

# **Innovative Enterprises and Regional Economic Systems. The case of Canton Ticino**

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## **Abstract**

Based on the literature and on empirical evidence provided by the analysis of the Canton Ticino's economic system, the paper explores how innovative enterprises can contribute to the competitiveness of a local economic system. Innovative companies are able to introduce innovations in strategic positioning, operational effectiveness and organisational process and context. Thanks to these flows of innovations they can remain competitive and achieve a profitable growth within a current competitive environment characterised by discontinuity, instability and uncertainty.

Innovative enterprises can play a fundamental role in enhancing local economies' competitiveness, thus helping the Canton Ticino to face the challenge of economic and social development. Visibility and creation of social consensus around the model of innovative enterprise can stimulate emulation which contributes to the diffusion of innovative business models. Political and institutional actors play a major role in managing processes targeted to create visibility and social consensus around innovative entrepreneurial values and culture.

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## Introduction

Research on regional economic systems has attracted an increasing number of management scholars. Literature contributions can be classified into three mainstreams, according to the unit of analysis chosen by scholars.

A large body of literature has focused on districts, within regional economic systems, as units of analysis. Italian economic literature is rich in contributions on regional economies developed on empirical evidence provided by Italian clusters with an industrial specialisation [Becattini 1979, 1986, 1989; Brusco, 1982, 1989]. Some Italian scholars have analysed cluster evolution [Guenzi, 1997; Viesti 2000]; others have focused on policies that can facilitate district formation [Visconti, 1996; Marelli, 2002] and on how a cluster can enforce the regional competitiveness and competitiveness of member firms [Becattini and Rullani, 1993; Brunetti, Marelli and Visconti, 2000];

Porter [1990] analysed relations between regional/national competitiveness and clusters. The national/regional success in a particular industry depends on four attributes: factor conditions, demand conditions, related and supporting industries, corporate strategy, structure and rivalry. Clusters and the geographical agglomeration of firms play a fundamental role in Porter's diamond and in particular, in the creation of factors: labour, capital and infrastructures. A cluster of domestic competitors stimulates factor creation through increasing rivalry and consequently improving company strategy and structure; the development of related and supporting industries creates or stimulates the creation of transferable factors.

Competitive dynamics which involve regions or nations are based on the ability of regional or national players to generate more value using factors. The way value is created is the "entrepreneurial innovation" that enhances regional or national competitiveness.

Some scholars adopted inter-firm relations as unit of analysis. Lorenzoni and Baden Fuller [1995] analysed the dynamics of cluster formation pointing out how a district formation can be guided by a firm which promotes the development of companies involved in collateral and related activities at different stages of the value chain and generates rival companies, typically established by former employees. According to this view, networking is the result of entrepreneurial action that, through network relations, can build the best organisational form to compete in his market and achieve superior performance

Lorenzoni and Lipparini [1999] analysed the process of vertical disintegration and focused on the ability to co-ordinate competencies and combine knowledge across firm boundaries. They evidenced the role played by the "leading company" and its relational capability inside the district.

Lazerson and Lorenzoni [1999] evidenced how "focal firms", that occupy strategically central position inside the district, play a major role in expanding districts' horizons to incorporate new technologies, organisational skills and markets. Boeri and Lipparini [1999] pointed out how in some industrial districts a

moderate form of hierarchy is emerging. They evidenced how the “leading firm” governs the generation and transfer of knowledge inside the district.

The idea that, inside a regional economic system, a single firm can play a leading role in driving the development of clusters is quite intriguing. In the above mentioned contributions, scholars, while choosing inter-firm relations as the unit of analysis, focused on the role of the single enterprise which acts as the meta-manager of a coalition of enterprises linking network organisation to single firm performance.

Other scholars choose the single enterprise as the unit of analysis and are tempted to clarify how the behaviour of a single firm or of a group of firms can enforce the competitiveness of districts [Varaldo and Ferrucci, 1993].

Coda [1983] evidenced how the renewing of enterprises’ business models can enhance district competitiveness and regional development. Minoia [2002] analysed the dynamics of internationalisation of an industrial district. He focused on a particular group of firms and found that their process of internationalisation can be the engine to stimulate the internationalisation of related companies of the district. The final result of such a process is to enhance district competitiveness in response to challenges deriving from globalisation.

Our contribution is positioned within this last mainstream, as we chose the firm as the unit of analysis. Specifically, we explore the current and potential role of a particular category of firm, that we call “innovative enterprise”, within a regional economic system. Based on literature and on empirical evidence, provided by the analysis of the Ticino system, the paper explores:

- I) the basic features of innovative firms;
- II) the reasons why innovative firms can be prevented from playing a driving role in the economic and social development of a local economic system and remain “hidden champions”, relatively isolated;
- III) how it would be possible to lever innovative enterprises to foster economic and social development

We adopted a System Dynamics approach, using a feedback concept in order to:

- I) define and represent the innovative enterprise business model;
- II) explain why innovative companies can remain hidden in the social and economic fabric;
- III) elicit how innovative enterprises could become a central engine for the development of regional economic systems.

The paper is structured as follows: capitalising on relevant literature on strategic management, we explore the concepts and features of innovative enterprises.

In the second part, capitalising on literature and through the analysis of empirical evidence, we explore the evolution of the Ticino industrial system during the second half of the 19<sup>th</sup> Century.

Finally, capitalising both on relevant literature and the empirical evidence of the Canton Ticino’s economic system, we explore how to lever on innovative

enterprises to foster the development of regional economic systems.

