eventually, several studies have confirmed the positive role played by the network related to the family, their specific resources and its overlapping with the business system especially in their formative years (Haynes, Walker, Rowe and Hong, 1999; Van Auken and Neely, 2000; Van Auken, 2003; Winborg and Landström, 2000): there is a stronger commitment to the founder's idea and the human resources are trustworthy (Lansberg, 1983; Ward, 1997).



**Figure 4. 2 – Operational Model of Family Business Sustainability (adapted from Olson et al., 2003)**

The Family FIRO Model is based on the developmental sequence of three dimensions: inclusion, control and integration. This model has found support when tested on family businesses (Stewart and Danes, 2001; Danes et al., 2002) underlining that the integration of the family business system is highly influenced by the way the other dimensions are managed. Giving a glance to the different dimensions, it emerges the importance of being able to manage them in times of change. This is true for the dimension of inclusion where the issues need to be reassessed and reconstructed in its sub-categories (structure, shared meaning and connectedness) in order to avoid the tensions already described in the SFB Model. Tensions arise from disruptions whose are common experiences during the process of business formation (Stafford et al., 1999) and their complexity can be better faced through flexibility of relationships and high level of commitment than a planning activity (Astrachan, 2003). Talking about the second dimension of the model, the control, several studies have pointed out that conflict is a normal part of healthy change within family-owned businesses (Danes, Zuiker, Kean and Arbuthnot, 1999; Danes and Amarapurkar, 2000; Danes and Morgan, 2004). Integration is the last dimension of the model to be cited and the one dependent on the first two as well as the one that positively contributes to family business sustainability (Danes et al., 2005).

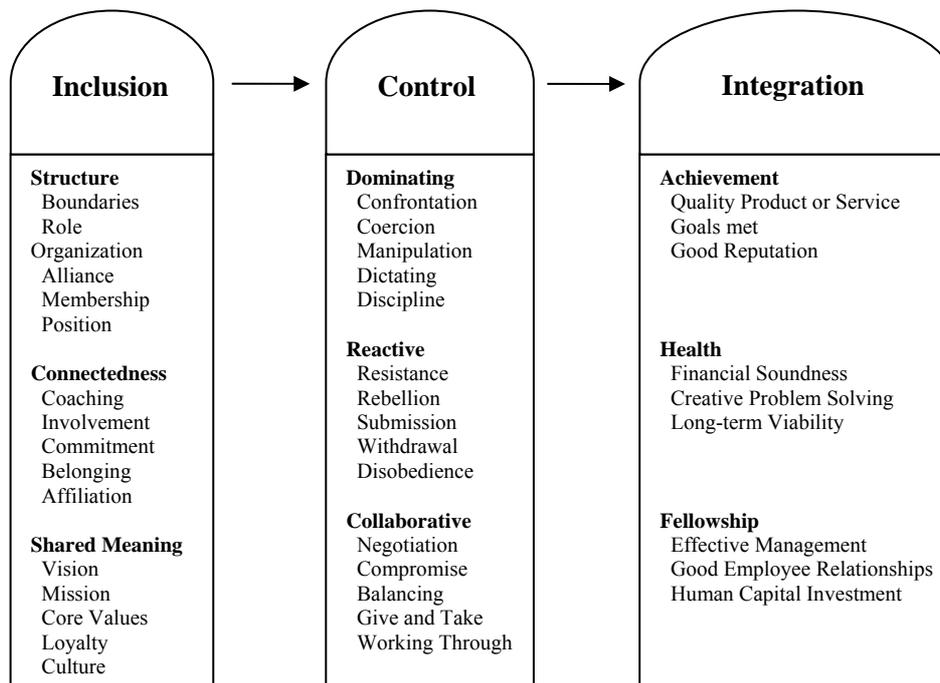


Figure 4. 3 - The FIRO Model (adapted from Danes, 2005)

The previous picture synthesizes the Family FIRO Model, giving a detailed description of their constituents as well as of the way they interact.

This model has been useful also for studying a special kind of relation existing in a family business: that existing between the entrepreneur and his/her partner. Married couples represent the 25 percent of the nascent entrepreneurial teams considered in a national representative sample in a study by Ruef, Aldrich and Carter (2002). Because of the marriage, a spouse becomes a critical stakeholder in the family business (Danes et al., 2005) and not just on the financial side. Of major importance in fact, it is the spousal commitment to the business (regardless of a spouse's degree of direct participation in the business) which has been defined by Shaffer et al. (2001) as the willingness to expend personal, temporal, or psychological resources to achieve a goal. It has been regarded as a source of competitive advantage (Harris, Martinez and Ward, 1994) and of an importance even greater during the initial years of the venture. This is due to financial constraints existing at the early stages of the business where family and business finances are linked (Aldrich and Cliff, 2003; Haynes et al., 1999; Steier and Greenwood, 2000) and the spouse role increase of importance due to the economic bands of marriage. As written above, the role of a spouse is not just confined in the financial field but is more complex since the subtle influence of the partner takes the form of personal or temporal resources (Danes and Olson, 2003) or just sustain the partner providing emotional support that ameliorates financial stresses (Danes et al., 2005).

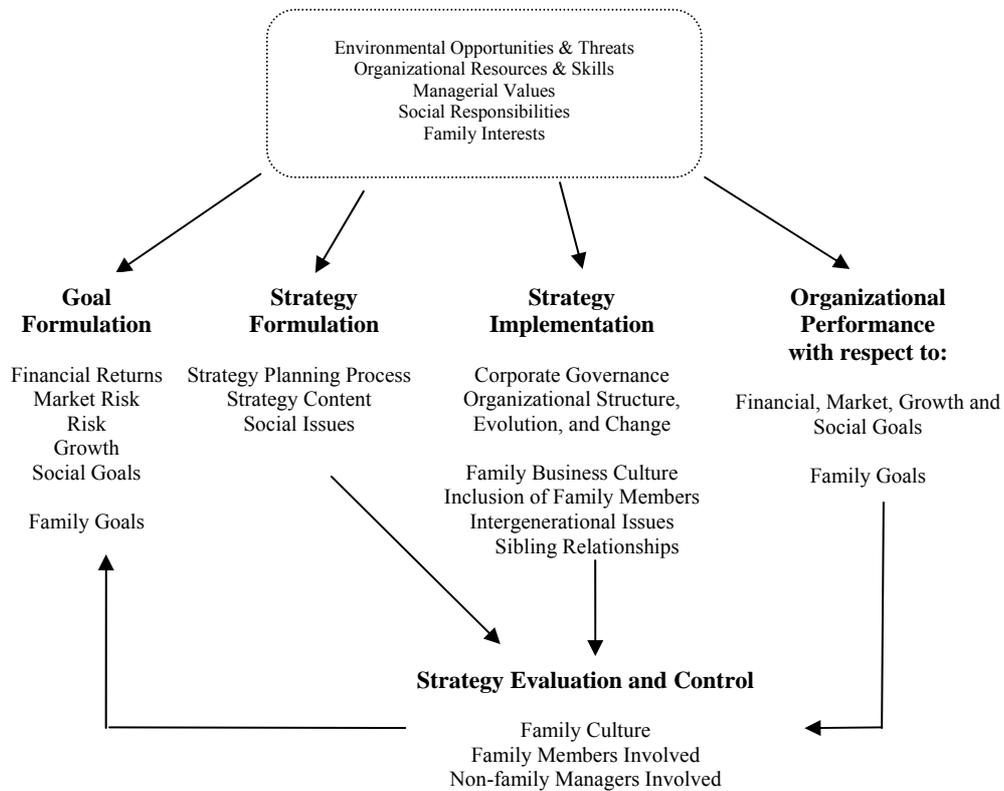
Nevertheless, even if a strong commitment of the family relatives it is of fundamental importance in order to reach the business success, it cannot be forgotten the role played by the strategic management of the family business. In this respect, the researches date back to the 1970s when a simplified model of the strategic management process was approached by several researchers (Andrew, 1971; Hofer and Schendel, 1978; Schendel and Hofer, 1979). The peculiarity of this model is the dynamic and interactive process through which the strategic management takes place. It is possible to point out five different moments (goal formulation, strategy formulation, strategy implementation, strategy evaluation and control ) characterizing the process of strategy management and, among them, the first four are all influenced by the opportunities and threats present in the environment, as well as the elements characterizing the business (organizational resources, skills, managerial values and social responsibilities, the attainment of an organization performance and the strategy evaluation and control) and family (family interests) systems. In turn, all the first four steps are in touch with the fifth one.

The goal formulation step consists in defining the objectives to be reached through the business activity, regarding both the business (financial returns, market share, risk growth and social goals) as well as family (family goals). Once the goals are set, the entrepreneur will have to take care of the strategic planning process, the strategy content, the social issues and, if successful, also of the succession in a phase called of strategy formulation.

The third step consists in bringing into practice the strategy through appropriate choices of corporate governance, organizational structure, evolution and change. This is a stage where the arguments discussed above about the family involvement and commitments are particularly important. This is the reason why the model considers

as fundamental part of this step the family business culture, the inclusion of family members, the intergenerational issues and the sibling relationships. The results of this effort constitute the forth step of the strategic management process and the organizational performance are taken with respect to both the business and family sides: financial, market, growth and social goals for the formers, whereas family goals for the latter.

Eventually, there is the stage of strategy evaluation and control where the performances are checked and evaluated by both the family members involved and non-family managers involved that will have to work taking care of the family culture. This is the part of feedback of the process that let the business to review its goals and take corrective solutions in order to improve its performances.



**Figure 4. 4 - The Strategic Management Process (adapted from Sharma, Chrisman and Chua, 1997)**

Therefore, “at all stages it is necessary to select and evaluate alternatives, make decisions, and ensure that effective control processes are in place in order to make

adjustments where needed” (Sharma, Chrisman and Chua, 1997; FFI). The understanding of these stages are major in order to recognize that “while the importance of the family cannot be denied, the business is no less important” (Sharma, Chrisman and Chua, 1997; FFI). The main difference with respect to a non-family business will be about the controlling family’s influence, interests and values that may have overriding importance in running a business. By the way, there is a very limited amount of research that has examined the ethics of entrepreneurs and small business owners (Ackoff, 1987; Longenecker, McKinney and Moore, 1988, 1989; Wilson, 1980; Brown and King, 1982; Chrisman and Fry, 1982; Brockhaus, 1994).

#### 4.2.2 Minority Business

Business ownership has been widely regarded as a way to increase opportunities for economic advancement, political power and job creation among disadvantaged groups (Loewen, 1971; Light, 1972; Baron et al., 1975, Bonacich and Modell, 1980; Min, 1989, 1993; Brown, Hamilton and Medoff, 1990) but also for being a potential route out of poverty and an alternative to unemployment (Glazer and Moynihan, 1970; Light 1972, 1979; Sowell, 1981; Moore, 1983). This is the reason why the big increase during the 1980s and early 1990s in the number of these companies among minorities, estimated from the Survey of Minority-Owned Business Enterprises (SMOBE), received a lot of attention. In fact, data from the US Bureau of Census (1990, 1996) and the US Small Business Administration (1999), regarding the decade 1982-1992, show a growth rate of 101 percent for the black-owned businesses, 230 percent for Hispanic-owned businesses and 201 percent for the Asian-owned businesses (Fairlie, 2000).

In order to examine the trends from 1979 to 1998 in business ownership among ethnic/racial groups in the United States, Fairlie (2000) preferred to use data from the Current Population Survey (CPS) due to the way the SMOBE counted the businesses (all the individuals reporting, to the IRS, to have received annual self-employment income of \$500 or more). In fact, data from SMOBE overestimate the number of businesses because they include many side or “casual” businesses owned by wage/salary workers or individuals whose are not in the labor force and excludes owners of incorporated businesses (except for owners of S-corporations) (Fairlie, 2000). Fairlie, after having restricted the samples to only individuals self-employed (ages 16-64) that worked at least 15 hours per week, compared the results of the minority samples (Black, Hispanic, Asian and Native Indian) with those of the whites evaluating the trend of the self-employment and the self-employment rates.

The white sample is the one that showed the biggest increase in the number of businesses reaching the 8.9 million but showing an almost constant number from the 1990 to the 1998. Instead, in terms of industries, the biggest growth rate in the total number of white business owners was for the professional services (more than the 40

percent). Increases in the number of self-employed in other services (construction, finance, insurance and real estate) also contributed substantially to the increase in the total number of self-employed.

Taking a look at the black sample emerges a growth pretty similar to that of the white sample in terms of industries interested (transportation, communication and public utilities accounted for 15 percent of the total increase of the black owners sample represent the only: 6 percent for the whites). The big difference refers to the growth rate which in this case is about the 87 percent compared to the 36 percent of the white sample.

Analyzing the third sample, the Hispanics, emerges their impressive growth rate in the period from the 1979 to the 1998 (+193 percent) which has brought them to own the 6.2 percent of all the businesses in 1998: the highest group's ownership that in 1979 owned just the 3.2 percent of all businesses. Another major difference with the previous samples refers to the industry profile of the new businesses: Hispanic business owners had a large increase in the retail trade (where the previous two showed a decline) and a smaller increase in the number of professional service businesses. Instead, in terms of business owners, whites and blacks show similar patterns in construction and other services whose accounted for a large portion of the total growth.

Data for the Asian and Native American samples through the CPS are available just since the 1989 and therefore are not fully comparable with the first three groups. Considering just this period, the Asian business owners (data include the Pacific Islanders) showed a higher growth rate than the previous three samples reaching the number of 475,000 units in 1998 (+55 percent since 1989). Major contributions to the growth have come from the retail trade, professional services and other services.

Eventually, there is the smallest ethnic/racial group examined so far (they own just the 0.7 percent of all businesses and their sample is made up by with just 110 observations per year): the Native Americans (data consider American Indian, Aleut and Eskimo). They experienced the largest growth rate (+81 percent) in the number of business owners since 1989 where the largest contributions to this expansion were due to retail trade, construction and professional services.

Fairlie (2000) found consistency between the figures from the CBS with those of previous studies reviewed in the literature and realized using alternative data sources and years: among them, the 1980 Census (Borjas 1986, Borjas and Bronars 1989, Light and Rosenstein 1995), the 1990 Census (Fairlie and Meyer 1996 and Razin and Light 1998), the General Social Survey (Hout and Rosen 1997), the Panel Study of Income Dynamics (Fairlie 1999), and the Survey of Income and Program Participation (Meyer 1990, Bates 1997). It emerges that the self-employment rate (fraction of workers whose are self-employed) is characterized by different growth rates depending on the ethnic and racial groups even if it "appears to be a fairly clear ordering of self-employment rates across groups over the entire time period": this is the reason why Fairlie (2000) focused just on data from 1998.

Giving an overall overview to the data, it is possible to note that the Whites and the Asians have the highest self-employment rates among the samples but with a difference in the percentages of men and women involved (men: 13.1 percent for

Whites and 12.4 percent for Asians; women: 7.4 percent for Whites and 8.4 for Asians). The other three groups are substantially underrepresented in business ownership in the United States: Blacks (5.1 percent for men and 2.7 per women), Hispanics (6.9 percent for men and 4.5 for women) and Native Americans (10.0 percent for men and 5.1 percent for women).

Fairlie (2000) further analyzed these data trying to find a relation between the growth rate of self-employed business owners and the increased number of workers belonging to a certain ethnic group with respect to their propensity to choose self-employment. His research brought to findings that reveal some important differences in trends in self-employment rates across ethnic/racial groups.

The expansion of the workforce has been found to be responsible of the large growth in the number of white male business owners as well as of the slight upward trend for the black male self-employer rate. It has been found to be entirely responsible for the remarkable growth rate of male Hispanic business owners (+159 percent), the rapid growth of the Asian male business owners and the self-employed Native American men.

Much different from the men situation is that of the women whose self-employment rates increased sharply from the 1979 to the 1998 even if the increase has been concentrated during the 1980s for most of them. Whereas the white rose by 40 percent in the two decades, the blacks by 30 percent and the Hispanics by 39 percent, they have followed different patterns. Just the blacks, in fact, had a noticeable growth in the 1990s (+26 percent) but for all of them Fairlie (2000) points out that the overall growth has been affected not just by increases in the female workforce.

The previous data have been confirmed by the 2002 Survey of Business Owners from the U.S. Census Bureau. In fact, considering the 23 million non-farm firms in 2002, the Hispanic Americans confirmed their leadership in terms of business ownership among the minorities (6.8 percent) preceding the African Americans (5.2 percent), the Asian Americans (4.8 percent or 4.94 percent including Native Hawaiian and Pacific Islanders in order to compare the data with Fairlie (2000)) and the American Indians (0.9 percent including the Alaskan Natives). These data bring to the relevance of the minority owned that, in 2002, owned 4.1 million firms that generated \$694.1 billion in revenues and employed 4.8 million workers.

Already in 1986, Hisrich and Brush noted the increasing number of minority entrepreneurs and pointed out the considerable risk, hard work and sacrifice that it involves. These are difficulties common to all the entrepreneurs but they argue that obstacles and risks are perhaps greater than for other entrepreneurs and the chances of success are lower identifying the reason primary in the lack of training and experience in business management. Anyway, despite of all difficulties, the number of minority entrepreneurs is increasing and Hisrich and Brush (1986) found an explanation in the difficulty many middle management level minorities have in entering senior-level executive positions.

The first topics studied in the field of minority entrepreneurship have been the same of the general entrepreneurship and, as well as for them, the results have brought to describe the minority entrepreneur without any significant relationship

between the sex of the entrepreneur and operative variable as the origin and status of the firm, the industry in which the firm was positioned, the size of the firm and its age. There have been, anyway, some studies that have considered the entrepreneurs by their gender. One of the first studies about white and black male entrepreneurs found a different level of creativity which was attributed to socio-economic factors rather than racial factors. Talking about the women side, some differences between white and minority women entrepreneurs regarded the higher values for the latter about the age at which they started the business, need for achievement and independence, conformity and benevolence. By the way, other studies regarding minority women entrepreneurs have not found racial differences but have underlined the existing differences between them and the women in the general population. The tested variables were achievement, autonomy, aggression, conformity, independence, benevolence and leadership (Hisrich and Brush, 1986).

Hisrich and Brush (1986) confirmed that minority entrepreneurs in their sample resembled the typical profile of the entrepreneur in most respects but pointed out differences in the way the minority entrepreneurs described themselves. Minority entrepreneurs considered themselves as more relaxed and flexible than anxious and rigid, as well as more adept to the idea generation but this could be due just to the way the sample used by the researchers was built on: appreciable number of minority entrepreneurs had an engineering background and they had seven or more years of experience. Eventually, they synthesized the typical minority entrepreneur as “a first-horn child from a lower- or middle-class family” with a blue-collar father, a college graduated, “married with children” that started the “first significant entrepreneurial venture between the ages of 35 and 45 and with previous experience in the area of the venture”.

On the other side, and perhaps of major importance, there are the motivational factors that led the minority entrepreneurs to start their venture. Still citing the study by Hisrich and Brush (1986), the strongest motivators to start the business were found to be achievement, opportunity and job satisfaction.

More recently, several studies have pointed out a variety of reasons that individuals offer for their choices to pursue particular careers including the choice to engage in business formation (Carter, Gartner and Greene, 2002; Levesque, Shepherd and Douglas, 2002; Simon, Houghton and Aquino, 2000). By the way, the reasons assumed by the researchers in the last decades differ to the findings of more recent studies. In fact, whereas the existence of different reasons sustaining the “nascent entrepreneurs” for starting businesses than those offered by individuals pursuing other careers were assumed (Dyer, 1994; Kolvereid, 1996), together with a special regard or emphasis placed on family and community among individuals from minority groups (Thomas and Alderfer, 1989), a recent research has highlighted that no statistically significant differences between nascent entrepreneurs and adults pursuing other careers for such reasons as: financial success, independence, innovation, and self-actualization (Carter, Gartner, Shaver and Gatewood, 2002). At similar results came Lee, Rogoff and Puryear (1995) when, controlling for family status, the African American and the non-minority business owners were found to have the same goals.

The previous reasons are part of the six categories (Innovation, Independence, Recognition, Role, Financial Success and Self-realization) identified by Carter et al.

(2002) after a comparison of several studies developed since the second half of the 1980s in different ways. The studies identifying the reasons for starting a business, reviewed by them, can be summarized in two big streams: one regarding the studies on entrepreneurs that are already established in the business (Birley and Westhead, 1994; Scheinberg and MacMillan, 1988) and the other one about prospective studies of individuals who are in the process of starting businesses (Carter, Gartner and Reynolds, 1996; Gatewood, Gartner and Shaver, 1995).

The similarity of reasons regarding entrepreneurs with respect to people pursuing other careers have been usually found during the last two decades (Gartner, 1985; Carter, Gartner and Greene, 2002) giving support to the universal career reasons thought by Sverko and Super (1995). Carter, Gartner and Greene (2002), at an overall level, found differences between nascent entrepreneurs and the others just on career reasons of Recognition and Roles whereas no significant differences were found between white and minority nascent entrepreneurs: both of them ranked high characteristics as Independence and Financial Success. Taking a last look at the six categories cited above and considering the different groups studied by the Carter, Gartner and Greene (2002), it is possible to underline how the Blacks were more likely to seek Recognition, Self-Actualization and Innovation than the Whites and the Hispanics were more likely to seek Recognition and be influenced by Role models than the Whites whereas no significant differences between Blacks and Hispanics were found.

Giving an overall view to the studies developed in the literature, and concerning with entrepreneurship in minority communities, five different categories of factors can be pointed out (Puryear, Rogoff, Lee, Haynes, Onochie and Grossman, in preparation): education and training; ethnic and racial factors; discrimination; goals, values and motivations; operating characteristics.

Education and training (including experience) have been found to explain the observed discrepancies in rates of self-employment among the different minorities by Boyd (1990), who gave a demonstration of this fact analyzing the self-employment for Blacks from the 1970 and 1980 census data, and Light and Rosenstein (1995) whose tested Census data through a supply (made up by human resource characteristics of the workforce such as ethnicity, age and education) and demand (made up by the financial differential between what entrepreneurs earn and what wage and salary employees earn) model.

Again Light and Rosenstein (1995) are among the main contributors of the studies on the ethnic and racial factors whose have found their major impact on entrepreneurship through their demand and supply model. They came to the interesting result that underemployed people were more likely to become entrepreneurs than those simply unemployed, explaining this fact through the presumed higher skills, training and qualifications but affected by racial prejudice: because "entrepreneurship requires means as well as motive". Differently from Boyd (1990), human capital differences, age and gender were not found to fully explain the low rate of entrepreneurship.

Light and Rosenstein (1995) have also contributed to the literature on the discrimination of minorities which was initially found to have limited minority self employment by Swinton (1984) and Borjas and Bronars (1989). Herbert (1989) and

Butler (1991) supported this data through their studies on the African Americans where they pointed out, respectively, the impacts of race and discrimination on the psychological development of Black male entrepreneurs as well as a detailed review of discrimination against this racial group. Eventually, there is also the study by Bates (1995) which supports this topic through an analysis of the Asian owned businesses in 1960 and noting how they were narrowly concentrated to laundries, restaurants and food stores.

Goals, values and motivations are other major factors in this field but without a large body of research comparing minority and non-minority businesses. Furthermore, they do not show consensus on these issues (Puryear, Rogoff, Lee, Haynes, Onochie and Grossman, in preparation) whereas a broader literature relating goals and their impact is available (Locke, 1968; Bandura, 1977; Evans, 1986; Tubbs, 1986) and shows that goals have an impact on performance and, on the other side, the are variables (performance, characteristics, expectations and rewards) influencing goals.

Last factor studied in literature, but reporting mixed results, is about the Operating characteristics of minority enterprises: literature gives inconclusive results about the inferred statement that similar operating characteristics could reflect similar goals (Puryear, Rogoff, Lee, Haynes, Onochie and Grossman, in preparation).

Studies about entrepreneurship within minority groups have often focused on the community level and rarely considered the individual motivational or behavior with the result of having many unresolved issues about the relevant dimensions of minority group and the career reasons of nascent entrepreneurs. By the way, in the decade from the beginning of the 1980s to the early 1990s, some studies tried to suggest factors influencing that decision and found the great influence exerted by the family. In 1981, comparing data from minorities with the whites, Dillard and Campbell pointed out the importance in this respect of the parents in African-American and Hispanic households. Importance of the family has been confirmed in a couple of studies few years later (Scherer, Adams, Carley and Weibe, 1989; Butler and Herring, 1991) where it was underlined the importance of a familial entrepreneurial role model. Considering the minority group level, elements of interpersonal influences have been found in peers, church and political leaders and other role model (Hill, Pettus and Hedin, 1990) as well as in the ownership in it (Roe and Lunneborg, 1990).

A considerable part of the literature regarding minorities in the United States has been dedicated to the African Americans, a group that is characterized by the low rate of self-employment among black men relative to white men: this parameter appears to date back to at least 1910 when black men were one-third as likely to be self-employed as white men (Fairlie and Meyer, 1999). The peculiarity of the African Americans is also underlined by the comparison with the Asian population. In fact, even if the latter group is much smaller, they owned in 1998 nearly as many businesses as the former and this data is consistent with the higher propensity of Asians than Blacks to choose self-employment shown in previous studies (Fairlie, 2000).

The literature on the African American businesses for families have developed through two lines of thought that share the historical role of this minority in providing

retail and service outlets for their racial group prior to the massive civil rights movement of the 1960s (Puryear, Rogoff, Lee, Haynes, Onochie and Grossman, *Sampling Minority Business Owners and Their Families: The Understudied Entrepreneurial Experience*, in preparation). The oldest line of thought explains the low rates of business participation through past economic and political discrimination (Trower and Subira, 1980; Shaw, 1983; Subira, 1986) and finding in the motivational approaches the key for the economic self sufficiency. Instead, the other line of thought refers to the failure of business management and economic theory in including the experience of Black entrepreneurship through a comparison of African Americans with other minority groups. In this stream of research, variables hypothesized to account for the differences such as value orientations (Enz, Dollinger and Daily, 1990), social and economic expectations (Green and Pryde, 1989), family structure (Green and Pryde, 1989) and the elimination of African American neighborhoods and their accompanying retail centers by urban renewal (Woodson, 1987) have not been fully studied on large scale for family and community life (Puryear, Rogoff, Lee, Haynes, Onochie and Grossman, *Sampling Minority Business Owners and Their Families: The Understudied Entrepreneurial Experience*, in preparation).

#### 4.2.3 Financing

Financing of the Small and Medium Businesses is a topic that is receiving a lot of attention from researchers worldwide. The interest is due to its characteristic of having been almost always a key concern of businesses and family businesses are not exceptions (Brockhaus, 1994). Moreover, as pointed out by Penrose (1965, p. 219), “Restrictions on the amount of credit a small business can obtain have a more far-reaching effect” on its competition, expansion, and opportunity to put its business plans to the test. It emerges a more comprehensive view of the process of getting credit which does not end with the initial credit application.

Nevertheless, it has been pointed out that after decades of great efforts in corporate finance, research to identify the determinants of a firm’s capital structure, it certainly continues to be a puzzle (Pindado, Rodrigues and de la Torre, 2006). In fact, this strand of literature has generated new questions, such as the role played by debt maturity in explaining a firm’s financial structure (see e.g. Barclay and Smith, 1995; Barclay et al., 2003; Ozkan, 2000, 2002; Stohs and Mauer, 1996). This line of research highlights the fact that long-term debt is not the only important concern when firms make their financial decisions, but that short-term debt should also be considered.

Before the review of the topic of entrepreneurship financing, it will be given an overview of the financial situation of the companies. From a study by Mark Crain (2005) about the impact of Federal Regulations on Small Firms comes a support to the relevance of the financial aspects in managing a company. In particular, he has

pointed out that very small firms (those with less than 20 employees) spend 45 percent more per employee than larger firms to comply with federal regulations. On the website of the Small Business Administration are available all these data broken down by industry but, here, it is enough to note that, on average, a company with less than 20 employees will have to spend \$7,647, compared to \$5,282 of a company with more than 500 employees in order to cope with all Federal Regulation (Environmental, Economic, Workplace and Tax Compliance). This is a kind of cost that a company has to sustain and may contribute to financial distress and, in turn, to the firm closure. It has already been mentioned before that only the 44 percent of new firms survive at least four years (instead, the two-thirds complete the second year) and the reasons have been explored recently by Amy Knaup (2005). Her findings about the new business's survivability have highlighted the importance in successful firms of factors as an ample supply of capital, the dimension ("being large enough to have employees"), the owner's education level and the owner's motivation to start the business (such as freedom for family life or wanting to be one's own boss). Numbers about firm closures and bankruptcies, based on data from the U.S. Bureau of the Census, have been given by Brian Headd (2005) and have shown a substantial constancy in the number of bankruptcies and a little decrease in the number of firm closures in the period between the 2001 and the 2005.

Keeping on analyzing the data from the SBA, it is interesting to point out how the small businesses are financed. Data, referring to June 2004 from the Survey of Small Business of the Finances Federal Reserve Board and prepared by James Kolari, show a the major role played by commercial banks in financing small firms. In fact, they were providing loans to small business for an amount of \$522 billion. Furthermore, commercial banks are responsible for supplying to the small businesses more than 80 percent of lending in the credit line market and, excluding the leasing, more than 50 percent in other markets (i.e. commercial mortgages and vehicle, equipment, other loans). Eventually, analyzing the dimension of the banks, it emerges the major role played by the large banks (with an asset size with more than \$10 billion) in financing small business with loans inferior to \$100,000: they provide the 67.5 percent of these loans for a total amount of 49.7 percent. Considering all the loans inferior to \$1 million, these banks are responsible for the 65 percent of them for a total value of 46.2 percent. Scott, Dunkelberg and Dennis (2004) have confirmed the role played by banks in being a dominant supplier of capital to small firms (84 percent of the identified loan sources). Taking a look at the other financial sources, a major role is played by finance companies whose accounted for the 6 percent whereas all the other credit sources accounted for only 10 percent of the loans granted. Taking care of the small business entrepreneurs' point of view, it emerges their fondness for smaller banks while they rated the large ones uniformly lower on almost all characteristics important to a small firm's banking relationship.

Several studies, as it will pointed out later, develop the topic of the capital structure and the main finding by Anderson and Reeb (2003), in a study on the S&P 500 firms, referred that the 33.6 percent of them are family businesses in which the founding family has, on average, 18 percent of firm equity (FFI). Moreover, they noted that the family firm capital structure is the same of the other firms among the 500 considered.

In 2005, Marc Casson approached the topic of resource acquisition and pointing out the crucial role played by asymmetric information: especially when talking about raising finance. This is a main issue in this part of literature because the entrepreneur is asked to share his/her information with the potential bankers and he/she does not know if he/she can trust them: they could exploit the information for themselves. Reviewing the evidence to this problem, Casson takes a look of the main way to get financing (self-finance, use of equity rather than debt finance, convertible securities, covenants and forfeitures and anti-dilution provisions) and discusses about the social and legal devices that can be employed (classified into “pre-investment tools” and “post-investment tools”) to manage financial risks to the mutual advantage of the entrepreneur and the investor.

Keeping clear in mind the dominant role played by banks as a provider of business loans, Scott, Dunkelberg and Dennis (2004) point out also other very important sources of financing for the small businesses: trade credit and credit cards (used by the 84 percent of the respondents with 42 percent reporting outstanding balances: average value among those carrying balance was almost \$17,000 with a median balance of \$4,000). This study shows also the limited use of newer technologies for banking transactions (i.e., just the 11 percent used the Internet for any business and only one percent reported using the Internet for loan applications) whose utilization was more concentrated within newer firms (owned by owner more comfortable with this technology): the little use is perhaps due to the year when the data were taken (2001).

Nowadays, the companies are facing a greater credit availability resulting from the combination of the radical changes that have taken place in the last decades in the USA and other changes brought by the fluctuating economic conditions. The period of radical changes started in the late 1970s with the deregulation of financial services, accelerated during the 1980s and has kept going on until the present. It has to be noted the negative effects brought by this kind of changes. They resulted in turbulence and instability associated with the bank mergers and acquisitions as well as the growing impersonality associated with the greater use of technology in the financial service industry.

What it has not been pointed out until now it is that, between 1995 and 2001, there has been a modest decline of banks (as primary source of external funding for working capital and capital expenditures) in favor of credit cards and trade credit. In particular, already in 2001, over the 80 percent of small business owners were using credit cards for business purposes (more than the fifty percent of them carrying balances each month) while the 54 percent used trade credit and, at least, the 75 percent said to take advantage of discounts on early payments most of the time.

Anyway, even if these radical changes have brought to a greater credit availability that has let almost 90 percent of owners who needed external funds to satisfy their needs (between 1999 and 2001), the merger and acquisition activity has affected the business owner through improved credit reliability and declined rates on their loans but imposing rising fees. Furthermore, these activities have brought costs on the non-credit aspects of the banking relationship: the business owners have complained for the decreasing quality of bank service, particularly with staff quality and turnover.

However, the benefits of increased competition were not distributed evenly as owners of older, larger firms had better overall experience than owners of smaller, younger ones (NFIB 2004).

Taking a better look at the sources of financing for small firms, it has been pointed out above the traditional primary role of banks but it is fundamental to stress the increasing importance of the role that other institutions are gaining in the small business loan market. Particularly interesting, it is the role of credit cards whose importance showed the biggest increase between 1995 and 2001: both in term of working capital (in 2001, most important source for the 15 percent of owners) and capital expenditures (in 2001, most important source for the 12 percent of the owners). Also trade credit increased in importance for both working capital and capital expenditure whereas finance companies showed just a modest gain and other loan sources (mainly made up by family and friends) were used less than in the early 1990s. In the report NFIB 2004 it has been highlighted also who and how has taken advantage of the different sources of financing. Here the distinction among the different profiles is quite evident and it shows how large firms, as well as the fastest growing firms, male-owned firms and older firms, are more likely to rely on banks for their working capital needs whereas credit cards are the preferred source of capital among owners of smaller firms (with sales under \$500,000 and assets under \$200,000), female owners, those firms in business for less than 10 years and those in non-professional service. The use of trade credit and finance companies has been described in terms of industry adoption. Whereas the former emerged as an important source by owners of construction, manufacturing and wholesale trade firms and the latter was reported to be used most likely in the transportation industry and by very fast growing firms, the other loans sources for working capital was concentrated among the youngest, smallest firms. Last noticeable point of the report refers to the role played by other loans, credit cards and finance companies whose appear to be primary backup for capital expenditures when owners were turned down on their most recent loan.

Eventually, it is interesting to have an evaluation of the incidence of collateral since the 52 percent of those receiving a new loan were required to post one as part of their loan agreement (the average collateral value was \$667,000 with a median market value of \$250,000). In the 64 percent of cases, business property was used for collateral whereas other forms of collaterals were lagging far behind such as inventory (36 percent, frequently used by firms in the wholesale and retail industry), personal guarantees not tied to non-business real estate (29 percent), accounts receivable (28 percent, they are the most used by the wholesalers), business owners own homes or other personal real estate for collateral (27 percent, where homes were the most often used by service firms and other personal real estate by those in the FIRE industry) and other personal assets (10 percent). The use of accounts receivable as collateral rises with firm sales whereas, in contrast, the use of the owner's private property generally declines with firm size (sales), while inventory shows no consistent pattern with firm size.