### **Innovative enterprises features**

In the mid 90's, in the field of strategic management, a debate emerged on the relation between firms' strategy and the structure of industry. According to strategic management scholars like D'Aveni [1994] and Markides [1997, 1999a, 1999b and 2000] the structure of industry is considered to be a dynamic environment that can be modified by companies' innovative strategies.

D'Aveni [1994] pointed out how firms are facing environments that are hypercompetitive. Such environments are highly changeable and even discontinuous, requiring organisations to respond flexibly and rapidly with innovative strategies. In the most hypercompetitive industries, competitors act boldly and aggressively to disrupt the status quo, forcing countermoves that are equally powerful. Global hypercompetition's demands for simultaneous efficiency, responsiveness and speed, mean, quite simply, that firms must become better learners. Without the ability to learn and to restructure internal and external relationships, companies in hypercompetitive environments will inevitably lose the ability to compete successfully.

Markides [1997] clarified the content of innovative strategies and the process of strategic innovation: "the essence of strategy is to choose one position that the company will claim as its own. A strategic position is simply the sum of the answers that a company gives to the questions: Who should I target as customers? What products or services should I offer them? How should I do this in an efficient way?" Strategy is all about choosing a distinctive (different from competitors) strategic position; in this perspective strategies are unique and they can be called "innovative". To have a unique strategic position, a company must generate strategic options - which are gaps in the competitive environments that a firm recognises and can fill - and then has to choose from among them. The process of generating new strategy is defined as "creative positioning" and is strictly related to a set of resources and capabilities that the company must develop and nurture.

The power of strategic innovation was recognised also by Henderson and Cockburn [1994, 2000] who pointed out how new strategies, implemented by pioneer companies can become dominant and can influence the strategic behaviour of competitors and the sector of industry. They related the ability of the firm to generate new strategy to a distinctive set of resources. Once the new strategy has been implemented and has been imitated by competitors, the original set of resources becomes obsolete and the company must renew it.

Also Porter [1996, 1997] contributed to the debate on strategic innovation pointing out that the essence of a good strategy is a unique set of activities difficult to be imitated and supporting a sustainable competitive advantage.. Continuous increasing of operational effectiveness is necessary but is not sufficient to sustain competitive advantage as the continuous search for

operational effectiveness, without making clear and coherent strategic choices, is subject to imitation by competitors.

An important contribution to understanding the process that enables a company to be innovative comes from internal entrepreneurship studies. According to Burgelman's process model of Internal Corporate Venturing [1983a, b and c, 1985], the introduction of new products and new processes can contribute to the development of new strategic paths that can contribute to corporate strategy renewal. The firm's ability to renew its corporate strategy and/or generate new strategies depends: on the availability of both induced and autonomous entrepreneurial activities on the part of front line management, on the ability of middle-level managers to retain the implications of entrepreneurial initiatives and on the capacity of top managers to allow viable entrepreneurial initiatives to influence the corporate strategy.

While presenting an ecological model of the strategy creation process, Burgelman [1991] emphasises the role of managers in designing the firm's structural context which is constituted by its organisational structure and the administrative systems such as, for example, information, rewards and incentive mechanisms. Administrative mechanisms influence the atmosphere in which the emergent strategic behaviour of front-line managers is shaped.

Bartlett & Goshal [1995] who capitalised on the Burgelman [1983a] model, introduced the concept of the behavioural context and tried to focus on the link between managerial actions and behavioural context. Top manager efforts should be devoted to design a firm's behavioural context moulding the smell of the place, the company climate that is manifested in a thousand small details of how a company function, to foster co-operation and spread a spirit of initiative within the organisation.

Based on the above mentioned contributions, we define the concept of an innovative company which is built on three pillars.

Firstly, innovative companies are able to generate innovation by positioning through creative positioning processes which can involve the development of new products, new markets, new distribution channels and new strategic business areas

Secondly, the ability of these companies to innovate positioning is based on the ability to introduce innovation in the organisational context and in management systems. These innovations, which involve both soft and hard organisational variables, structure and processes, are typically finalised at instilling bottom-up discipline and at releasing initiative capabilities in order to mould an organisational context which is entrepreneurial and disciplined at the same time.

Thirdly, in order to build and sustain a competitive advantage, productivity improvements cannot be ignored. The continuous introduction of innovation in operations is the third pillar of an innovative company. Innovations in operations develop in the two directions of value creation for customers and cost reduction, in order to increase productivity.

An innovative company concept can be represented through a feedback loop diagram that highlights mutual relations among the three pillars (Figure 1).

The introduction of innovations in strategic positioning, operational effectiveness and in the organisational context enables a company to remain competitive and to achieve profitable growth. Innovations in the organisational context can create a behavioural environment that fosters innovation in positioning.

The redesigning of the organisational structure and of administrative systems, renewal of corporate culture and style of leadership allow the release of entrepreneurial energy embedded in the organisation that can determine, for instance, the development of successful new products and new markets and the exploration of new business areas. Creative positioning has a direct impact on the behavioural context because it defines the field of entrepreneurial commitment, where organisational learning must take place, requiring further organisational innovation (Figure 1 feedback R1).