Thinking about the data presented above, it emerges the increasingly important role of Relationship banking for the SMEs and an opposite situation to that described by Baas and Schrooten (2006) whose argue that SMEs seem to suffer from limited access

to external financial resources all over the world (Beck and Maksimovic, 2002; European Commission, 2002; Beck et al., 2003). Nevertheless, it is often pointed out the reluctance of banks to provide credit to this type of enterprises since they have relatively limited publicly available information about SMEs. The origin of the scarcity of information publicly available can be found in the low legal accounting requirements for these enterprises whose, in turn, let the managers of SMEs have only small incentives to invest in detailed information practices.

Relationship banking refers to the long-term relationship between firm and the bank that assures the firm's access to credit giving to the bank access to more valuable information about the firm (Allen et al., 1991; Nakamura, 1992; Berger et al., 1999; Boot, 2000; Schaeffer, 2003) and is often considered as the most appropriate lending technique for collecting information on SMEs (Boot and Milbourn, 2002). Even if these considerations could be expected to lead to declining loan interest rates over time, the literature gives mixed evidence about it: whereas Greenbaum et al. (1989) and Sharpe (1990) demonstrate conditions under which lenders subsidize borrowers in early periods and are reimbursed in later periods, Peterson and Rajan (1994) suggest that loan interest rates decline with relationship lending.

Recent researches on relationship banking have been promoted right from the argument that it can compensate this specific lack of information through the collection of exclusive information. Baas and Scrooteh (2006) found in the existence of this exclusive information the explanation for the close linkage between the lending technique of a bank and the interest rate offered to a firm: they showed that relationship lending leads to relatively high interest rates if compared to the much lower burden in the case of financial statement lending. The relevance of this topic is such to have been used in the recent discussion on the introduction of international accounting standards in Europe and gives strong arguments for an improvement of the current design of accounting standards specifically for SMEs: its mandatoryness for all types of companies would lead to an improvement in decision-making and a more efficient situation for both banks and enterprises and it would have a self-containing, positive impact on competition within the banking sector (Baas and Scrooteh, 2006).

Coming back to a broader point of view, relationship banking it is just one of the four lending techniques pointed out by Baas and Schrooten (2006) and the only one based on "soft information" (qualitative information). As explained above, private information about the firm and its owner are exchanged with the bank which will take advantage from decreasing monitoring costs whose entity will depend on the tightness of the banking relationship. Based on "hard" (quantitative) information, there are three techniques: financial statement lending (standardized financial reporting data whose efficiency depends on the quality of available data), Asset based lending (it consists of credit collateral and there is no credit loss if credit volume is in the limit of collateral value) and credit scoring (based on standardized financial data about the owner and the firm, it is characterized by a flat rate of monitoring cost and its efficiency depends on the quality of available data but can be a proxy of financial insight).

Berger and Udell (2006) have proposed a more complete conceptual framework for SME finance since they view an oversimplification in the way several researchers categorizes the lending technologies (defined by them as a unique combination of

primary information source, screening and underwriting policies/procedures, loan contract structure, and monitoring strategies/mechanisms). Their view broadens the approach given by Baas and Schrooten (2006) and it is due to the consideration that transaction lending is not a single homogeneous lending technology but there are different lending technologies: financial statement lending, small business credit scoring, asset-based lending, factoring, fixed-asset lending and leasing. They describe the differences introduced by their approach also talking about informationally transparent and opaque borrowers: while the firsts are the focus for the financial statement lending, the others are the focus for the opaque borrowers. An important difference of their approach concerns with the conceptual framework usually adopted by researchers: it is about the inferred disadvantage of large institutions in lending to opaque SMEs while the association is considered right for what concern the large institutions and the transaction technologies. In fact, Berger and Udell (2006) argue that large institutions deliver credit to many types of opaque SMEs through the transactions lending technologies that specifically address problems of informational opacity using hard information: different types depending on the lending technology in use. Focusing on small business credit scoring, it has been shown that large institutions use hard information on the SME and/or its owner obtained from credit bureaus to infer future loan performance. Another form of credit lending is the asset-based lending which consists in valuations of the assets pledged as collateral to evaluate repayment prospects done by the institutions. For factoring, institutions focus on the quality of the accounts receivable purchased while, for fixed-asset lending and leasing, large institutions look at the valuations of the fixed assets that are pledged as collateral (fixed-asset lending) or directly owned by the institution (leasing).

In literature, anyway, it is possible to find support for large institutions with respect to the small ones and vice versa. In fact, just for citing a couple of examples regarding the disadvantages for the large institutions, Williamson (1988) highlighted the possibility for large institutions to be disadvantaged at relationship lending because of organizational diseconomies with providing also transaction loans and other wholesale services whereas Berger and Udell (2002) underlined the closeness of small institutions to enterprises because of their fewer layers of management.

Empirical literature in this topic is often based on data from US banks and SMEs and these studies have found large institutions to lend to larger, older SMEs with stronger financial ratios, and small institutions are found to rely more on soft information and lend to SMEs with which they have stronger relationships (e.g., Haynes et al., 1999; Cole et al., 2004; Scott, 2004; Berger et al., 2005).

Giving a broader overview of the literature, it is possible to take a look of what the main focus in entrepreneurship financing research was around the beginning of the 1990s. In that period, this field of research was almost totally concerned with the venture capital form of funding (Brophy, 1992) and it focused in those years on venture capital flows, investment criteria of venture capitalists, their strategies and roles, and the value added by venture capital firms (Timmons and Sapienza, 1992). Brockhaus (1994) has pointed out the marginal interest of venture capital for family businesses since formal venture capital firms typically look for high-growth technology-based companies and hope to obtain their profit at the time the business

"goes public" or is bought by a larger firm. By the way, some areas of common interest exist since for some family the best choice would be to sell the business. This is the reason why, a part of the literature of that period has analyzed the different ways in order to transfer the ownership. These ways refer to the leverage buyouts (Bull, 1989; Malone, 1989), ESOPs for family firms (Hoffmire, Willis, and Gilbert, 1992), Initial Public Offerings (Bygrave, 1992) and additional alternatives to get cash from the business (Dreux, 1990). Another portion of literature has faced the topic of how the families should invest the funds obtained from the sale of all or a part of the business (Hamilton, 1992) as well as the extra-money gained by a family business. Brockhaus (1994) suggests the option of investing in the early stages of someone else's business, whereas Freear and Wetzel (1989) describe how entrepreneurs and wealthy individuals find each other. Looking at the empirical side, in 1988 Gaston and Bell found that 83% of informal venture capitalists had entrepreneurial experience, a finding confirmed two years later by Postma and Sullivan (1990) whose reported that 49% of the investments made by informal venture capitalists were referred by friends or family, 24% by business associates, and 18% by accountants and lawyers. It emerges the importance of the contacts developed through the informal venture capitalists' businesses and family and friends.

A more comprehensive approach to the venture capital galaxy has been given by De Clercq, Fried, Lehtonen, and Sapienza (2006) whose have deeply analyzed this source of capital describing the role of the different types of venture capitalists (classic or professional venture capitalists, business angels, corporate venture capitalists) according to the sources of investment funds, typical scope and size of investments, primary motive(s) for investing, investment criteria, reporting requirements and exit issues.

Giving some details about the different types of venture capital providers, it is possible to see how the Business Angels are private individuals usually involved in providing seeding and start-up capital investing their own money (typically not more than \$100,000). They are moved by personal as well as equity growth motives, act in a geographic area very close to the business to be financed and do not usually plan in advance the exit method.

Much easier to find and used to invest in later stages are the Corporate Venture Capitalists. Among the three types of venture capitalists providers, they are the most diverse from the Business Angels in all their activities. They are subsidiaries of large firms able to invest the largest amount of money (typically up to \$20 million) that choose their investments looking for strategic and equity growth motives. The only common point with the Business Angels refers to the exit planning methods that is often unplanned and do not rely just on trade sale but also on acquisition and IPO.

Eventually, between the BAs and the CVCs, there are the Professional Venture Capitalists (VCs): general partnerships that invest funds (typically up to \$10 million) of outside limited partners and look for equity growth though the management of a portfolio of entrepreneurial ventures (Sahlman, 1990). This is, probably, the most studied category of venture capital providers and, differently from the other two types of investors, they operate without any preferences in all the financing stages of the business (in 1998, Wright and Robbie underlined that they invest modestly in seed financings though) and have a planned exit method that often brings to the trade sale

or the IPO. They want to be involved with the business and, in order to assist in growth and to monitor progress, VCs stay highly involved with their portfolio companies and expect regular reporting from the entrepreneur (Busenitz, Moesel and Fiet, 2004). Moreover, as time goes on, the demonstrated ability of the CEO to bring venture to the market increases in importance and it is not unusual for the CEO to be replaced as the venture growth explodes (Tybee and Bruno, 1984; Wright and Robbie, 1998). This is the reason why VCs prefer to invest in ventures geographically close to them and choose to become involved with the board either directly as members or indirectly through a syndicate.

It emerges that Venture capital firms are small, flat organizations (Wasserman 2005; 2003) that make investment decisions collectively with the other partners of the venture capital firm (De Clercq, Fried, Lehtonen, and Sapienza, 2006) and usually, since their limited life (typically 10 years), they manage more than one fund at time (Norton and Tenenbaum, 1993).

Those presented above are the sources of capital whose have been categorized in several ways in the literature. Just in order to give an example, another kind of classification has been provided by Jarvis (2000) who gave a classification in four points: personal savings (including contributions from family and friends); debt financing (including hire purchase and leasing), normally through a commercial bank; third, soft loans supported by central government; and finally, equity funding via venture capital and informal investment (Jarvis, 2000).

Venture capital is one of the possible ways to get financing for a business and a broad literature has been developed about this topic and the resulting capital structure. In fact, the first studies date back to the 1950s when researchers started wondering why firms choose differing proportions of debt and equity to finance their operation. From that period comes the most famous work in that field: the one by Modigliani and Miller (1958). Frielinghaus, Mostert and Firer (2005) pointed out the existence of five major sub-theories within capital structure theory; even if Meyers (2001) found that nobody has proved to be conclusive. The innovative contribution to literature by Frielinghaus, Mostert and Firer (2005) is the idea to link the organizational life stage theory with the capital structure theory. The former became widely studied starting from the 1970s and it has been considered as an extension of the product life cycle theory by Rink and Swan (1982) and, therefore, based on the four stages of start-up, growth, maturity and decline. In 1984, Friesen and Miller reviewed the literature and found five common life stages (birth, growth, maturity, revival and decline). The meticulous description has gone further and have found in Adizes the originator of a model that incorporates ten life stages not defined by company's chronological age, sales or assets, or number of employees but from typical patterns of behavior defined by the interrelationship of flexibility and control: courtship (conception of the business idea and, therefore, stage without a capital structure), infancy (the entrepreneur decide to take the risk and commercialize the idea. Negative cash flows are usual and bring the company to be vulnerable to financial shocks (Marshall and Heffes, 2004): the need for external financing is accomplished by relationships with early stage investors), go-go (high-growth stage reached after having survived the trials and tribulations of the beginning. There is the need to access more external capital, which has been found by Carpenter and Petersen (2002) to be a major factor

constraining the pace of growth of young firms), adolescence (high-growth is accompanied by the changing culture of the firm and managers are introduced at the request of outside investors in order to balance the need to grow and the need for profit. Other important characteristic is the financing method: high growth firms find financing in the introduction of private equity investors or through an IPO), prime (the optimal life stage, the most efficient since stakeholders and employees align themselves to the firm. The optimal balance between external factors, internal factors and managerial motives is reached and the level of risk is lowered), stable (stage at which fewer high return investments are available), aristocracy (here the company is operationally successful, financially strong and highly liquid but there is a marked increase in rigidity. Fundamental is the role of financiers such as investment bankers and private equity since the companies at this stage pursue firms in the go-go stage), recrimination (stage where a negative transformation of firm culture takes place: no more promoting innovation, with employees that escape from responsibilities and where the market has little consideration for the firm's schedule of investments. The way to resuscitate the firm at this stage consists in introducing capital structure changes, managerial incentives and new business strategies), bureaucracy (it often signals the end of the company which is not able to sustain itself anymore), death (the company ceases to exist, also because the result of merger or acquisition).

The previous statements about the firm's life stage are useful to understand some of the dynamics behind the decision of financiers when they are asked to give or deny credit to a firm. In particular, Black (1998) pointed out the importance of understanding firms' life stages and growth patterns for both financiers (in order to better evaluate firm's financial information, current and future needs and management capabilities) and asset managers (in order to better allocate their funds according to company's future prospects).

It has been already noted the inconclusiveness results of the research about the capital structure but a matter that should not be expected to lead to the debt-equity choice (Myers, 2001). It is useful to give a brief overview of the five different theories elaborated in order to study the capital structure because it helps in understanding the different issues that affect the sensitive topic of financing firms.

The first one, it is going to be introduced, is the one most closing related to the topics developed above: the capital structure life stage theory. It has been developed since the beginning of the 1990s and the studies have emphasized different characteristics such as the trade-off between business risk and financial risk (Bender and Ward, 1993): the former decreases along the life stages allowing the latter to increase. More recently, Hovakimian, Opler and Titman (2001) suggested the use of 'relatively more debt to finance assets in place and relatively more equity to finance growth opportunities'. These thoughts are supported by Damodaran (2001) who comes at the same conclusions of using more debt in case of financing a stage of maturity and equity in case of growth stage or high-growth firms. The last considerations have brought Frielinghaus, Mostert and Firer (2005) to synthesize the previous study with the idea that 'debt ratios should increase as the firm progress through the early life stages'. Furthermore, the same scholars have come to the conclusion that 'firms in the declining life stages would again experience a growth in business risk and would need to decrease their exposure to debt'.

A second theory about the capital structure, and widely cited in literature, it is called Pecking Order Theory. It suggests a strong relationship between life stage and capital structure and it is based on the findings by Myers (1984). Taking a look at the firms' balance sheets, he observed that companies first use equity, then debt and, if necessary, external equity. This theory has received the support of several studies (i.e. Fama and French (1988) as well as Allen (1993) have found that leverage is inversely related profitability and, therefore, debt is only issued when there is insufficient retained income to finance investment) and introduced a different conclusion to what Ross (1977) argued about using more debt to overcome information asymmetries and signal better prospects. In fact, Myers (2001) started from the same point about information asymmetries to argue that managers are unlikely to issue equity because they fear it will signal that the stock price is overvalued. These are the reasons that have led Frielinghaus, Mostert and Firer (2005) to conclude that higher leverage rates will have to be expected at early and last stages.

The other three theories are based on problems that businesses usually have to cope with in the day by day activity. The oldest one got its step with the publication about the arbitrage argument by Modigliani and Miller (1958); they pointed out the independence of the market value of a firm from its capital structure. Several remarks have been made to this starting point, because the expected invariance of the capital structure (from firm to firm and over the firm's life stages) is based on a 'deliberately artificial set of conditions' (Barclay, Smith and Watts, 1995:6) consisting of no information costs, no personal or corporate taxes, no contracting or transaction costs and a fixed investment policy. The development of this approach consisted in the introduction of the taxation which brought to what it is called the Static Trade-Off Theory. Whereas Miller (1998) highlighted just the positive effect of increasing the level of debt as far as possible, Stiglitz (1974, 1988) and other researchers recognized the existence of an upper limit (and an optimal level) on the amount of debt that should be present in a firm's capital structure because of limitations due to bankruptcy costs that increase as the firm's level of debt increases.

In 1984, Myers described the Static Trade-Off Theory including the previous considerations and pointing out that firms maximize their value by balancing the tax benefits (or tax shields) with the bankruptcy costs (or insolvency costs) associated with increasing levels of debt: an optimal capital structure is hypothesized. Cassar and Holmes (2003) synthesize this theory stating that 'Static trade-off choice encompasses several aspects, including the exposure of the firm to bankruptcy and agency costs against the tax benefits associated with debt use' identifying a subset of bankruptcy costs called liquidation costs (they 'reduce the proceeds to the lender, should the firm default on finance payments and become insolvent'). Frielinghaus, Mostert and Firer (2005) have stressed out the identification made by some researchers about problem areas in the ability of static trade-off theory to explain actual firm behavior because it has brought to mixed considerations by the other researchers: Warner (1977) suggested that bankruptcy costs are much lower than the tax advantages of debt, implying much higher debt levels than predicted by the theory but Myers (2001) found that, in reality, highly profitable firms tend to have less debt than less profitable firms. Among the studies supporting the theory, Kayhan and Titman (2004) pointed out the role of the interest tax shield and found that, over the long term, firms tend to

reach debt ratios consistent with the theory. Taking the support also of other studies (as those by Opler and Titman, 1994; Bradley et al., 1984; and Graham, 2000) Frielinghaus, Mostert and Firer (2005) have summarized the Static Trade-Off theory through level of debt usage that are low in early stages, high during the prime stage and low again in the late stages: this is due to expectation of seeing bankruptcy costs reducing in importance as firms grow and develop but experiencing a decrease in earnings (and hence a decrease in the tax shield benefit of debt) from the aristocracy stage and as a result might be inclined to use less debt.