A typical example of the dynamics of this feedback is constituted by the early history of 3M Corporation [Von Hippel, Thomke and Sonnack, 1999]. Under Mc Knight's chairmanship the company grew from a regional producer of abrasive material into an international company, a leader in the production of innovative accessories for office and industrial use based on adhesive technologies. Since the beginning, Mc Knight moulded an organisational context that allowed the emergence of bottom-up strategic initiatives which enlarged the competitive scope of the company, introducing an increased managerial complexity that required further managerial system innovations.

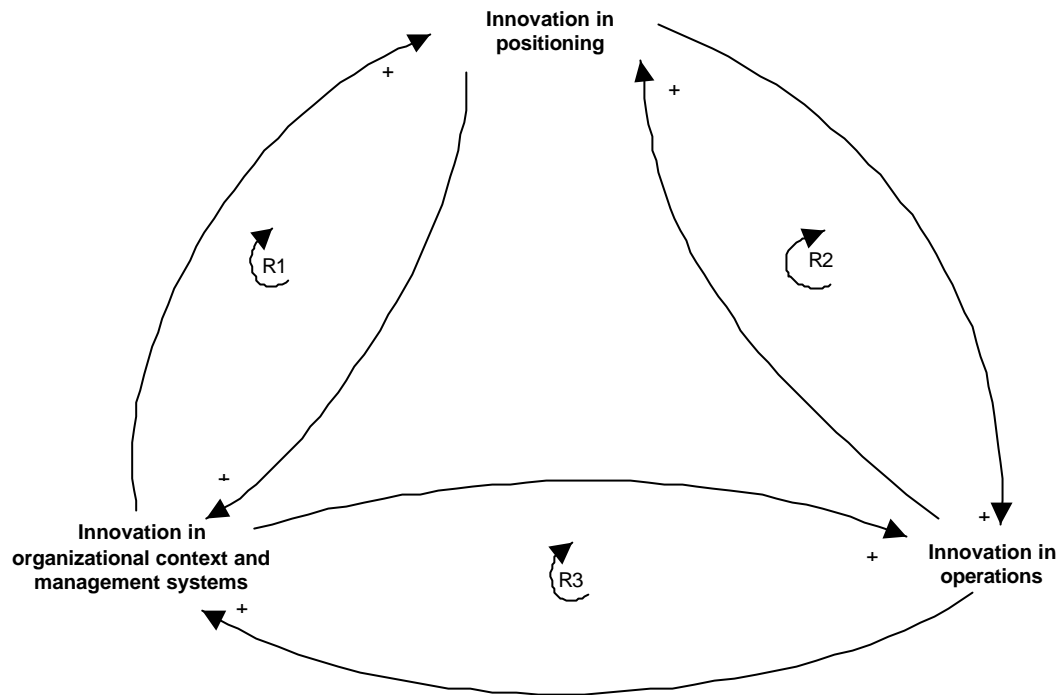
Creative positioning is not only based on organisational innovation, but also on the ability to reduce costs through the introduction of operational innovations. The success of new strategic initiatives depends also on the ability to reduce costs and increase quality levels through the introduction of operational innovation. Furthermore, creative positioning is stimulated by the constant tendency towards the efficient allocation of resources through the introduction of operational innovations (Figure 1, feedback R2).

Sony's Walkman contributed to renewing the consumer electronic industry [Cooper, 1994]. The success of the Walkman was based not only on innovative features (weight, size, transportability) but also on a very affordable price for young consumers. To obtain low price management, engineers introduced many operational innovations to reduce production costs dramatically.

Operational innovations are stimulated by corporate challenges which require changes in the organisational context and furthermore induce changes in organisational structures and processes.

Innovations, typically resulting from challenging programs like Business Process Reengineering, TQM, 6-Sigma, the "Box of Ideas", are examples of feedback 3 which translate into incremental or dramatic improvements in productivity and operational effectiveness (Figure 1)..

Figure 1 A System Dynamics view of innovative enterprise: linking different kinds of innovation



Thanks to the ability to generate innovation in strategic positioning, operations, management systems and the organisational context, an innovative enterprise develops superior capabilities to compete, to involve other relevant stakeholders and therefore to generate superior competitive, economic and social performance (Figure 2).

The feedback loop R1 (Figure 2) shows how competitive capabilities enforce the ability of the company to meet customers' needs that determines higher profitability.