Already cited as one the problems in getting financing for the businesses, especially when still small, it is the information asymmetry which is the base of the fourth theory about capital structure: Information Asymmetry Theory. This is an approach that, starting from the Modigliani and Miller's study tries to get closer to the reality removing also the assumption about the market possession of full information about the activities of firms' (Ross, 1977). Allowing information asymmetries brings into the main scene the role of signaling behaviors because the managers will choose the capital structure having more information than the market. While it has been argued that information asymmetries decrease over the lifetime of a firm (Baeyens and Manigaart, 2003), the only problem is about the exact interpretation of these behaviors because in literature can be found different explanation: Ross (1977) considered an increasing leverage as a signal of the increased value of the firm and a proof of size and future cash flows whereas Fama and French, 1988, argued that higher debt amounts would actually signal poor prospects for future earnings and cash flow (this is due to the less internal financing available to fund development). The missing clarity in the understanding of the signals has led Frielinghaus, Mostert and Firer (2005) to avoid any considerations about the usage of debt at the different stages of life cycle with regard to the asymmetry information.

Last theory cited in this review is the Agency Cost Theory which is based on the divergent interests in running a business, as well as the existing asymmetries, between the managers/entrepreneurs and their investors. In literature, several contributions can be found and they let to trace a profile of the debt usage at the different stages of the firm's life cycle. In 1986, Jensen commented broadly this topic pointing out that agency costs are good reasons for firms to increase their leverage (in this way they will lower the pressures by the investors) but are especially severe 'when the organization generates substantial free cash flow'. The same author, talking about rapidly growing organizations, also argued about the less effectiveness of debt in reducing agency costs when they are involved with 'large and highly profitable investment projects but no free cash flow'. Considering also the contributions by Ang, Cole and Lin (2000) (whose argued that the firm with the lowest agency costs is, by definition, the one that is run by its owner) and Fosberg (2004) (who found that the debt ratio decreases as agency costs decrease because of an increasing proportion of ownership by management, and that those firms with fewer shareholders have more debt than firms with many shareholders), Frielinghaus, Mostert and Firer (2005) have come to describe the usage of debt as low at the early stages and high later.

It is not the main focus of this research, but it has to be noted that the case of new technology-based firms may sometimes be characterized by different financial choices if compared with the other firms. For instance, it is possible to cite the study

by Hogan and Hutson (2005) for realizing that these kinds of companies do not match the pecking order hypothesis since they prefer outside equity to debt and this is not just explainable with the information asymmetries in the banking sector.

The previous analysis of the capital structure theory can be completed adding the topic of the affection of financial distress on Small firms financial structure (Pindado, Rodrigues and de la Torre, 2006) which has been influenced by the strand of literature risen with the question about the role played by debt maturity in explaining a firm's financial structure (see e.g. Barclay and Smith, 1995; Barclay et al., 2003; Ozkan, 2000, 2002; Stohs and Mauer, 1996). The importance of this line of research is due to the consideration of both the long-term and short-term debt (Cassar and Holmes, 2003): a fundamental consideration when studying small firms because of their difficulties in gaining access to long-term debt (Pindado, Rodrigues and de la Torre, 2006). The preference for lending short-term debt by the banks is due to the willingness of avoiding taking risks when financing small firms and it is directly linked to the financial distress situation a firm may face. This happens because payments are habitually made through bank accounts and, therefore, bank lenders are the first to know when a firm faces a financial distress situation and they can simply not renew the short-term debt when it matures. Thus, the discussion comes back to the trade-off between the benefits and costs of debt which focuses on ex-ante insolvency costs, whose negative effect on leverage has been theoretically justified (i.e., Barnea et al., 1981) as well as empirically documented (i.e., Miguel and Pindado, 2001).

Concluding this review about the capital structure, it is possible to point out that as shown by Hall et al. (2004), there are variations in the effects of the determinants of capital structure across countries but financial theories of capital structure and financing can be applied to SMEs (Berggren, Olofsson, and Silver, 2000; Berger and Udell, 1998; Cosh and Hughes, 1994; Cassar and Holmes, 2003). Keeping on looking at the studies coming from around the world, it is interesting to note the implication of a study on Australian SMEs by Cassar and Holmes (2003) that has shown how bank financing differs from other outside financing of firms characteristics that are not just size: banks seem to place greater emphasis upon the asset structure of the firm, appear to issue finance to firms with lower risk and lend to firms which have lower growth.

Among the various factors that may influence the financing choices highlighted by Cassar and Holmes (2003) there are also the strategic decisions of the firms as well as the limited management skills and knowledge of the small business owners/managers. Small businesses financing is also affected by the limited separation of business decisions from the personal objectives and assets of the owners (Holmes et al., 2002).

Talking about ownership, it is interesting to note the study on UK SMEs by Watson and Wilson (2005) about board pay and the separation of ownership from control. This is a topic directly related to the financing side because of the different goals that investors and managers have. Even if, the lack of a separation of ownership from control characteristic of closely-held firms implies that the agency and incentive alignment concerns central to the large firm literature (Fama and Jensen, 1983; Garen, 1994; Holmstrom, 1979, 1982), there will be a substantial minority of enterprises with an ownership and management structure that is very similar to large listed firms. This diversity in the ownership and control characteristics of SMEs has let Watson and Wilson (2005) to model and empirically test contrasting behavioral motivations

behind Board pay decisions through the closely-held pay model adapted from previous research by Keasey and Watson (1996) and Watson (1990) and have brought to results consistent with their need to align shareholder and manager incentives: the results indicate that the change in non-closely held SME Board pay is significantly related to both external market pay comparisons and “benchmark” profits.

Financing constraints influence business growth also in transition economies (Budina et al., 2000; Bratkowski et al., 2000) but studies have focused also on the effect of property rights (Johnson et al., 2002). A recent study by Hartarska and Gonzalez-Vega (2006) has given evidence on both these topics whose were already studied by Johnson et al. (2002): considering transition countries including Russia, they gave empirical evidence on the affection of property rights concerns on firm reinvestment in large group and that these concerns are more important than financing constraints. Indeed, their study was based on the assumption that credit markets clear which is far away from all the theory discussed above about the asymmetric information: loans (and other external funds) are either rationed or available at a premium (Jensen and Meckling, 1976; Stiglitz and Weiss, 1981) and, in such circumstances, external and internal finance are no longer perfect substitutes (Myers and Majluf, 1984). This one could be the reason why several studies reported of the significant financing constraints faced by small firms in post-communist countries (Budina et al., 2000; Pissarides et al., 2000; Lizal and Svejnar, 2001; Konings and Xavier, 2002). However, these constraints do not affect all firms uniformly the high information costs of external financing reflect important impediments to capital formation, and policies that decrease the cost of external financing may be appropriate: the study has given evidence that the formal financial sector did not channel funds to the most successful investment projects but there is evidence that loans were given to firms that had more transparent transactions, given their use of bank services (Hartarska and Gonzalez-Vega, 2006).

The topic of financial constraints has been developed in many perspectives as it is shown in the next few examples. An interesting study from Sweden has focused on the Business Services since their increasing importance in Swedish economy (Davidsson et al., 1996) and has pointed out the different approach to financing of younger firms whose regard favorably the added expertise of new (preferably angel) equity holders. These owners considered equity finance to be regarded as a ‘package’, with transfer of management skills from venture capitalist to firm sweetening the bitter pill of control-loss.

While Sarno (2005) offers an approach which emphasizes the location of small and medium firms in getting financial resources (finding the reasons of liquidity constraints in Southern Italy in the undersized nature of firms and the higher risk of business activity), Honjo (2006) and Cziraky, Tisma and Pizarovic (2005) look more at a macroeconomic level at what happens in Japan and Croatia respectively with respect to the governmental programs for the promotion of SMEs in each country.

Another interesting study on the finance for SMEs in UK (Hughes, 1997) have pointed out the relevance of macroeconomic factors (high interest rates and prolonged recession in the early 1990s) in shaping the access to credit of SMEs whose were relying mainly on short-term finance from banks. The same study introduces also the new questions about the developments of ethnic businesses in the 1980s (especially

those run by the Asian community) and recalled the debate on their ways to raise finance pointing out the two sides of it: cultural stereotyping, lack of established track records and racial discrimination are faced with strong informal financial networks.

The ethnic and, more generally, the minority businesses have become more and more studied through researches developed all around the world.

Role of ethnicity has been explored by several studies and it has become a sensitive topic especially in those countries where different ethnicities live together. A first example, it is a research by Fafchamps (2000) on manufacturing firms in Kenya and Zimbabwe that has explored the access to credit for African manufacturing firms. The particular characteristic of researches in developing countries, it is the different makeup of local business from that of the overall population because it has been shown an higher proportion of entrepreneurs among members of particular ethnic or religious groups or for residents of foreign origin (i.e., Bigsten et al., 1998). Furthermore, religious and ethnical background of dominant business-groups varies considerably from place to place as other studies developed by historians, anthropologists and sociologists have pointed out (Bauer, 1954; Geertz, 1963; Cohen, 1969; Meillassoux, 1971; Jones, 1972; Amselle, 1977; Geertz et al., 1979; Staatz, 1979). In fact, studies have pointed out the interplay between trust, trade and ethnicity or religion as Islam (Shillington, 1989; Ensminger, 1992) and others have underlined the preference of African entrepreneurs to make business within their own ethnic group which, in turn, emphasizes the role played by trust and reputation in the communities (Marris, 1971; Macharia, 1988; Himbara, 1994; Mitchell, 1969; Granovetter, 1985; Coleman, 1988; Hart, 1988; Milgrom et al., 1991; Greif, 1993, 1994; Platteau, 1994). Closely related to these topics is the one about network effects whose have received somewhat less attention in the discrimination literature. However, they have become the focus of a rapidly growing literature that has modeled these processes and has shown that, in a world of imperfect information, they provide an economic advantage to better connected agents (Kranton, 1996; Taylor, 1997; Fafchamps, 1998). Importance of network is major also for explaining gender or ethnic bias, through the emphasis put on socialization, but also its role in getting credit since market transactions normally encompass an element of credit: recourse to formal collateral is impractical for most business transactions and, therefore, trade credit gets allocated essentially on the basis of trust (Fafchamps, 1996, 1997; Fafchamps et al., 1994). Fafchamps (2000) noted that only very small firms can operate on a cash-only basis through a relationship based on trust but credit from suppliers is an important source of finance for small and medium-size firms (Cuevas et al., 1993; Bade and Chifamba, 1994; Fafchamps et al., 1994, 1995). In 2002, Biggs, Raturi and Srivastava have developed the topic of ethnic networks and access to credit again on manufacturing companies from Kenya. Their findings are based on the considerations that "it is often observed that when full information and formal third party enforcement of contracts are not available, ethnic networks can facilitate exchange" (Hamilton, 1994; Redding, 1990 and Pyatt and Redding, 1995) and on the awareness about the critical role played by the access to external financing (Light and Bhachu, 1993; Minters, 1999).

Given the previous overview of the literature developed around the world, it is possible to have a better understanding of the next part and focus on the situation of

financing for the US SMEs. A large portion of the literature about financing small and medium enterprises has been developed on data from the USA and a special attention has been received by topics as minority, discrimination and the role of family businesses. Above, it has already been shown how the small businesses get financing and a confirmation comes from Brown (1993) who points out the best ways to finance a small business (giving a special attention to Black minority). In order to improve the list of seven ways to tap for money (Pension Funds and Insurance Companies, Venture Capital, Specialized Business Innovation and Research Awards, Small Business Administration Bonds, SBA Loans Program and Commercial Banks) presented by Brown (1993), it is major to give the necessary recognition to the financial support given by credit cards whose have greatly increased their role in the last years. Rayasam (2006) pointed out the aggressive marketing campaigns by credit card companies to persuade many small-business owners to change their ways and gave some numbers about the possible increased use: Sastry Rachakonda (director of Discover Business Card) saw a need to be filled in the \$4.7 trillion in 2005 small-business purchases (of which only \$300 billion was spent using payment cards). This is a very important source of capital for small business because, as said by Peter Horan (CEO of Allbusiness.com), the competition helps small-business owners in keeping more-detailed and frequent statements about where their money goes. The competition brings also to higher credit limits and lengthy payment schedules whose give them flexibility similar to that of larger companies (Rayasam, 2006).

Haynes, Walker, Rowe and Hong (1999) focused their research on the financial side of family-owned businesses and cited also the results of elaborations of data from the Federal Reserve as well as the National Survey of Small Business Finance, National Family Business Survey and US Census Bureau. Relevance of debt has been shown through the increased level of debt (+15%) hold by households (Kennickell et al., 1997) and data from the Federal Reserve Board showed that small business debt exceeds \$2.4 trillion and household debt exceeds \$4.0 trillion (Cole, Wolken, and Woodburn, 1996; Kennickell, Starr-McCluer, and Sundén, 1997). Major sources of credit loans are commercial banks (Cole et al., 1996) and, as noted by Haynes and Avery (1997), households engaged in small-business ownership have substantially higher debts and a higher probability of borrowing from commercial banks and family members than those households not engaged in any small-business ownership.

Reviewing the literature with respect to the U.S.A. situation, it is possible to confirm the findings discussed above about the enterprise characteristics and the use of debt: Leeth and Scott (1989) found that the use of secured (collateralized) debt is related to the age of the firm, loan size, loan maturity, prevailing interest rate, legal environment, and type of industry while, few years later, Bates (1991) introduced the factor of ethnicity and found different sets of relevant variables (for Whites, owner's age and education, amount of equity capital (debt plus equity), and whether the business was ongoing or a start-up; for African Americans, education, owner's experience in a family-owned business, amount of equity capital invested, and whether the business was ongoing or a start-up) as well as a smaller use of debt financing by the African Americans. In the same study emerged some surprising results if compared to the findings of a couple of studies by Light's (1972) and Light and Bonacich's (1988) whose demonstrated the importance of a rotating credit system

in the development of business enterprises among Asians. In fact, Bates (1991) evaluated how the business's owner and spouse and the owner's friends and relatives contributed to the amount of start-up capital and found that minorities (29.4% for Hispanics and 29.9% for Asians) invested the same amount of non-minorities (19.3%).

Another interesting trend pointed out by the Center for Venture Research at the University of New Hampshire and regarding the Business Angels in the USA has shown fewer deals (minus six percent in the first semester of 2006) but with more funding (plus fifteen percent in the same period). The news, reported by BusinessWeek.com (7/24/06, "A Rumor of Money for Entrepreneurs"), emphasized that the trend began in 2004 but it does not mean that angels are abandoning seed and startup investing. As stated by Jeffrey Sohl (director of the center), it is just that "the market conditions, the preferences of large formal angel alliances and a possible slight restructuring of the angel market are resulting in angels engaging in more later-stage investments".

Looking at the data provided by the 1998 Survey of Small Business Finances (SSBF) and analyzed by Haynes (2003), it is possible to point out also the important role of finance companies in providing credit to small businesses (primarily for vehicle loans, capital leases and other asset-backed credit). While the probability of using a finance company has remained relatively constant from 1993 to 1998 for all types of loans except leases and mortgages, borrowers were more likely to utilize both finance company leases and mortgages in 1998 than 1993. Moreover, the study pointed out the preference of low-risk borrowers for finance companies than high-risk ones even if the finance companies may charge higher interest rates on lines of credit and asset-backed loans than commercial banks.

Other major topics about the financing of family businesses in the USA have been highlighted by Olson, Zuicker, Danes, Stafford, Heck and Duncan (2003) through a research that strived to evaluate the impact of the family and the business on family business sustainability. This study pointed out the importance of the use of the Sustainable Family Business (SFB) Model for researching on this kind of topics because it "gives equal recognition to the family and the business and the interplay between the two in achieving sustainability for both" (Heck et al., 2000; Stafford et al., 1999). Stafford et al. (1999) stressed out how this model borrows heavily from household management theory with its underlying family systems theory and, therefore, it is considered as an "innovative approach to the study of family business" (Trent and Astrachan, 1999) which has let to recognize the effects of the family on the business. Particularly, it has been shown that the nature of the effects of the family on business ventures is at least as important as the size of the effects. From a financial perspective, it is major to point out the role of family tensions whose bring to a declining business productivity as already pointed out by previous researches (Danes and Amarapurkar, 2000; Danes et al., 2000; Rosenblatt, 1991; Stewart and Danes, 2001). In turn, the less income the business generated, the more likely the family was to use its income to meet any cash flow problems that arose in the business (Olson, Zuicker, Danes, Stafford, Heck and Duncan, 2003): this result meets the conclusions of Haynes et al. (1999), they "confirm that small businesses actively intermingle business and family resources. If resources are intermingled, then any

assessment of the well-being of the family (or business) is incomplete without an assessment of the well-being of the business (or family)". Eventually, another result of the study by Olson, Zuicker, Danes, Stafford, Heck and Duncan (2003) found that only one characteristic of the business, cash flow problems, significantly and negatively affected the functional integrity of the family: in accordance with Danes et al. (2001) this result brought a picture where the less functional the family, the more likely the business is to have cash flow problems.

Other fundamental topic of the review of the literature, it has to be noted the importance of the risk-taking behavior of family business owners in the USA. From this characteristic depends also the way the entrepreneur decides to finance its business. Xiao, Alhabeeb and Haynes (2001) published the first study giving a complete overview of this topic through the use of the data from the 1995 Survey of Consumer Finances. The results have been consistent with the previous literature finding that variables as age, race, net worth and number of employees in the business affect risk-taking attitudes and behavior. Other findings have shown that a risk-taking behavior is positively associated with the number of years of ownership, gross sales, who started the business and the sole proprietorship and that education influences the risk-taking attitudes. Last consideration is that family business owners are more risk tolerant than non-owners.