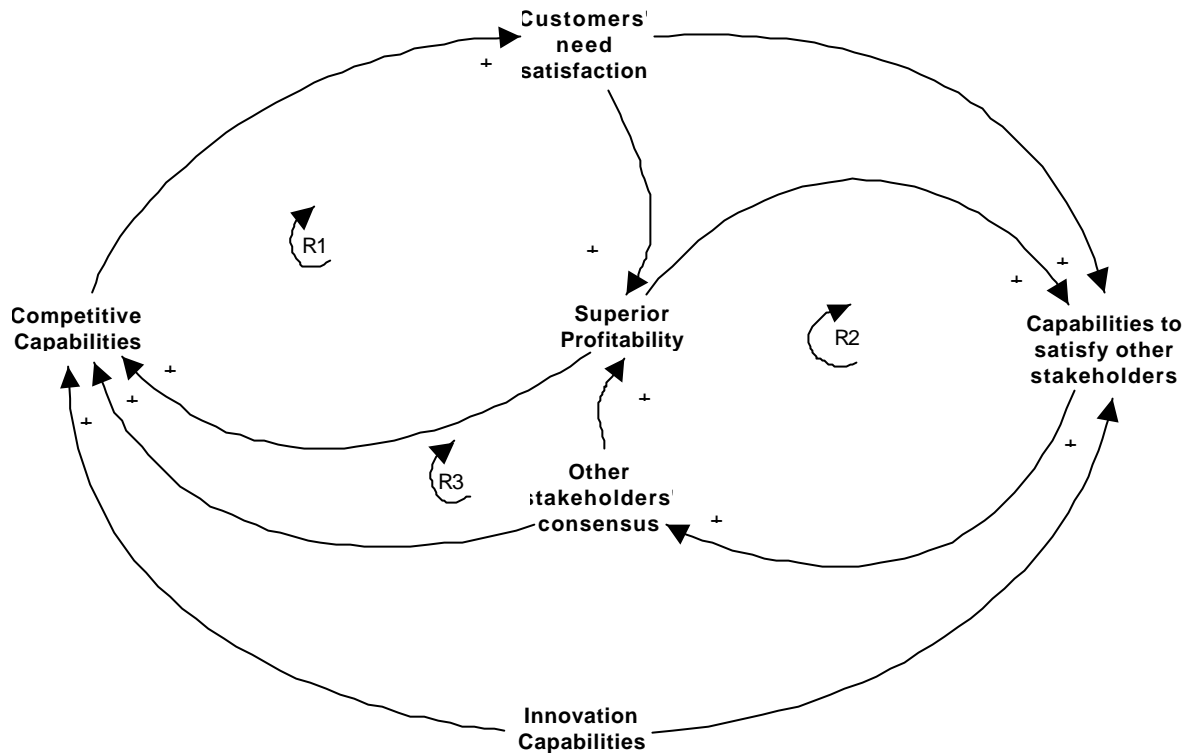
Innovative enterprises' capabilities to establish very good relations with other relevant stakeholders, based on integrity and trust, create consensus and contribute to generate higher profitability. (Figure 2, feedback R2). Other relevant stakeholders usually include employees, supply chain partners, shareholders, and possibly banks and other financial institutions, local communities and public institutions.

Innovative enterprises are able to generate around them a consensus of very high quality which is based on a deep adhesion to the company's mission, values, strategy and managerial action.

Relevance of other stakeholders' consensus is underlined also by the positive feedback loop R3 (Figure 2). For example: employees with a high level of commitment to the firms' goal will assure a better service to customers, thus reinforcing the competitive capabilities of the company. On the opposite side of the feedback loop R3, customers with a high level of satisfaction may stimulate front line employees' commitment to further meet their needs.

Profitability has a central role in innovative enterprises' business models. Profit is the result of innovative processes and superior capabilities, and, at the same time, the fuel which nurtures further innovation.

Figure 2 The innovative enterprise: linking capabilities and performance



Now a central question emerges: what are the features and how do the mechanisms of innovation generation work, or rather, what are innovation capabilities?

In our vision of innovative enterprise, innovation capabilities are depicted by the learning loops R1 and R2 of Figure 3.

The fundamental element is represented by strategy in action or realised strategy. Strategy in action defines the behavioural context where learning processes can or cannot take place, depending on the features of such a context [Coda and Mollona, 2002].

In the innovative enterprise, strategy in action defines a behavioural context which is neither bureaucratic nor chaotic, but which is entrepreneurial and self disciplined, where people co-operate, take initiatives and, while are respectful of company basic values, are effective in achieving enterprise goals.

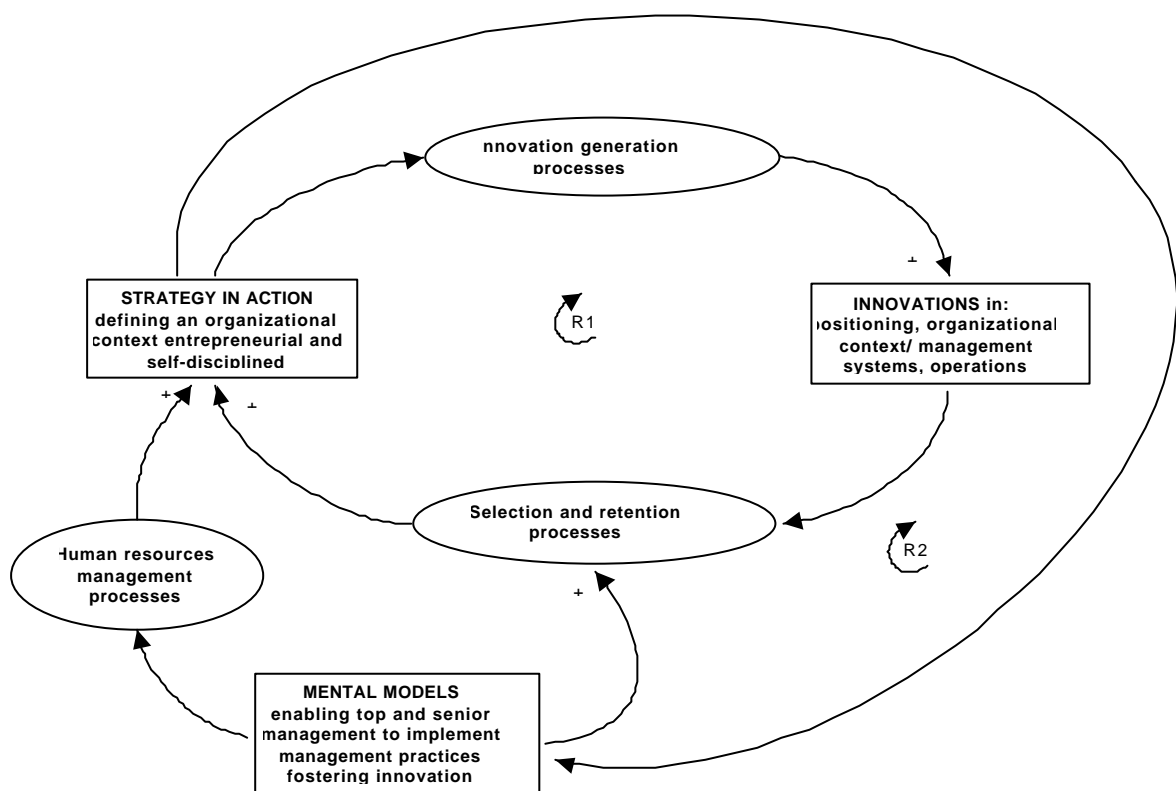
In such a context innovation generation processes take place and flow into the introduction of innovations in positioning, organisation and management systems and operations.

Innovations, which pass selection processes, are implemented and contribute to modify realised strategy and, consequently the behavioural context, enforcing its ability to foster further innovation. This loop (Figure 3, R1) represents the engine of innovation which is the basic feature of innovative enterprise. The



engine of innovation is promoted and guided by top and senior management's strategic intent to implement management practices fostering innovation. These latter are high-involvement human resource management practices which are very effective in both instilling discipline and releasing creativity. Human resources management practices involve evaluation, selection, and retention processes finalised at keeping a certain level of coherence with the firm's corporate strategy without discouraging innovation. The introduction of innovations can contribute to the renewal of strategic and operative paradigms and of top and senior management's mental model (Figure 3, R2) (Burgelman 1983c).

Figure 3 The engine of innovative enterprise



Our representation of innovation capabilities (Figure 3) evidences the importance of leadership. The role of leaders is essential for an enterprise to become and to remain innovative. Top managers and entrepreneurs govern processes which are critical to build and to sustain innovation capabilities guided by a challenging and long term view of company's success. Finally, in our view, human capital is a critical factor in building an innovative enterprise. People are the protagonists of the learning processes shown in feedback loops R1 and R2 (Figure 3). In particular, the actors of loop R1 are representative of top and senior management, while the actors of loop R2 are employees directly involved in operations, research, commercial services etc.

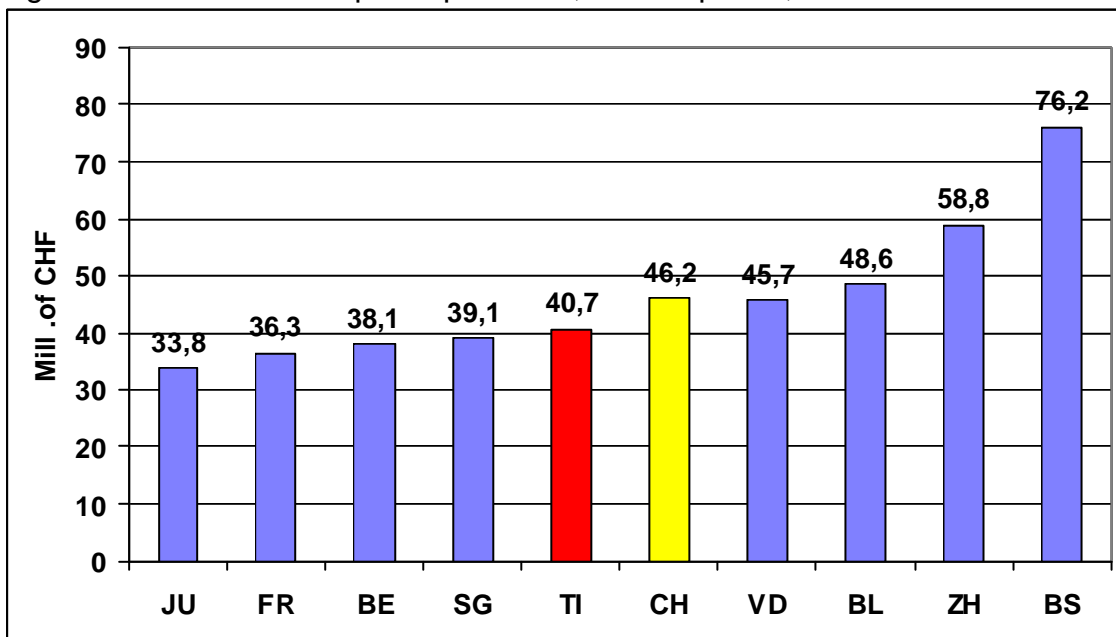
## The evolution of the Canton Ticino economic system

Switzerland is a highly-industrialised country, it occupies 16th place for GDP in the world ranking and the 3rd place for per capita GDP [World Bank, 2002]. Sectors of the Switzerland economy which have a strong competitive position in the global market are: banking, the chemical and pharmaceutical industries, the metallurgical industry, and the food and watch industries.

We conducted our research on the Ticinese economy during 1999 and 2000. The economic structure of Canton Ticino has many similarities with the Switzerland one. The GDP per capita analysis revealed that Ticino region is positioned a little bit below the average Switzerland value, differences between Ticinese per capita GDP and the per capita GDP of richer cantons vary from 10% to 45%. On the contrary Ticinese per capita GDP is 10% to 20% higher than the per capita GDPs of less rich cantons [SFSO, 1999a and 1999b], (Figure 4).