Nevertheless, it is often emphasized in the everyday life that a major constraint for minority nascent/entrepreneurs is the access to credit and education. These are the same matters reported by Perman (2006) after having had an interview with civil right activist and Baptist minister Rev. Jesse Jackson who pointed out the need for more support to the minority entrepreneurs. Also Olson (2005) stressed out the importance of the valuable technical assistance provided to small businesses by Federal, state and local governments (the SBA reported that 2.44 million entrepreneurs received business counseling and technical assistance through one or more of the agency's advisory training programs in 2004). He has noted that Federal policy has evolved not only in the area of housing, but also in the area of economic development and has agreed with the Federal Reserve that has recognized the importance of information sharing and creating infrastructures that support information flow. These are topics related to financing through the thoughts expressed above.

Several studies about minority entrepreneurs in the USA are dedicated to the comparison between the racial groups of whites and blacks. Recently, this has been done by Kollinger and Minniti (2006) in a paper where it has been stressed out "that the under representation of black Americans among established entrepreneurs is not due to lack of trying but may instead be due to stronger barriers to entry and higher failure rates". In this respect, the financial constraint does not seem to limit the black Americans toward entrepreneurship and, actually, their "results also show that, even after controlling for both socio-economic and perceptual variables, black Americans are still more likely to start a business than white Americans". Still referring to the analysis of the financial capital, there is another study published in 2006 (Kim, Aldrich and Eister, 2006) which has been developed using a data set unique for the United States. After having examined the relative relevance of financial, human and cultural capital forms of resources in pursuing start-up ventures, they pointed out that "neither financial nor cultural capital resources are necessary conditions for

entrepreneurial entry. By contrast, potential entrepreneurs gain significant advantages if they possess high levels of human capital. Furthermore, they found a significant positive association of entrepreneurial entry with advanced education and managerial experience. A particularity in the development of that study, it is the description of financial resources along two dimensions: Household income and Household wealth. Of major interest is the literature related to the household wealth because mixed contributions have been given: while Evans and Jovanovic (1989) pointed out the necessity of substantial start-up capital during the business start-ups, other studies noted the existing liquidity constraints (i.e., Reynolds and White, 1997; Jurik, 1998) and Kim, Aldrich and Eister (2006) have suggested a direct positive association between wealth and starting a business, but at very high wealth levels, people have other career options. Liquidity constraints are the reason why many aspiring business owners use financial bootstrapping methods to decrease external capital needs in their start-up phase (Kim, Aldrich and Eister, 2006). In order to conclude this part, it is possible to present the description given by Harrison et al. (2004) of bootstrapping: reliance on internal funding sources (i.e., a second mortgage on a house); low cost acquisition of financial resources (i.e., credit cards and rotating credit associations); and low cost acquisition of other start-up resources (i.e., conduct initial operations from home).

Eventually, we take a look at an important phenomenon in the U.S. economy: the rapid growth of women-owned businesses since the mid of the 1980s (Haynes and Haynes, 1998). As for the minorities, researchers have tried to offer evidence of discrimination in financial markets but, while previous literature has offered no evidence of price discrimination in financial capital markets, advocacy groups still claim that female business owners face discrimination (Ando, 1985; Peterson, 1981; Aldrich, Elam and Reese, 1997; Brush, 1997; Carter and Rosa, 1998; Marlow, 2002). However, it is important to study this critical problem because the consequence, of the undercapitalization during enterprise formation and development, is the underperformance during the life of the business (Carter and Marlow, 2003). Carter (2000) pointed out that the use of more start-up capital by men owners was related positively and significantly to current value of capital assets, sales turnover, and total number of employees.

Some of the reasons, given by a part of the literature, on the relatively lower level of financial success realized by women-owned businesses come from researches done in the late 1980s and early 1990s but that have been recalled in more recent works (Haynes and Haynes, 1998). They refer to relatively small dimension of women-owned businesses, the lack of relevant business experience for business owners and their tendency to be concentrated in business classifications earning relatively low profits (Aldrich and Auster 1986; Aronson 1991; Lascocco et al. 1991). Other reasons have been described by Marlow (2002), who underlined the manner in which a combination of occupational segregation and domestic/caring responsibilities act as impediments to women entrepreneurs in accumulating both credibility and the variety of capital assets necessary to engage fully with this process.

On the other side, in the same period, other researches sustained that men- and women-owned small businesses have similar financial characteristics. Examples of these results are taken from different specific service industries (as food and drink,

computer and software sales and health) where Kalleberg and Leicht (1991) found that they are similar to men-owned businesses in terms of earnings, earnings growth rates and business failure rates. In the same direction, the evidence about the rural economy goes: women-owned businesses appear to have significantly lower gross sales than men-owned small businesses. Moreover, in 1994, Tigges and Green showed that several factors influencing the business' success are the same for women- and men-owned small businesses but the literature describes the formers as less successful financially than the latter except in rather specific industries (Haynes and Haynes, 1998).

The reasons for these performances have been often argued to be found in the difficulties to get access to the needed financial and human capital resources (Haynes and Haynes, 1998): banks have been found to be reluctant in lending them money (Hisrich and Brush, 1984; Humphreys and McClung 1981) and this is may due to the fact that these businesses often belong to low-growth, high-fly competitive industries (Humphreys and McClung 1981), or also because women may lack the managerial experience and access to key information networks that would increase the probability of success (Hagan, Rivchun and Sexton, 1989). More recently, Coleman and Carsky (1996) suggested also that reasons could be their youngness, the absence of track record of profitability or because they have few assets to use as collateral since often they are service businesses (research based on women-owned businesses in Connecticut). Shaw, Carter and Brierton (2001) found a reason in the fact that women are less likely to have generated a credit track record to indicate formal credit worthiness than their male counterparts.

As already written above, the evidence is mixed. In fact, Ando (1985) dismissed the notion that men and women face differential access to financial credit and Haynes (1995) found that women-owned businesses do not appear to pay higher loan prices or face more stringent collateral requirements (Haynes, 1995). However, while previous literature has offered no evidence of price discrimination in financial capital markets, advocacy groups still claim that female business owners face discrimination (Ando 1985 and Peterson 1981).

Talking about capital structure of women-owned businesses, it has been observed that males-owned businesses tend to held more debit than women but Masters and Meier (1988) showed that risk-taking preferences for men and women are very similar. The reasons could then be found in the existence of other sources of financial capital as family and friends (Haynes and Haynes, 1998) but also in the use of a different founding strategy that requires fewer financial resources (Carter and Reynolds, 1997).

Several studies have shown evidence of the difficulties in obtaining financial support for women starting their own business (i.e., Aronson, 1991; Fay and Williams, 1993). While Aronson (1991) explained this fact through the higher rate of dependency on so called "angel money" (personal savings and loans from friends and relatives to meet needs for capital), Carter (2000, p. 174) preferred to stress out that female business owners used three times less capital at start-up than do male business owners. In a research by Chaganti, DeCarolis, and Deeds (1996) it was shown that women entrepreneurs tended to seek internal rather than external equity financing.

Divorced women have to cope with more difficulties: Ando (1985) found that divorced women have more credit difficulties than non-divorced women.

An interesting argument concerning the financing of women-owned businesses is about their relationships with venture capitalists: Seegull (1998) reported that women are almost entirely excluded from this source of funding. Stout (1997) found that only 2% of the \$33 billion invested by venture capitalists between 1991 and 1996 was available to self-employed women. Greene et al. (2000) suggested the existence of three specific barriers faced by women when accessing such funds: structural constraints (the overwhelming majority of venture capitalists are male and the knowledge to get in such networks is critical); human capital constraints (Carter (2000) and Marlow (1997) found that women are not as likely as men to be able to demonstrate professional management histories and many women owned firms are still concentrated in the crowded segments of the service sector with fewer opportunities for the growth profiles/potentials sought by equity funders); strategic choice (venture capitalists will require a stake in the ownership of the firm: Bygrave (1992) suggested that any where between a 15–30% return with a 20–75% ownership stake is typical. However the rapid growth and loss of control is not acceptable).

Eventually, Haynes, Walker, Rowe and Hong (1999) have approached a topic that has become more studied in the last year: the intermingling of resources. The reason is the incentive given by the U.S. tax law: i.e., business income paid in cash or vehicles available for family use reduce income taxes.

### 4.3 Dataset and Econometric Model

The final decision on the topic it would have been developed in this work, it was decided not just looking at the data available but also considering the speech of Ramona Heck at the 2003 & 2005 National Minority Business Owner Surveys Conference where she pointed out various topics still not or just partially discussed in the literature. The social value of self-employment is stressed by the website [usstate.info.gov](http://usstate.info.gov) where it is stated that “in the United States, a business failure does not carry the social stigma it does in some countries. Often, failure is seen as a valuable learning experience for the entrepreneur, who may succeed on a later try. Failures demonstrate how market forces work to foster greater efficiency, economists say”.

Two points are of major interest for the way the topic has been approached in this work. One is about the relationship between family and Business, a topic described as not well studied yet and where it is possible to point out dynamics different from the usual ones. The other point is about the small number of studies available that have compared goals, strategies and operations of the minority owned businesses. Heck underlines that different paths in the business ownership could be due to different availability of resources: Light identifies human, financial, social and cultural capital.

This is an explanation of the reason why the topic of the determinants of credit denial is investigated here. It is a way to consider how the business owner is running his/her business and to relate it to its ethnicity.

The set of variables taken into consideration will be built up using the data from the 2003 & 2005 National Minority Business Owner Surveys and other data publicly available through governmental organizations (census, 2002).

The aim of the following model is to determine the main determinants of credit denial through the data available and regarding four different samples: White, African-American, Mexican and Korean business owners.

#### **4.3.1 The Database NMBOs**

The analysis has been accomplished through the usage of data from the National Minority Business Owner Surveys (NMBOS). These data have been gathered between 2003 and 2005 using nationwide samples, completed through telephone interviews, and are based on the protocols developed by a 17 college and university research consortium (Family Business Research Group): in 2003, there were 81,149,000 White American and 13,629,000 African American households whereas, in 2005, there were 7,126,000 Mexican American Households (data not available for Korean Americans households). The sub-samples count 200 responses each (given by owners-managers in business for already one year, working at least 320 hours per year in the business, involved in the day-to-day management of the business and resided with at least another family business) and refer to African Americans, Korean Americans, Mexican Americans and White Americans.

In 2003, interviews to the African American and the White American business owners were accomplished by Global Marketing Research Services (GMRS) of Melbourne, Florida. They placed 12,300 random calls out of a list of 30,000 combined households belonging to the two sub-samples (actually, home-based businesses since they had the same telephone numbers for the household and the business) and completed 5,575 random contact calls (4,397 households did not own a business). After having dialed for a maximum of 10 times over a 6-weeks time period, the sub-samples count 193 and 210 observations for African Americans and White Americans respectively.

In 2005, interviews were conducted by TMR, Inc. of Cedar Knolls, New Jersey; they contacted 26,264 Korean Americans and 19,965 Mexican Americans having also to translate, when requested, the questions from English to their native language. The eligible ones were 2,293 Korean Americans and 2,055 Mexican Americans whose have brought to obtain sub-samples of 200 units each.

The overall sample is built up of Micro, Small and Medium Enterprises with a prevalence of the first two. For the African American owners' sample, the maximum number of employees except the owner is 30 whereas the Korean American and the

Mexican American ones reach 100 units. The White American owners sample stays in the middle with a maximum of 67 employees.

A straightforward implication of the previous data is the preferred legal form of ownership: the sole proprietorship in all the sub-samples.

(%)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Sole Proprietorship</b>	69.43	63.00	69.700	69.05
<b>Legal Partnership</b>	6.23	3.50	4.000	3.81
<b>C Corporation</b>	8.29	22.50	13.850	9.05
<b>S Corporation</b>	8.29	8.50	6.750	12.86
<b>Limited Liability Partnership (LLP)</b>	1.55	0.50	0.450	0.95
<b>Limited Liability Corporation (LLC)</b>	1.55	1.00	3.100	1.43
<b>Something Else</b>	4.66	1.00	2.150	2.85
<b>TOTAL</b>	100.00	100.00	100.00	100.00

**Table 4. 1- Legal Ownership by ethnic group**

The companies show to be highly concentrated on the Sole Proprietorship form whatever their ethnic identity is. More differences emerge from the analysis of the industry where each single company operates. The minority owned business owners show a quite diffuse preference for Personal Services and Retail Trade sectors even if the African Americans have also some similarities with the White Americans.

(%)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Retail Farm</b>	1.46	1.5	4	2.01
<b>Production Farm</b>	1.46	1	0	9.40
<b>Other</b>				
<b>Agriculture, Forestry, and Fisheries</b>	3.65	2	1.5	4.70
<b>Construction</b>	2.92	2.5	5	12.08
<b>Manufacturing</b>	2.92	2	3.5	0
<b>Transportation, Communications</b>	12.41	0	2.5	2.68
<b>Wholesale Trade</b>	0	4.5	1.5	0.67
<b>Retail Trade</b>	15.33	36.5	25.5	13.42
<b>Finance, Insurance, and Real Estate</b>	4.38	0.5	7	9.40
<b>Business and Repair Services</b>	16.79	2	13	15.44
<b>Personal Services</b>	16.06	38	20.5	10.07
<b>Entertainment and Recreational Services</b>	7.299	3	3	2.68
<b>Professional and Related Services</b>	15.33	6.5	13	17.45
<b>Mining</b>	0	0	0	0
<b>TOTAL</b>	100.00	100.00	100.00	100.00

**Table 4. 2 - Business industry by ethnic group**

African Americans and White Americans show to give a good part of their preferences also to sectors as the Professional and Related Services as well as for Business and Repair Services. White Americans distinguish themselves for having preferences more widely spread and they result to be the only group highly involved in construction sector.

Looking at the single sub-samples, it emerges that a vast majority of all the observations are about first generation businesses. The Korean American owners have the highest percentage of first generation businesses and this could be justified with their being the youngest community among all the samples under analysis.

(%)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>First</b>	90.10	95.00	85.35	89.90
<b>Second</b>	6.78	4.50	11.12	8.17
<b>Third</b>	2.08	0.00	2.53	1.45
<b>Fourth or more</b>	1.04	0.50	1.00	0.48
<b>TOTAL</b>	100.00	100.00	100.00	100.00

**Table 4. 3 - Family generation involved in the business**

Looking at the way the current owners got involved in the business, it is immediate to note that the majority of the owners have started the business by themselves. Nevertheless, again the Korean American owners sample highlights a strong difference from the others having the purchase from a non-family member as preferred way to start the business. A part of this one, there are no big differences in the other ways to start the business among the different samples.

(%)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Start the business</b>	69.43	63.00	69.75	69.90
<b>Inherit from family</b>	6.23	3.50	4.00	3.81
<b>Work as employee</b>	8.29	22.50	13.85	9.05
<b>Purchase from family member</b>	8.29	8.50	6.75	12.86
<b>Purchase from non-family member</b>	1.55	0.50	0.45	0.95
<b>Other</b>	1.51	1.00	3.10	1.43
<b>TOTAL</b>	100.00	100.00	100.00	100.00

**Table 4. 4 - Way to start the business**

The sub-samples show also differences in term of the gender of the owner. Whereas the Korean American and the Mexican American samples have almost the same amount of both male and female owners, the percentage is quite different when considering the African American and White American ones.

	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Male (%)</b>	63.21	53.50	52.50	61.43
<b>Female (%)</b>	36.79	46.50	47.50	38.57
<b>Owner Age</b>	49.41	50.62	46.60	53.88
<b>Age when started working in the business</b>	37.20	40.48	33.47	36.85
<b>Years lived in the United States</b>	49.75	20.82	41.92	-
<b>Years in his current community</b>	24.52	12.89	23.66	25.88

**Table 4. 5 - Descriptive statistics on the entrepreneurs**

Keeping on analyzing the owners, it emerges that their mean age is around fifty years old also in the sub-samples (the Mexican Americans result to be the youngest with an average value of 46.6 and the White Americans are the oldest with 53.9). Even more homogeneous is the age about when they started working in the business: around 35 years old.

Much bigger is the difference when talking about the year spent in the community (data available for all the samples and referring to the community where the owner lives) and the years spent in the USA (data regarding the minority samples). In this case, it emerges how the different minorities are differently established in the USA with the African American owners that have the highest average value which is more than twice bigger than the Korean American one.

The NMBOs survey lets also to evaluate the education of the owners and here two groups are highlighted:

- The African Americans, the Korean Americans and the Mexican Americans whose, on average, have reached two years of college, vocational, technical, associate degree;
- The White Americans whose, on average, have a higher level of education having reached a B.A., B.S., or equivalent.

	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Highest school grade (20 PhD)</b>	14.60	14.66	14.31	16.58
<b>Manager Education (%)</b>				
<b>Business Related Degree</b>	39	24	24.5	34
<b>College</b>	77	40	65.0	78
<b>Continuing Education</b>	81	46.5	68.5	68

**Table 4. 6 - Entrepreneur/Manager general and business related education**

Some other questions investigate on the business related knowledge of the owners and the African American and the White American samples show higher percentages of achievement of business related degrees and attendance of some college classes. The African Americans are also the first in pursuing continuous education through seminars and courses (about 80 percent of cases), preceding Mexican Americans and White Americans (about 65 percent) and Korean Americans (about 45 percent).

Overall, owners perceive matters regarding the demand side (marketing above all, but also pricing and the identification of customer needs), together with the personnel management and financing as the major problems of their business activity. Taking a look at the single sub-samples, the only noticeable difference is between the Korean American Owners and all the others: in fact, on average, they have a higher evaluation of problems whereas just the African American rate financing issues as the most relevant. Minority business owners are more concerned in financing issues than their counterparts in the White American sample.