SME are widely diffused. However the density of enterprises is lower in Ticino (1 enterprise for every 20 residents) than in the rest of Switzerland (1 enterprise for every 19 residents) and there is a prevalence of companies (83% compared with 79% for Switzerland) operating in the service sector, especially in banking and financial consulting [SFSO, 1999a and 1999b, Alberton, 2000] (Figure 5).

Figure 4. Ticinese/Swiss per capita GDP, current prices, 1998



Source: SFSO, 1999a and 1999b

Figure 5 Comparison between the economic structures of Ticino and Switzerland.

<b>TICINO</b>	<b>SWISS</b>
<b>1 enterprise each 20 residents</b>	<b>1 enterprise each 19 residents</b>
<b>90% SME</b>	<b>90% PMI</b>
<b>83% Service 8% Manufacturing 9% Building</b>	<b>79% Service 11% Manufacturing 10% Building</b>
<b>26% Export/GDP 70% to UE countries</b>	<b>29% Export/GDP 60,4% to UE countries</b>

Source: SFSO, 1999a and 1999b

Located on the border between two high industrialised regions, German Switzerland and Lombardy, The Ticino Region is an open economy. Exports are mainly devoted to the EU, in particular to Italy and Germany. Furthermore the lower incidence of exports on GDP, respect to Switzerland, is caused by the presence of banks and financial service companies that operate locally. It must also be considered that Ticinese companies very often operate as suppliers of German Swiss companies which are very active on international markets [Alberton, 1996].

To better understand the structure of the Ticinese industrial district and to detect the existence of innovative companies, a survey was conducted on a sample of 154 Ticinese enterprises operating in the industrial and in the service (financial and non-financial) sectors.

The sample represents the population of companies associated to the Ticinese Industrial Association (AITI). For all companies it was possible to obtain information about their history, sector of activity and market position. Data was collected by a documental research in AITI's archive and was verified in specific cases via telephone interviews.

Eighty per cent of the companies were established after the Second World War (Annex 1), this can be assumed as an indicator of the relatively young age of the Ticinese industrial system compared to other cantons like Zurich and Basel where the industrialisation process dates back to first half of the 19<sup>th</sup> Century [Bergier, 1990]. Industrial companies are distributed across the three main districts of Canton Ticino: Lugano, Mendrisio and Bellinzona (Annex 2). Canton Ticino is a multibusiness area (Annex 3) with the exception of a relative high concentration of firms operating in the financial sector in Lugano and of companies operating in the electromechanical machine tools industry in the area of Locarno which constitutes two specific clusters [Alberton 1996].

The Ticinese economy is characterised by the presence of innovative enterprises operating in different industrial sectors such as electromechanical tools, the mechanical engineering industry, packaging, the chemical and pharmaceutical industries, consulting services, financial services. Our survey revealed the existence of 12 innovative companies in our original sample (Annex 4). Data on these companies was collected through: the AITI database, 6 face to face semi-structured interviews with companies' top management and 3 face to face semi-structured interviews with economic analysts and opinion leader operating in the Ticino region. These are small and medium sized companies, they are market leaders in Switzerland, Europe or worldwide, preferably in a market niche, and they compete with differentiation strategies to create more value for customers through innovative products and services. However, the presence of these companies is occasional and appears not to affect the entire Ticinese economy and industrial system. The reason for the occasional diffusion of innovative companies lies in the industrial history of the region.

Until the end of the 19<sup>th</sup> Century the Canton Ticino was an agricultural region, virtually isolated by the San Gottardo Mountain in the north of Switzerland. There were some small workshops, run by farmers and active in silk production. Main commercial flows were established with the north of Italy and in particular with the Como region. Industrial development started at the end of the 19<sup>th</sup> Century. With the opening of the San Gottardo Tunnel, Ticino assumed a strategic position becoming the door to German Switzerland and to Germany for Italy [Guzzi-Heeb, 1990]. The textile and mechanical industries were the first to develop. Workshops were opened by companies coming from German Switzerland where the labour cost was higher than in Ticino. The increase of resident population boosted the development of the construction industry and of related activities, like the production of material and components for building. Meanwhile Canton Ticino, thanks to its natural beauties, attracted many tourists coming mainly from the north of Switzerland and Germany. Lugano and Locarno became climatic stations well renowned throughout Europe.

Despite the starting of industrial development at the end of the 19<sup>th</sup> Century and the increase of commercial and tourists flows, Canton Ticino remained an agriculturally based region, with a pro capita income significantly lower than other industrial cantons of Switzerland [Guzzi-Heeb, 1990], until the end of 50's, when economic problems and social tensions in Italy stimulated an exceptional flow of money to Ticinese banks.

The Swiss banking tradition dates back to the 12<sup>th</sup> Century when Italian merchants coming from Venice and Genoa, established banks and financial service offices in Geneva [Bergier 1990]. Since then, the banking system and to assure the highest level of confidentiality to bank customers.

In Ticino, until the 50's, the financial sector, with 11 banks and 1,550 employees, was much less developed than in other cantons. During the 60's and the 70's, with the arrival of Italian savings, leading Swiss banks, headquartered in the Zurich and Geneva areas, opened offices in Lugano. Some Italian banks did the same. A few Ticinese entrepreneurs founded banks,

but many Ticinese residents established consulting firms specialising in financial services to support wealth management. In 1982, 44 banks were operating in the Ticino Canton with more than 7,000 employees.