(1 to 5 Likert scale)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Customer needs</b>	1.89	3.86	1.99	1.87
<b>Pricing</b>	2.02	3.78	1.96	2.26
<b>Finance</b>	2.86	2.94	2.55	1.99
<b>Personnel</b>	2.74	3.35	2.34	2.81
<b>Marketing</b>	2.35	3.57	3.03	2.31
<b>Governmental Regulation</b>	1.91	2.81	2.06	2.25
<b>Business vs. Family</b>	1.90	2.49	2.12	2.05

**Table 4. 7 - Major problems identified by the entrepreneurs**

In order to solve the problems, business owners can rely on several institutional resources that may help them in different ways. The Small Business Administration offices around the country are the preferred source of help for all the sub-samples considered: values run from the 28 percent for the African Americans and just the 11 percent for the Korean Americans.

(%)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>SBA</b>	28	11	21	24
<b>Other Gov Offices</b>	15	7	12	18
<b>County Office</b>	15	7	5	13
<b>Other Organizations</b>	22	6	10	22

**Table 4. 8 - Help received from Institutional Offices**

Business owners have very different opinions about the help received. Just the 60 percent of the African American and Korean American owners are satisfied of it, whereas the level of satisfaction is much higher for the Mexican Americans (more than 76 percent) and the White Americans (90.5%).

Focusing on the financing side, it emerges a preference for banks, saving institutions or credit unions as source of external capital both considering the last year observed and the company source of financing since the start of its activities.

(%)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Banks, Saving Institutions, or Credit Unions</b>	30.16	35.24	11.99	37.94
<b>Finance Companies, Brokerage Firms</b>	7.81	1.15	2.61	8.44
<b>Family Members</b>	23.10	5.74	11.94	16.88
<b>Friends</b>	10.10	3.55	1.41	5.06
<b>Suppliers or Anyone Else</b>	16.40	1.57	5.35	17.01
<b>Credit Cards</b>	14.01	5.05	8.86	14.77

**Table 4. 9 – Companies’ sources of financing since the start of activities**

As easy predictable, an important role is played by the financial support of the family members in all the sub-samples and considering both the periods (since the beginning and last year). What deserves a little bit more of attention is the increased role of credit cards as source of financing for all the sub-samples and their increasing importance is confirmed by the data referred just to the observations about the last year.

(%)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Banks, Saving Institutions, or Credit Unions</b>	28.71	25.51	11.55	32.98
<b>Finance Companies, Brokerage Firms</b>	6.36	1.10	3.05	8.43
<b>Family Members</b>	26.16	5.10	6.12	19.44
<b>Friends</b>	5.20	1.92	0.61	3.00
<b>Suppliers or Anyone Else</b>	14.49	1.05	4.17	16.66
<b>Credit Cards</b>	14.64	5.20	9.85	15.55

**Table 4. 10 - Companies' sources of financing during the last year of activity**

Families are very involved in the financial side of business activities because they do not just bring capital but could also require it. Intermingling of business resources by families is in fact a topic developed in literature (Haynes....) and confirmed by the answers given in all the sub-samples.

By the way, the owners under interview have reaffirmed the importance of family over business and Korean Americans show the higher preference of this kind.

	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Business vs. Family (1 to 5 Likert scale)</b>	3.82	4.12	3.93	3.54
<b>Business Real Estate to secure loans for family needs (%)</b>	7	16	14	9
<b>Business Finance to secure loans for family needs (%)</b>	11	11	12	8

**Table 4. 11 – Importance of Family with respect to Business and competition for the use of business assets**

In some occasions, business resources (as the financial assets or the real estate) are used also for securing loans that serve for family needs. In this case, Korean American and Mexican American owners result to be the more involved in this kind of choice.

The previous observations are an unavoidable consequence of the perception of tensions in family raised because of the business activity. In fact, on average, all the sub-samples point out the importance of competition for resources between family and business and other issues regarding the work of family member inside the business.

	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Family Member Confusion in Business Roles</b>	1.52	1.50	1.50	1.51
<b>Confusion over Who can Make Decisions</b>	1.30	1.57	1.63	1.40
<b>Unequal Ownership</b>	1.21	1.33	1.51	1.29
<b>Unfair Compensation</b>	1.29	1.44	1.66	1.36
<b>Failure to solve Business Conflicts</b>	1.44	1.72	1.81	1.52
<b>Unfair workloads among family members</b>	1.53	1.56	1.70	1.63
<b>Competition for Resources between family and business</b>	1.46	1.76	1.70	1.65

**Table 4. 12 - Reasons of competition for resources between the family and the business**

Another resource for resolving problems, different from institutional organizations and family, is the belongingness to a kind of network. It is expected that White Americans already have a good network since they were born in the USA and have chosen their community. For minority owners, instead, to participate in the life of an association could help them in finding new contacts and integrate themselves in the local community.

(1 to 5 Likert scale)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Religious organization</b>	3.89	3.28	2.63	n.a.
<b>Social organizations</b>	3.18	2.10	2.34	n.a.
<b>Business or ethnic organizations</b>	2.81	1.91	2.32	n.a.
<b>Professional organization</b>	2.83	2.10	2.27	n.a.
<b>Professional extra ethnic organization</b>	3.03	1.80	2.58	n.a.

**Table 4. 13 - Participation in organizations**

The process of integration in a community in the new country is fundamental for the minority business owners. However, on average, both the minority entrepreneurs and the White Americans have expressed to be quite satisfied of the community support.

Moreover, other data regarding just the minorities from the NMBOs survey show how the different minority groups rely on the support of their ethnic group. The smaller dimension of the Korean American minority in the USA could justify their smaller share of ethnic clients (on average, less than 25 percent) whereas it is less than 50 percent for African Americans and Mexican Americans. Other questions investigate the way in which being a minority business influence its activity. Being a minority owner brings both to the perception of advantages and disadvantages:

- to the 30.5 percent of the Korean American and the Mexican American owners and the 28.5 percent of the African American ones happened to be rejected for a job because of their being part of an ethnicity;
- as entrepreneurs, the 21.2 percent of the African Americans, the 21 percent of the Mexicans and the 11.5 percent of the Korean Americans responded to have lost business of their race;
- on the other side, racial matters have helped in receiving business especially for the Mexican Americans (44 percent of cases), but also for the 19.7 percent of African Americans and the 24 percent of Korean Americans;
- Ethnicity have helped in obtaining financing for the business in less than the 10 percent of all the cases in all the sub-samples: 5.7 percent of the African

- Americans, 9 percent of the Korean Americans and 7.5 percent of the Mexican Americans;
- Nevertheless, minority business owners reported more cases of financing prevented by race than those where it helped. For African Americans and Mexican Americans the number is about the 19 percent whereas the Korean Americans were just the 5 percent;
  - However, on average, minority owners think that their ethnicity has helped them more in business than what it hurtled.

(1 to 5 Likert scale)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Help to the Business from the Belongingness to an Ethnic Group</b>	2.80	2.65	3.25	n.a.
<b>Business Hurt from the Belongingness to an Ethnic Group</b>	2.50	1.91	1.84	n.a.

**Table 4. 14 - Business performances and ethnicity issues**

Independently from the belongingness to a minority, answers regarding the use of computers for developing business activities have given mixed results, showing the highest rate of utilization by the African Americans and the White Americans.

(1 to 5 Likert scale)	African Americans	Korean Americans	Mexican Americans	White Americans
<b>Computer (%)</b>	81.77	55.50	71.00	77.62
<b>E-commerce Business Ordering</b>	1.78	1.83	2.19	1.53
<b>Internet impact</b>	2.44	2.60	3.07	2.26
	3.46	3.13	3.87	3.33

**Table 4. 15 - Use of computer and business processes related to it**

Among the businesses utilizing computers, it has to be pointed out the attitude of the Mexican American owners in adopting more extensively the possibilities given by the internet: they top in both running an e-commerce website and accepting or sending business to business electronic ordering.

These results are confirmed by the evaluation of the internet impact on the business activities given by all the owners. To be noted, that the African American and the White American samples were built up referring to the year 2000 whereas the other two refer to the 2004.

### 4.3.2 Econometric model

The main objective of this work is to find out the determinants of innovation at a firm level and considering the specific situation of one of the most industrialized provinces in Italy. This is done trying to reply to the following question: are firms in the sample acknowledged that innovation is their fundamental strategic variable?

This result is reached through a general to specific approach based on a Logit model. This model has been chosen according to the theory of determinants of innovation on which our study is based on.

The previous statements contain some of the fundamental elements constituents of an analysis regression: a statistical technique for modeling and investigating the relationship between two or more variables. Better, it is a collection of statistical tools for finding estimates of the parameters in the regression model.

The objective of fitting a regression equation or model is for predicting future observation of the dependent variable, or estimating the mean response for a particular level of the independent variable. Depending on the number of the latter, the linear regression model will be simple (in case of a single regressor or predictor,  $x$ , and a dependent or response variable,  $Y$ ) or multiple. The latter is the case of our analysis and contains more than one regression variable. In general, a multiple linear regression model will relate a dependent variable or response to  $k$  independent or regressor variables:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + \varepsilon$$

The parameters  $\beta_j$  (where  $j=0, 1, k$ ) are called the regression coefficients and  $\varepsilon$  is the error term with expected value equal to zero. The previous equation describes a hyperplane in the  $k$ -dimensional space of the regressor variables ( $x_j$ ) and the parameters  $\beta_j$  represents the expected change in response  $Y$  per unit change when all the other regressors  $x_i$  ( $i \neq j$ ) are held constant. As pointed out by Montgomery and Runger (1999), multiple linear regression models are often used as approximating functions. This means that the true functional relationship between  $T$  and  $x_1, x_2, \dots, x_k$  is unknown, but over certain ranges of independent variables the linear regression model is an adequate approximation. More complex models can take into account interaction effects whose can be represented by a cross-product term in the model that will generate a non-linear surface. However, in general, any regression model that is linear in parameters (the  $\beta$ 's) is a linear regression model, regardless of the shape of the surface that it generates.

It is possible to estimate the regression coefficients in the multiple regression model through the least-square estimation method. In order to come to a solution, it will be necessary to consider the least square function  $L$  for  $n > k$  observations:

$$L = \sum_{i=1}^n \varepsilon_i^2 \varepsilon^2 = \sum_{i=1}^n \left( y_i - \beta_0 - \sum_{j=1}^k \beta_j x_{ij} \right)^2$$

The least square estimates of the parameters  $\beta_j$  will be found through the minimization of the function L with respect to the  $\beta_j$  parameters.

The choice of the model has been done working with a mindset defined by Breiman (2001) as belonging to the data modeling culture (the other approach is defined “The algorithmic modeling culture”). This is the way to proceed when an analysis starts with assuming a stochastic data model for the inside of the black box. The models belonging to this approach starts with assuming a stochastic data model for the inside of the black box. Therefore, commonly, the response variable is the result of a function of predictor variables, random noises and parameters. The model inside the black box could be a linear regression, a logistic regression or a Cox model and they estimate values of the parameters from data and are successively used for information and/or prediction.

In our analysis, the dependent variable will be a discrete one; therefore, a brief overview on these kinds of models will be given in the next lines. In a discrete choice model, the dependent variable only assumes integer values. Usually, with this kind of model a discrete dependent variable is used to denote a category (in this case the model is also called dummy-endogenous or qualitative response) or to count the number of events. There is a special denomination for this model when it uses the ordinary least squares: it is called “linear probability model”.

Called y the dependent discrete variable that takes on two values (1 or 0), the interest will lie in modeling the probabilities of observing a certain event ( $y=1$  in our case). In particular, given the 'i' observation:  $p_i = P \{y_i=1\}$ .

In this case of dummy dependent variable, it is possible to use the Ordinary Least Square (OLS) approach as expressed above and therefore recognizing that

$$p_i = P \{y_i=1\} = P\{\mathbf{x}_i' \boldsymbol{\beta} - \varepsilon\} = F_\varepsilon(\mathbf{x}_i' \boldsymbol{\beta})$$

from which descend a likelihood function that is equal to the product among the probability of having observations with dependent variables at 0 contributing for  $(1-p_i)$  and those at 1 contributing for  $(p_i)$ .

Depending on the distribution of the data, a different kind of model will be used. Very popular, for the binary discrete model, are the logit and the probit methods.

The logit will be chosen in case of a logistic distribution:

$$F_\varepsilon(z) = \frac{e^z}{1 + e^z}$$

this has a linear log-odds ratio

$$\log\left(\frac{p_i}{1-p_i}\right) = x_i'\beta$$

Instead, a normal standard distribution of  $F$  leads to a probit method. The scale of both the distribution is fixed and the former has variance  $\pi^2/3$  whereas the latter has variance 1 (multiplying  $y_i^*$  by any non-zero constant, the result will not change). Given the similarities among the two methods, in most applications, logit and probit analysis will give the identical substantive conclusion (Nassimbeni, 2001) except in some situations where it is needed to choose the appropriate model. These are cases with an extremely large number of observations and heavy concentration of the observation in the tails of the distribution. According to Liao (1994), Horowitz and Savin (2001) and Nassimbeni (2001), logit models are more appropriate for distribution with heavier tails and both distributions are symmetric around zero.

Whereas the ordinary least squares based predictions of the conditional probability can be greater than one or less than zero, the logit and probit models are typically estimated by maximum likelihood. These kinds of estimators are considered the most precise estimators in large samples because of their asymptotical efficiency.

Time after time, the maximum likelihood method has gained appreciation among the researchers because there are no more any computational restraints due to computational effort whose favored the ordinary least squares method in the past. There are other three main reasons that justify the use of logistic regression instead of ordinary linear regression. In fact, the latter brings to predicted values theoretically inadmissible: greater than one and less than zero when you move far enough on the  $x$ -axis. Moreover, given the assumption of homoskedasticity (variance of  $Y$  constant across values of  $X$ ) there would be, in case of a binary variable, the maximum value of the variance when there are the fifty percent of 1. Eventually, in case of utilization of a binary dependent variable in a linear regression, it is hard to justify the normal distribution of errors of predictions ( $Y-Y'$ ) since  $Y$  only takes the values 0 and 1: on that premise rest the significance testing of the  $\beta$ .

Further preference to the maximum likelihood estimation, at least until recently, comes from a historical point view. Horowitz and Savin (2001), according to Amemiya (1981), traced back the upsurge of models involving discrete dependent variables in econometric to the 1970s. The nature of survey data has tipped the balance in favor of maximum likelihood estimation and the logit model. Survey data often involve several explanatory variables, some of which are continuous and, in the case of a continuous variable, it is easy to see that there may be a large number of sparsely populated cells. Another advantage of maximum likelihood estimation is its feasibility when there are few observations per cell, which includes the case of no observations in some cells.

Logit and probit models are called multinomial when the dependent variable takes on three or more discrete and unordered values. As pointed out by Horowitz and Savin (2001), the multinomial logit specification is attractive on analytical grounds because of an important and elegant result by McFadden (1974), which shows that the multinomial logit model can be derived from utility maximization under certain conditions and that the probabilities have simple closed-form expressions. On the

other side, there is a danger in using the multinomial logit model because it can produce misleading inferences when some of the alternatives are close substitutes. The cause is a feature known as the independence from irrelevant alternatives property: the characteristics of any other alternatives in the choice set have no influence on the odds between the i-th and j-th alternatives.

As seen before, the logistic curve relates the independent variable,  $X$ , and the mean of the dependent variable  $P(\bar{Y})$

$$P = \frac{e^{a+bX}}{1 + e^{a+bX}}$$

This is a more general expression than the other one written above and includes two parameters of the model: ' $a$ ' and ' $b$ '. Whereas the former yields  $P$  when  $X$  is zero, the latter adjusts how quickly the probability changes  $X$  a single unit. Moreover, defined odds as the probability of a positive event divided by a negative one:

$$odds = \frac{P}{1 - P}$$

It is possible to define, in a logistic regression, a dependent variable as a logit (natural log of the odds)

$$\log(odds) = \log it(P) = \ln\left(\frac{P}{1 - P}\right)$$

And to note that if log odds are linearly related to  $X$ , then the relation between  $X$  and  $P$  is nonlinear, and has the form of the S-shaped curve. When taken from large samples, the difference between two values of  $-2\text{LogL}$  is distributed as chi-square.

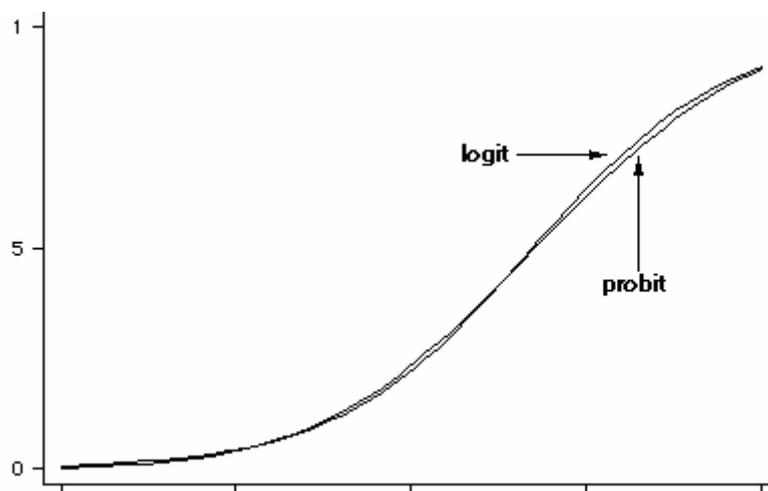
More in general, logit is an extension of log-linear models: this kind of models has the advantage of making it far easier to analyze multi-way tables (more than two categorical variables) and to understand just which values of which variables and which interaction effects are contributing the most to the relationship when compared to traditional approaches. Log-linear models were developed to analyze the conditional relationship of two or more categorical values. It is important to be able to distinguish the log-linear analysis from a logistic regression and there are four main characteristics that can be highlighted. The first one refer to the dependent variable which is categorical (nominal or ordinal), unlike binomial logistic regression and the second is about the expected distribution of these variables (Poisson and not binomial). Furthermore, the link function is the log (not the logit) and predictions are estimates of the cell counts in a contingency table, not the logit of  $y$ .

Logit and probit extend the log-linear model to allow a mixture of categorical and continuous independent variables to predict one or more categorical dependent variables. As argued before, both logit and probit usually lead to the same conclusions for the same data. Logit regression yields results equivalent to logistic regression, but with different output options. Many problems can be handled by either logit or logistic regression, though the latter has become more popular among social scientists.

As seen before, there is a model that brings to the similar result given by a logit regression: this is the probit. Probit models were introduced by Chester Ittner Bliss in 1935 and they are popular specification of a generalized linear model. Also in this situation, the previous equations, seen for the logit model, are still good. Told  $Y$  the binary dependent variable and  $X$  the vector of regressors (independent variables) the probit model will be:

$$\Pr(Y = 1 | X = x) = \Phi(x' \beta)$$

where  $\Phi$  is the cumulative distribution function of the standard normal distribution and the parameters  $\beta$  are typically estimated by maximum likelihood. Also the cumulative standard normal curve used by the probit, as well as the one used by the logistic (log odds) one, has an S-shaped curve.



**Table 4. 16 - Predicted Logit and Probit probabilities**

As highlighted before, probit comes generally to the same conclusions as a logistic regression but its coefficients are more difficult to be interpreted and it is not recommended when tails are fat (Pampel, 2000: 54-68). By the way, in general, the choice of utilizing it is largely one of personal preference.

Last model briefly discussed in this paragraph is the Tobit model. This is a model that constitutes a nonparametric alternative to OLS regression or ANOVA and it is often used when variables are extremely skewed (and therefore, they do not meet the parametric assumptions). This is a model proposed by James Tobin in 1958 and it has been used in econometrics and biometrics in order to describe the relationship between a non-negative dependent variable  $y_i$  and an independent variable  $x_i$ . Also in this case, there is a latent variable  $y_i^*$  which depends on the independent variable  $x_i$  and the parameter  $\beta$ . In general, in Tobin model, the dependent and observable

variable  $y_i$  is defined to be equal to the latent variable whenever the latent variable is above zero and zero otherwise:

$$y_i = \begin{cases} y_i^* & \text{if } y_i^* > 0 \\ 0 & \text{if } y_i^* \leq 0 \end{cases}$$

where the latent variable ( $y_i^*$ ) will be equal to:

$$y_i^* = \beta x_i + u_i, u_i \approx N(0, \sigma^2)$$

As proven by Takeshi Amemiya (1973), the likelihood estimator suggested by Tobin is consistent whereas the resulting ordinary least squares estimator is inconsistent. It has to be noted that the Tobit model is a special case of a censored regression model, because the latent variable  $y_i^*$  cannot always be observed while the independent variable  $x_i$  is observable. Common variations of the Tobit model are still called Tobin model. The variations of the model have been classified by Amemiya (1985) in five categories and Schnedler (2005) has provided a general formula to obtain consistent likelihood estimators for these and other variations of the Tobit model.

Kinsey (2001) has underlined how Tobit provides more efficient estimates of parameters and more accurate estimates of the expected value of the dependent variable than can be obtained from OLS regression models when the dependent variable is truncated. Ordinary least squares method assumes a constant variance of the error term among all observations. There is heteroskedasticity (the standard errors of the estimates are inconsistent, and the usual tests of significance cannot be applied (Goldberger 1964)) since the previous assumption does not hold with a truncated dependent variable, especially when observations cluster at the limit value(s). Equally important, estimates from OLS do not have a lower bound, which means that the model could estimate probabilities less than zero. Tobit, on the other hand, accounts for a concentration of observations at the limit value by estimating the probability of a limit response, as would be done in probit analysis. In addition, Tobit estimates the value of the dependent variable as a linear combination of the explanatory variables with unknown coefficients plus a normally distributed disturbance term for the non-limit responses.

Econometric applications in the leading journals have almost always seen the utilization of logit and probit models even if, just seldom, the functional form is known in practice (Horiowitz and Savin, 2001). A miss-specified functional form leads to the estimates of the coefficients and the inferences based on them highly misleading. It is possible to relax the restrictive assumption about the supposed knowledge of the functional form by using either semi-parametric or nonparametric models: in these types of models, the functional form is unknown.

Usually, researchers use a logit model when they wish to specify a categorical variable as the dependent variable in a model (hierarchical and general log-linear analyses are non-dependent procedures). On the other side researchers will choose the

probit model when they wish to specify a categorical variable as the dependent in a model and that categorical variable is assumed to be a proxy for a true underlying continuous normal distribution. Important concept in choosing a model are the saturation (a saturated log-linear model is one which incorporates all possible effects: a 1-way effect for each variable, all 2-way interaction effects for models with two or more variables, all 3-way interaction effects for models with three or more variables, and so on) and the parsimoniousness (a parsimonious model is the most incomplete model which still achieves a satisfactory level of goodness of fit).

According to the previous statements and the previous work found in the literature (i.e. Storey, 2004), the variables under investigation will be tested through a probit model.

#### **4.3.3 Model explanation and variables selection**

The first step in determining the model has been about discerning among financing problems and credit rationing by the Financing Institutions.

The following model is going to test whether some variables are determinants of credit denial standing on the theory of information asymmetry. Most theoretical analysis has dealt with barriers to trade arising from information asymmetry between borrowers and lenders, (Ray, 1998). This is a topic firstly addressed by Akerlof (1970) and, subsequently, become a common base for all the extensive recent work on agency costs, signaling, adverse selection and moral hazard. In 1981, Stiglitz and Weiss pointed out that are not just the prices (interest rate) in the capital market to equate demand and supply but rather the rate charged determines also the riskiness of the borrowers.

Borrowers have better information than the lenders and this fact explains the existing asymmetry between them. Lenders cannot screen and monitor individual projects in a context of imperfect information and, hence, rely on borrowers' characteristics to assess the viability of the projects. Therefore, lenders are expected to prefer lending to who they know better or have more information about. Looking at the literature, few parameters have been found to be important when determining financial decisions.

In analogy to what it has been mainly done so far in the literature, it has been developed a model which rely on a probit regression. This regression contains strive to analyze the determinants of credit denial and considers independent variables belonging to different stream of the literature starting from the approach used by Storey in 2004. There are variables whose try to give measures about the riskiness of the business and others regarding the business resources with a focus on the human capital side (mostly related to the skills of the owner in case of micro and small companies). Looking at the first group of variables, it is possible

to point out the possible influence given by some variables exogenous to the company as those related to the State or the industry sector. Other measures of risk are directly related to the company and are related to the legal form of the company, its size and age. The other independent variables describe measures of the human capital and refer to characteristics of the owner as the gender, the education, the age, the ethnicity and the years live in the USA as well as others combining the owner skills with the way chosen to lead the business: the existence of a network and those related to the way the business is managed (being a family business and if it is home based).

The dependent variable has been derived from a statement made by the business owners interviewed. They had to rate how obtaining financing was a problem for their business basing their evaluation on a five point Likert scale (1 means Not a Problem and 5 means Major Problem) and the data have been depurated taking out the episodes of credit rationing. These cases have been verified through an answer about the source of financing they received in the considered years (2000 for White and African American samples, 2004 for Korean and Mexican samples). A business has been considered to have financial problems when its owner ranked at least at 3 the problems in obtaining financing and did not receive money from any funding Institution in the considered year.

The independent variables tested are derived from the analysis of the literature and integrated with some regarding discrimination issues (sex and race). For what concerns with the risk measures:

- **State:** looking at the Gross State Product (measured as the annual average growth in the periods 1998-2002 and 2002-2004), it is possible to take care also of the effect of a poor geographic location in the contest of a certain business cycle condition. This data should help the lender in lowering the information asymmetry: a higher State relative growth should induce the lender to be more likely to finance a company. This variable has been tested also by Kim (2006) when considering the State relative growth;
- **Industry:** depending on the sector of activity (primary, secondary, tertiary), the lender may find easier or more difficult to assess the firm creditworthiness because of the amount of intangible assets: **GDP by Industry:** contribution to the growth of the domestic product by industry (average annual growth in the periods 1997-2000 and 2001-2004). Already tested in literature by Kim (2006), it should be negatively related to the denial of credit;
- **Tertiary:** As pointed out by Avery, Bostic, Samolyk (1998) the use of personal commitments may be critical to obtaining financing especially when the company offers professional services;
- **Legal Form:** according to Storey (2004), banks are assumed to view lending to private corporations as less risky than lending to individuals. Since the presence of a second owner is likely to bring a different, and additional, skill set to the business as highlighted by Cressy (1996), bank will favor partnerships over sole proprietorships. Freedman and Goodwin (1994) pointed out that also in the case

of micro enterprises with corporate status, banks are more likely to finance because companies are required by law to produce accounts whose are seen as “good discipline”. Legal form has been described through the use of dummy variables as already done in literature by several authors (sole proprietorship, legal partnership, limited company, and corporation). In the following analysis, `Sole_Prop` and `LtdorCorp` are dummy variables set at one when the legal form of the company is Sole Proprietorship for the former and or Limited or S or C Corporation for the latter. According to the previous statements, while `Sole_Prop` is expected to have a positive impact on the denial of credit, `LtdorCorp` coefficient is expected to be negative;

- **Size:** company dimension is a parameter widely used in literature. Because of the existing information asymmetry, lenders will incur in less costs when lending to larger firms because these companies tend to own more assets than smaller firms: business assets may be sufficient security for creditors (Avery, Bostic, Samolyk, 1998). Instead of using the number of employees other than the owner as done by Dunne and Hughes (1994), it has been tested a dummy variable named `Micro` equal at 1 when the number of employees working in the company except the owner is equal or inferior to nine;
- **Age:** this is a variable widely used in literature and it has been used by researchers as a proxy for lender information costs and as a signal of the firm's viability (Avery, Bostic, Samolyk, 1998). Older firms are likely to be better known, have longer, more established relationships with lenders, and thus be easier for lenders to evaluate (Bates, 1991) and lend them money. Therefore, the variable `Age_biz`, measured as the difference between the year when data have been gathered and the year when business started, is expected to have a negative impact on the denial of credit to a business owner;
- **Home based business:** at my knowledge, it is a variable never tested in this kind of analysis. In 1995, Winter and Fitzgerald pointed out some statistics about the failure of home based business. In the following analysis, it will be checked its relevance as possible determinant of credit denial for a business owner.

Small businesses highly rely on the skills of their owners/managers and, therefore, it is major to consider the measures of human capital whose often refer directly to the owner:

- **Gender of owner:** `Owner_sex` is a variable which does not refer to the information asymmetry. Instead, it strives to look for eventual gender discrimination in the financing process. The variable is coded as 1 if the owner is a woman, 0 otherwise. In literature, even if Rosa and Carter (1998) found differences on the basis of gender, recent studies about gender discrimination have been taken out by Storey (2004) and Kim (2006) but without coming to a conclusion;

- **Owner\_Age:** even if not relevant, in the past it has been found to be negatively related to the denial of credit (Storey, 2004) and this is a fact again explaining through the minimization of information asymmetry between the borrower and the lender. Here, the same hypothesis is tested;
- **Years in USA:** this is a variable I have decided to test since, probably, it is simpler for a lender to gather more information about a potential borrower when this person has spent more time in the hosting country;
- **Family business:** credit lender may be suspicious when financing a family business since the existence of risks for intermingling (Haynes, Walker, Rowe and Hong, 1999);
- **Education:** Education of manager/owner may also provide some information about the firms' management and, hence, lenders may prefer to lend to firms with educated managers (Maya, 2002). College is the dummy variable tested and set at one if the owner has attended at least a college course;
- **Network:** this is a variable obtained from a question asked just to the minority business owners. It should help in explaining that an entrepreneur well integrated in the local community has fewer problems in obtaining financing. The more integrated is a business owner in a community and the lower should be the information asymmetry of the lender. This is a dummy set at 1 when the entrepreneur is involved in at least one organization (religious, community-based social, business organization or ethnic network, professional organization);
- **Minority:** Minority does not refer to the information asymmetry. Instead, it strives to look for eventual gender discrimination in the financing process (coded as 1 if the owner belongs to one of the following samples: African-American, Korean American and Mexican American). Dummy variables about minority have been used by several authors (Bates, 1991; Ratumi and Swami, 1999; Maya, 2002; Storey, 2004). African, Korean and Mexican are the single dummy variables whose describe the ethnicity of each business owner. In this context, the reputation mechanism helps in enforcement.

The variables described above are tested through a probit regression as widely done in literature for this kind of analysis (i.e. Storey, 2004):

$$y = \beta_0 + \beta_1 RiskMeasures + \beta_2 Human Resources + \beta_3 RM * HR + \beta_4 HR * HR + \varepsilon$$

The regression considers the variable representing measures of riskiness as well as measures of the human resources and some interplay between the single variables:

- **Owner\_Sex\*Owner\_Age**
- **Owner\_Sex\*Sole\_Prop**

- **Minority\*Network, Minority\*Network, Minority\*Years\_USA, Minority\*Fam\_biz, Minority\*Sex** and the same kind of multiplication have been taken out also with the single dummy variables describing the ethnicity (African, Korean and Mexican)

Group	Variable name	Definition	Sign	References
<b>Dependent Variable</b>	<b>Probl_finance</b>	=1 if the company had problems in getting financing, 0 otherwise		
<b>Independent Variables</b>				
<b>- Risk measures</b>	<b>GSP</b>	Rate of growth by State	-	Kim (2006)
	<b>SBA_funds</b>	Average funds given by the SBA to each active company per State	-	
	<b>GDP by industry</b>	GDP by industry sector on country basis	-	Kim (2006)
	<b>Tertiary</b>	=1 if the business belongs to the service industry, 0 otherwise	+	Avery, Bostic, Samolyk (1998)
	<b>Sole_prop</b>	=1 if the legal form is sole proprietorship, 0 otherwise	+	Freedman and Godwin (1994)
	<b>LtdorCorp</b>	=1 if the legal form is Limited Liability or Corporation, 0 otherwise	-	Storey (2004) [solo Ltd]
	<b>Micro</b>	=1 if the company has less than 10 employees (except the owner), 0 otherwise	+	Fazzari et al. (1988), Audretsch and Elston (2002)
	<b>Age_biz</b>	=2003 (or 2005)-year biz started	-	Bates (1991), Cressy (1996), Biggs (2002)
	<b>Home_Based</b>	=1 if the business is home based, 0 otherwise	?	Home-based biz investigated by Winter and Fitzgerald (1995)
<b>- Human capital measures</b>	<b>Owner_Sex</b>	=1 if the owner is a female, 0 otherwise	?	Kalleberg and Leicht (1991)
	<b>Owner_Age</b>	Age of the owner at the considered year (2000 and 2004)	?	Cressy (1996), Storey (2004)
	<b>Years_in_USA</b>	Years spent in the USA by the minority business owner	-	
	<b>Family_biz</b>	=1 if the business is owned and managed by the family, 0 otherwise	?	Risks for intermingling see Haynes, Walker, Rowe and Hong (1999)
	<b>College</b>	=1 if the owner attended at least some college classes, 0 otherwise	-	Bates (1991), Biggs (2002)
	<b>Network</b>	=1 if the business owner belongs, at least, at one association, 0 otherwise	-	Kranton (1996), Taylor (1997), Fafchamps (1998)
	<b>Minority</b>	=1 if the business owner is African American or Korean American or Mexican American, 0 otherwise	?	Biggs (2002)
	<b>African</b>	=1 if the business owner belongs to African American ethnic group, 0 otherwise	?	
	<b>Korean</b>	=1 if the business owner belongs to the Korean American ethnic group, 0 otherwise	?	
	<b>Mexican</b>	=1 if the business owner belongs to the Mexican American ethnic group, 0 otherwise	?	

**Table 4. 17 - Summary of the variables investigated**

## 4.4 Results

The previous variables have been tested through three different levels of analysis and starting from a more general approach where the single ethnicity were not pointed out and arriving to a model where the single ethnicity variables have been multiplied with few others.

In the next lines follows a summary of the results given by the three probit regressions run in the analysis.

The first analysis gathers all the ethnicities in the variable *Minority* which results to be highly relevant in the regression. Other variables resulted to be relevant at the 1% are related to size (*Micro*) and age (*Owner\_Age* and *Minority\*Years\_in\_USA*) all with the expected signs. Also the legal form *Sole Proprietorship* (*Sole\_Prop*) is relevant at the 1% but with an unexpected sign. The belongingness to a network (*Minority\*Network*) shows the expected effect and it is relevant at the 5%. Eventually, at the 10 %, several other characteristics play a major role: size (*LtdorCorp*) and age (*Age\_Biz*) both with the expected signs as well as the multiplication *Owner\_Sex\*Owner\_Age*.

Looking at the single ethnicity of the business owners, as done in the regression 2, quite similar results are obtained. At the 1%, size (*Micro*) and minority (*Korean* and *Mexican*) confirm their relevance and signs. *Owner\_Age* is still relevant with positive sign but at the 5%. The same relevance it is obtained by the two legal forms tested (*Sole\_Prop* and *LtdorCorp*) as well as the *Owner\_Age* and all of them confirm the signs of the first regression. At the 10%, it is confirmed the role played by *Age\_Biz* and it is found with a positive sign the *African American* minority.