Main money exporters were wealthy Italian families and Italian entrepreneurs. The Italian economy was characterised by high level of inflation, the stock market was underdeveloped, and furthermore it was forbidden to invest money in foreign markets. Lastly, the Italian social landscape was characterised by terrorism and strong political tensions and there was the remote possibility that the Communist party might take over.

The process had significant effects on the Ticinese economic system: the development of banking system made Lugano the third financial hub of Switzerland after Zurich and Geneva. By the end of the 80's Lugano had the highest density in Switzerland of banks per inhabitant: 1 for every 929 people [Guzzi-Hebb, 1990].

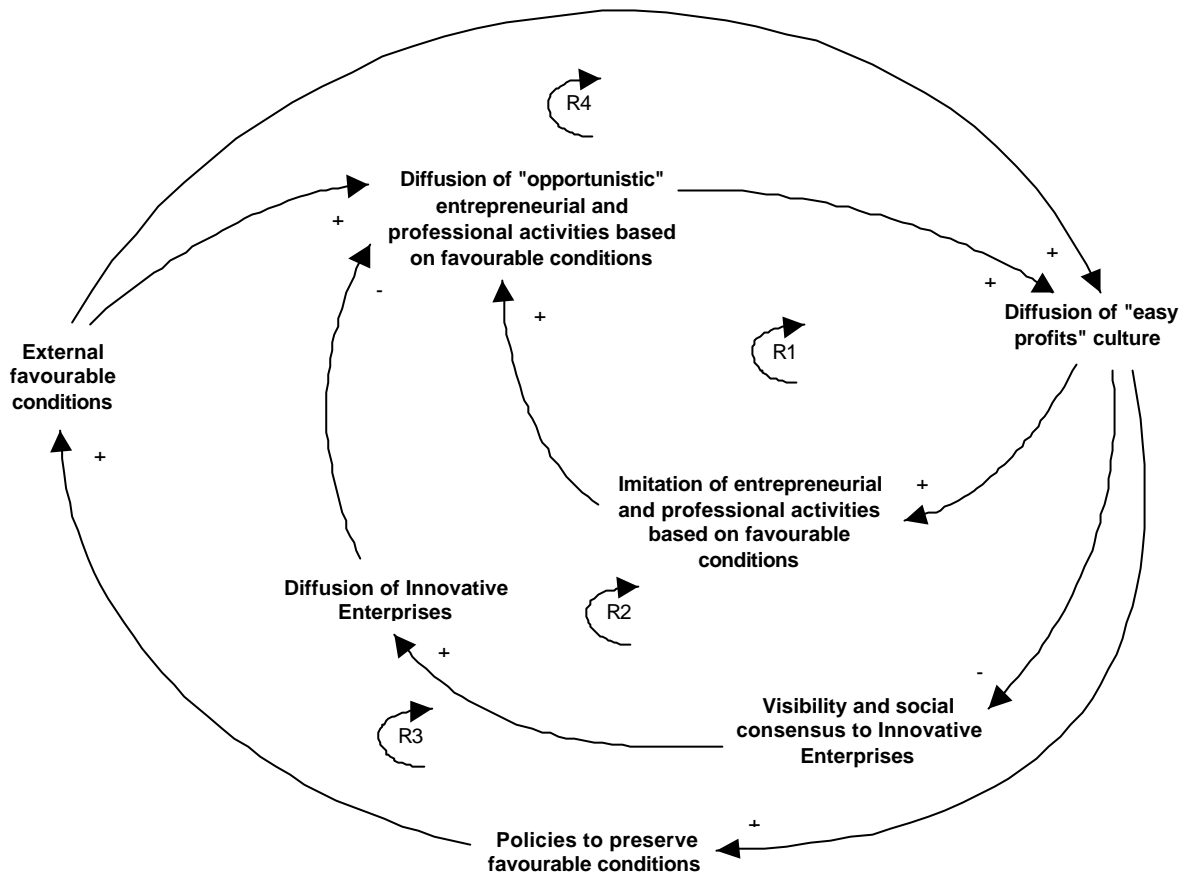
During the 60's the development of the industrial sector was boosted by the construction of the highway that connected the Lombardy region to German Switzerland and Germany through the Canton Ticino. The increase of commercial flows stimulated the establishment of new companies. Industrial companies were established by Ticinese entrepreneurs with the financial support of wealthy Ticinese professionals that reinvested profits made by offering financial services. The second way through which companies were founded was the foreign investment of Italian entrepreneurs which found in Switzerland a favourable social environment with an historical absence of strikes and very high standards of personal safety. Ticinese industrial companies were also established, as happened at the end of 19<sup>th</sup> Century, by entrepreneurs coming from Germany and German Switzerland that could find in the Canton Ticino a well qualified workforce at affordable prices.

During the 70's the number of foreign workers grew dramatically, and a new figure entered the labour market: the "cross-border worker". Cross-border workers came from the neighbouring districts of Lombardy (Como and Varese districts) They were Italian residents employed in Ticinese companies. Swiss companies paid them up to 40%-50% less than Swiss resident workers, also thanks to a favourable exchange rate compared with the Lira. During the 60's and the 70's, the presence of cross-border workers reinforced the attractiveness of Canton Ticino for Swiss companies from high labour cost areas like the Canton of Zurich.