Eventually, some multiplications between the minority variables and some measures of the human resources and of the risk have been considered. Also in this case, at the 1%, size (*Micro*) is relevant with the expected sign as well as age (*Owner\_age*) and minority (*Korean* and *Mexican*) whose have all a positive influence. Again, *Sole Proprietorship* is relevant at the 1% with an unexpected sign. Just *LtdorCorp* is relevant at the 5% with the expected sign whereas, *Age\_Biz* and the multiplication *Korean\*Network* result to be relevant at the 10%.

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	1		2		3	
	Coefficient	Std.Error	Coefficient	Std.Error	Coefficient	Std.Error
Constant	-3.03808 (-4.88)***	0.6229	-2.54520 (-4.42)***	0.5763	-2.64147 (-4.16)***	0.6354
GSP	0.0447633 (0.777)	0.05762	0.0103196 (0.170)	0.06065	-0.00294580 (-0.0481)	0.06122
SBA funds per State	1.26550e-008 (0.304)	4.160e-008	-1.03210e-008 (-0.249)	4.144e-008	-7.9874e-009 (-0.189)	4.216e-008
GDP by Industry	0.0400738 (0.976)	0.04106	0.0209682 (0.479)	0.04379	0.0007994 (0.0178)	0.04486
Tertiary	-0.0721090 (-0.420)	0.1717	-0.0354035 (-0.205)	0.1730	0.0024101 (0.0136)	0.1767
Sole_Prop	-0.649591 (-2.70)***	0.2404	-0.597841 (-2.50)***	0.2395	-0.666490 (-2.73)***	0.2444
LtdorCorp	-0.444457 (-1.91)*	0.2323	-0.461320 (-1.97)**	0.2345	-0.501549 (-2.12)**	0.2368
Home_based	-0.0144340 (-0.108)	0.1341	0.111498 (0.762)	0.1464	0.105794 (0.708)	0.1493
Micro (<=9)	0.730305 (2.92)***	0.2498	0.684233 (2.73)***	0.2502	0.675699 (2.62)***	0.2574
AGE_BIZ	-0.00982012 (-1.74)*	0.005637	-0.0110929 (-1.91)*	0.005794	-0.0105408 (-1.81)*	0.005836
Owner_Sex	0.887058 (1.35)	0.6567	0.531119 (1.02)	0.5207	0.745838 (1.11)	0.6689
Owner_Sex*Owner_Age	-0.0163054 (-1.70)*	0.009579	-0.0133693 (-1.41)	0.009482	-0.0139553 (-1.41)	0.009930
Owner_Sex*Sole_Prop	0.382659 (1.50)	0.2556	0.307505 (1.21)	0.2542	0.378878 (1.46)	0.2591
Owner_Age	0.0211547 (3.15)***	0.006726	0.0161622 (2.46)**	0.006576	0.0184204 (2.58)***	0.007134
College	0.127609 (1.03)	0.1233	0.122441 (0.985)	0.1243	0.154141 (1.21)	0.1278
Minority	1.54840 (4.61)***	0.3356				
Minority*Owner_sex	-0.297020 (-0.837)	0.3549				
Minority*Fam_Biz	0.120451 (0.761)	0.1583				
Minority*Years_in_USA	-0.0108218 (-2.86)***	0.003788				
Minority*Network	-0.298355 (-2.31)**	0.1289				
African			0.445174 (1.92)*	0.2324	0.476146 (0.724)	0.6574
African*Owner_sex					-0.196240 (-0.455)	0.4317
African*Fam_Biz					0.308293 (0.871)	0.3541
African*Years_in_USA					-0.0035488 (-0.441)	0.008049
African*Network					-0.0605848 (-0.177)	0.3425
Korean			1.18957 (5.14)***	0.2313	1.46911 (3.65)***	0.4025
Korean*Owner_sex					-0.283553 (-0.743)	0.3814
Korean*Fam_Biz					0.357068 (1.53)	0.2330
Korean*Years_in_USA					-0.0099320 (-1.18)	0.008422
Korean*Network					-0.370584 (-1.88)*	0.1975
Mexican			1.07772 (4.97)***	0.2167	2.10892 (4.26)***	0.4949
Mexican*Owner_sex					-0.324901 (-0.817)	0.3975
Mexican*Fam_Biz					-0.407495 (-1.33)	0.3057
Mexican*Years_in_USA					-0.0107008 (-1.55)	0.006886
Mexican*Network					-0.137931 (-0.673)	0.2051
	n = 657		n = 657		n = 657	
	Chi^2(20):		Chi^2(18):		Chi^2(30):	
	265.21 [0.0000]		263.52 [0.0000]		278.06 [0.0000]	

Table 4. 18 - Results of the regressions

Note: variable relevance at \* 10% \*\* 5% \*\*\* 1%

## 4.5 Conclusions

The work presented in the previous pages is based on the National Minority Business Owners (NMBOs) Survey and has tried to add some new insights at the existing literature dedicated to the financing of Small and Medium Businesses. Particularly, at our knowledge, the NMBOs database has given the possibility for the first time to test the determinants of credit denial on such a wide basis in the USA.

The analysis has been the result of different streams of literature. They address the topic of financing with respect to the particular nature of the businesses analyzed. The database is made up by random observations regarding micro, small and medium companies (maximum 100 employees except the owner) around the country and considering just African American, Korean American, Mexican American and White American business owners. Moreover, part of the business can be classified as Family Business and a good percentage of them are home based.

The analysis refers to data gathered between the 2003 and the 2005, a period subject to big movements in credit markets (process of merger and acquisition among credit and finance institutes) but it has been reported that they have not brought to relevant changes in credit availability (Berger, Goldberg and White, 2001).

The analysis has taken the step from the literature referred to the information asymmetry which can explain decisions of lenders when it comes to decide the approval of a loan to a borrower. This study has confirmed the role played by characteristics as age and size in explaining the denial of credit. To be more precise, the dummy Micro, as well as the variable Owner\_Age, is highly relevant in all the regressions and shows that smaller companies and older business owners will face more problems in getting financing. Whereas the result about size has been demonstrated in several studies, the role of the age of the owner was still to address. The result obtained seems to indicate us the preference for credit lenders of people whose strive to obtain higher returns.

Another variable very relevant, and with an expected effect, is the Sole Proprietorship dummy: the negative sign indicates that sole proprietors do not face higher denial rates. On the other side, the expected sign is obtained when companies are S or C corporations or limited liability: they are not credit rationed. The previous statement refers to a variable relevant at the 10 percent, a level of significance gained also by the variable related to the age of the business, which confirms the information asymmetry theory: an older business will have encountered fewer difficulties in obtaining financing.

It is worth to be noted the high relevance obtained by the dummy Minority which indicates that minority business owners are most likely to be credit constrained even if the years spent in the host country lower as well as the belongingness to a network. The effect of the last two variables is explainable directly with the information asymmetry theory since a business owner that has spent more time in the USA or belongs to an association / organization of any kind will be better known by credit lenders.

Deepening the analysis to the specific ethnicities, the results concerning with the non-minority related variables are confirmed whereas differences emerge right when looking at the credit denials determinants relate to the minority status. African

American business owners do not show any significant minority-related variable in contrast to what happens to the Korean Americans and the Mexican Americans. In fact, the ethnic dummy variables about Korean Americans and Mexican Americans are positive and relevant at the 1% pointing out the existence of problems in getting credit. Just for Korean Americans the belongingness results to be significant and let to lower the probability of having a credit denied. This is a result sustaining the rapidly growing literature (Kranton, 1996; Taylor, 1997; Fafchamps, 1998) that highlights how, “in a world of imperfect information,” networks “provide an economic advantage to better connected agents (Fafchamps, 2000), Partially participating in the explanation of these results there is also the way the business owners manage their own businesses. From the analysis of the data, it has been showed that the purchase from a non-family member is the favorite way of Korean American business owners to get involved in the business. Furthermore, they are relatively new in the USA and this is maybe a possible reason of their scarce recourse to the help service given by several organizations. In literature, it has been show the possible self-sustaining condition of being a minority business owner because the people from the same ethnic group will prefer this business to others: Korean American are the minority with the lowest percentage of business coming from their own minority whereas the Mexican Americans were the most satisfied of the support given by the community.

The analysis has not found any relevant relation with the gender of the owner as well as with his/her education level (again Korean Americans have the lowest average values and differ substantially from the average value reached by the other sub-samples). Furthermore, neither being a family business nor being home-based has shown to be relevant when analyzing the determinants of credit denial.

Several studies have confirmed the existence of a considerable wealth gap between minority (African Americans) and White business owners (Browne, 1993; Blau and Graham, 1990; Oliver and Shapiro, 1995; Wolff, 1994) and this fact could constitute a possible barrier to business' success. Also Bates (1989), Blanchflower et al. (2001) and Fairlie (1999) have pointed out the existence of discrimination in the small business credit market between African and White Americans and Badu, Daniels, Salandro (1999) found that African American households are significantly more risk averse in their choice of assets and typically pay higher rates for several types of credit instruments.

Discrimination is a possible explanation of our results but not the only one.

An improvement to this work should rely on a more complete description of the financial resources of a business owner. The observations in the database often refer to family businesses and, therefore, it would be a great improvement to dispose of data about two dimensions of the household financial resources: household wealth and household income.

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## Chapter 5

### Conclusions

*“Patience is a key element of success”*

- Bill Gates -

The main goal of my dissertation was about investigating the phenomenon of entrepreneurship in our society from various points of view. The reasons for investigating it are easily found in the interest showed by the scholars belonging to different disciplines and schools. Entrepreneurship is a topic that emerged from psychology, economics and sociology (Cogliser and Brigham, 2004) and it is nowadays widely treated also in other fields of literature as those about management and finance. Every discipline refers to the entrepreneur describing his role with a different perspective. This is the reason why there are, at least, thirteen different ways to describe him/her. However, almost all the contributions seem to agree in attributing to the entrepreneur a positive function in our society or economic system because the entrepreneur is moved by high motivation and he is not scared by the change. The entrepreneur looks at change as a source of new opportunities and exploiting opportunities he/she brings innovation into our lives.

Innovation, in its various forms, has been told to be of fundamental importance in order to pursue a politic of economic growth. Schumpeter has got two main results in this respect. One is about his introduction of the distinction between invention and innovation: a major step for highlighting the difference between an inventor and an entrepreneur. The other one is about his enriched notion of innovation since he considered not just new processes but also new intermediary products, new markets and new organizational forms. Schumpeter’s thought constitutes the bridge among the three concepts just described: the entrepreneur is responsible to kick off the economic development through the introduction of innovation. He intended the economic development as the disruption of the regular circular flow thanks to the novelties introduced.

These are the main reasons that have brought the scholars to describe the entrepreneur in ways somehow related to the Schumpeter’s approach and emphasizing how the entrepreneurial role is diffused in economic system. Entrepreneurial functions can be found inside a company owned by someone else (corporate entrepreneurship) as well as outside (assuming the risk of his/her own activity). Citing Nolan Bushnell (founder of Atari and Chuck E. Cheese’s), “the true

entrepreneur is a doer, not a dreamer”, the person that decides to do something and believes to be able to accomplish to his/her dream.

In the previous chapter, issues under investigation have been about major topics in entrepreneurial life. Chapter 3 has been dedicated to the strategic management of a manufacturing firm with a special focus of its choices in term of innovation activity. The following chapter, instead, has coped with one of the major problems entrepreneurs usually point out: especially in the first years of their activity.

The taxonomy of strategy adoption by manufacturing company has taken the step from a kind of analysis already developed in literature. It has been based on a sample of 225 companies chosen randomly in the province of Bergamo in order to describe as better as possible the manufacturing industry. The original contribution of my work has been about taking into account variables never investigated before and proposing a model that gathers previous results of similar studies with the results of the analysis. Therefore, the first thing to be pointed out is the recognition of the existence of three main strategies adopted by manufacturing companies. These strategies describe the behavior assumed by the entrepreneur when running his/her business:

- **Marketers:** companies involved with innovation activities that suffer less of path dependency. From the previous analysis they result to be also smaller than the companies named innovators;
- **Innovators:** companies usually larger and older than the others that have a more structured research and development activity. Innovation is fostered not just by the presence of laboratory for research and development but also by collaborations with clients and/or universities;
- **Caretakers:** mostly young companies that do not rely on innovation. These companies are less likely to have external collaborations.

These profiles match recall the results obtained by Roth and Miller (1989). In my review of literature I found that several scholars have come to the same results and have named the three strategic behaviors in the same way. According to this stream of research, I have used the same terminology. My original contribution has been about the independent variables considering particular variables never investigated (i.e. recognition of path dependency, belongingness to a cluster, etc.) together with variables already widely investigated in literature on determinants of innovation in a company. Eventually, taking into account also other data emerged from the interviews with companies' managers or entrepreneurs, it has been possible to point out an original graphical representation that helps in clearing out how companies can reach the business success through their strategic behavior which depends on their involvement in innovation related activities and their approach to the market. Every company can be successful on the market (reaching the top of the pyramid and maximizing its success), independently from the strategy adopted. The choice of a certain strategy implies just the adoption of the right tactics that, in turn, will lead to the intermediate results that will be constantly monitored in order to correct the possible mistakes brought into practice. The profiles obtained can be further described

stressing out the different approaches to market used by manufacturing companies in relation to their efforts in research and development activities and their market target. The companies most involved in R&D activities are marketers or innovators. Whereas the former companies are more involved in product innovation and look more at incremental innovations, the latter are companies that strive for innovating radically. Therefore, innovators try to be the first on the market in order to look for high spenders or having returns for a longer time. The third profile refers to caretaker companies. These companies are focused mainly in lowering the costs of production. They will reach all the customers even if their core is not with the high-spenders and will not invest too much in research and development activities. These positions are descriptive of the most common behaviors inside the clusters even if there could be companies that, inside a cluster, may take decisions a little bit different from the majority (i.e. marketer companies looking for high spenders or caretakers more involved in innovation and looking for process innovation).

This research has helped out also in describing the situation of the manufacturing industry in the province of Bergamo. The analysis has highlighted the existence of an inverse relation between dimensions and technology level and the recognition of innovation as strategic variable. A large part of manufacturing companies, especially the smaller ones, do not recognize the need for graduated employees as well as the role of University as source of ideas. Results support the findings by Unioncamere-Lombardia about the need of innovation, internationalization and repositioning on the global market. There is the need for a change in the way activities are developed day by day. In particular, SMEs do not show signs of opening for future collaborations with universities (it is underestimated the importance of collaborations also with clients (i.e. joint-venture, cooperation and partnerships)). The majority of the companies is small and has low, or medium-low technology level. Therefore, it is not surprising that entrepreneurs seem not really aware of the role played by knowledge and, furthermore, they undervalue the importance of investing in personnel formation and physical investments.

The last part of the work has been about the problems in getting the needed capital in order to start and sustain a business. The research has been realized using the National Minority Business Owners (NMBO) Survey database: it contains about 200 observations for each ethnic group (African American, Korean American, Mexican American and White American). The database is made up by random observations regarding micro, small and medium companies (maximum 100 employees except the owner) around the U.S.A.: observations have been realized between the 2003 and the 2005, a period subject to big movements in credit markets (process of merger and acquisition among credit and finance institutes). Given the peculiarity of the dataset, I have got the chance to accomplish to the widest research on the determinants of credit denial including in the research three minorities and compared them to the subsample made up by White Americans. However, the fourth chapter has not just been about minorities and financing but it has been considered also the topic of family business. It has been really important to consider this aspect in the research, not just because of the high percentage of family owned businesses, because it has been shown the interdependence of the two subsystems: business and family have to

interact in order to operate on the market. The analysis has been realized through some multinomial logit regressions and has found in the literature about information asymmetry a good way for evaluating actions: a lender has got less information than the borrower when it comes to decide for a financing. Furthermore, information asymmetry can also be seen in terms of knowledge of the entrepreneur about the institutional help he/she could receive from Governmental Offices.

This mix of independent variables under investigation, as well as the wideness of the sample, constitute the main original contributions of the study. According to a part of the review of the literature, the study has confirmed the role played by characteristics as age and size in explaining the denial of credit: smaller companies and older business owners will face more problems in getting financing. Whereas the result about size has been demonstrated in several studies the role of the age of the owner was still to address. As happened in previous studies, there is no relevance of any discrimination related to the gender of the entrepreneur. However, the variable related to the age of the business confirms the information asymmetry theory: an older business will have encountered fewer difficulties in obtaining financing. Maybe the major result is about the role of the dummy variable about being a minority entrepreneur: results show that they are most likely to be credit constrained even if the less years spent in the host country as well as the belongingness to a network show to be relevant. The effect of the last two variables is explainable directly with the information asymmetry theory since a business owner that has spent more time in the USA or belongs to an association / organization of any kind will be better known by credit lenders. Looking at the specific ethnicities, the results point out the existence of differences with the previous results with regard to the credit denials determinants related to the minority status: non-minority related variables are confirmed. When running the last regressions, African American business owners do not have any significant minority-related variable whereas Korean Americans and the Mexican Americans show this kind of relations. In particular, Korean Americans show the importance of the belongingness to a network in order to lower the probability of having a credit denied. This is a result sustaining the rapidly growing literature (Kranton, 1996; Taylor, 1997; Fafchamps, 1998) that highlights how, "in a world of imperfect information," networks "provide an economic advantage to better connected agents (Fafchamps, 2000).

By the way, it is not possible to state the existence of real discriminations since Korean Americans are relatively new in the USA (this could be a possible reason of their scarce recourse to the help service given by several organizations). Moreover, as stressed out in review of the literature, it has been showed the possible self-sustaining condition of being a minority business owner because the people from the same ethnic group will prefer this business to others: Korean Americans are the minority with the lowest percentage of business coming from their own minority whereas the Mexican Americans were the most satisfied of the support given by the community.

Discrimination is a possible explanation of our results but not the only one.