However the cross-border labour cost advantage and capital exportation were not the only favourable factors which determined the development of the Ticinese economy. First of all, during the 70's, Ticinese industry benefited from the development of the Swiss economy, pulled into the global market by pharmaceutical, chemical and metallurgical companies based in the German speaking cantons. It is necessary to consider a further favourable factor represented by the protectionism accorded to Swiss industrial companies against the importation of low price goods from foreign countries.

The development of the Ticinese Economic System can be represented with the causal loop diagram (Figure 6).

Figure 6 Development of the Ticinese economy 1950-1990: an SD approach



Four interacting engines can explain the formation of the actual economic structure of the Canton Ticino. The first engine (Figure 5, feedback R1) shows how the development of the Ticinese economic system was sustained by favourable conditions that stimulated the development of the entrepreneurial activities that we defined "opportunistic". Banks, professional consulting firms, industrial companies operating as sub-suppliers of German Swiss companies were born and developed under favourable conditions. Cross border workers gave a cost advantage to the Ticino in comparison with other cantons. Consequently a relevant number of industrial companies based in German Switzerland set up partnership relations with Ticinese suppliers or established their workshops. Switzerland's economic protectionism reduced opportunities for companies coming from lower cost countries (like Italy) to operate into the Ticinese market. Money flows from Italy boosted the financial service sectors and in particular very profitable professional activities related to money exportation and wealth management.

The possibility to realise easy profits fed an imitation process that stimulated the creation of other enterprises and professional activities basing their success on favourable external conditions.

While the economic system was developing thanks to favourable external conditions, innovative companies were created and grew. Ten of 12 innovative companies (of our sample) were established since the 50's, mainly by Ticinese entrepreneurs (Annex 4). However, innovative entrepreneurial initiatives did not spread across the Ticinese economic system. Diffusion of an "easy profit" culture and of the model of opportunistic entrepreneurship obscured the few innovative entrepreneurial initiatives (Figure 5, feedback R2). Social consensus rose around professional activities and service firms related to the banking system as well as around entrepreneurs that established firms operating as sub-suppliers of German Swiss companies. The absence of visibility for the model of innovative enterprises jeopardised the diffusion of these initiatives.

The diffusion of an "easy profit" culture had a relevant effect also on political choices as illustrated by feedback loops R3 and R4 (Figure 6).

The efforts of politicians were devoted to perpetuating the existence of favourable factors, for example through legislation to protect the bank secrecy and to preserve the confidentiality of the sensitive data of foreign investors. The immigration policy was based on the principle of preserving the cost advantage provided by cross-border Italian workers avoiding the arrival of stable immigrants that could benefit from the Ticinese welfare system and create social problems.

The presence of favourable factors fed the diffusion of opportunistic entrepreneurship (Figure 6, feedback loop R3) as well as of a culture based on "easy profits" (Figure 6, feedback loop R4)

The combined action of these 4 positive engines boosted the development of the Canton Ticino until the end of 80's. Only at the beginning of the 90's did the weaknesses of the Ticinese economic system emerge with the progressive reduction of favourable factors that fuelled the above mentioned engines.

From the end of the 80's to the first half of the 90's, with the increase in international trade and the creation of the European Common market, the Ticinese Region experienced a dramatic economic crisis that affected the industrial and banking systems.

Ticinese companies suffered on the internal market from the competition of Italian companies which had cost advantages related to the currency exchange rate. On foreign markets (especially in the EU) Ticinese companies lost competitiveness in favour of competitors coming from low cost countries (South-East Asia, Eastern Europe). The results of the crisis were: the bankruptcy of many companies, increased unemployment, the disappearance of certain industries like electronics and basic mechanical engineering [Alberton 2000].

The banking system was also affected by the market downturn caused by the reduction of favourable external factors. Since the beginning of the 90's the progressive financial market liberalisation in Italy, together with the development of the wealth management market and of the stock exchange market opened new investment opportunities for Italians in the domestic market. Meanwhile the reduction of social tensions and the stabilisation of the Lira reduced the

incentives for capital exportation.

At the beginning of 2002 the introduction of the Euro currency, combined with new fiscal legislation in Italy, stimulated the return of exported Italian savings which accounted for a substantial part of the financial resources managed by Ticinese Banks. After the 11th of September 2001, new international agreements to prevent the finance of terrorism determined a further reduction of overseas money flows. Consequently also the financial and banking system entered a period of crisis, characterised by a reduction of employees and the closure of suppression of many regional bank offices.

Positive feedback that stimulated development of the banking system started to show their negative side by amplifying the effects of the reduction of favourable external conditions and jeopardizing the Ticinese economic system.

The process was to accelerate with the complete disappearance of favourable factors.

In fact the Italian economy is now part of the Euro area characterised by a high level of currency stability and very low interest rates.

New “Bilateral Agreements” between the EU and the Swiss Federation lower protection against imports of goods from the Common Market. Swiss politicians accepted a higher level of freedom on trade to preserve the so called “bank secret” and therefore the development of the banking system. The Ticinese industrial system is particularly exposed to the challenge deriving from foreign competitors. Its economy is characterised by a prevalence of the SME which operates in traditional sectors with strong competitors located in the neighbouring area of Lombardy. On foreign markets, in particular in Germany and Italy, Ticinese companies suffer from the competition of lower cost producers like Italian and Spanish companies as well as of companies of low cost Eastern European countries.

The reduction of favourable factors will accelerate the negative action of reinforcing loops. The reduction of favourable factors will also determine the loss of competitiveness of non-innovative industrial companies contributing to jeopardize the competitiveness of the Canton Ticino in the global economy. As depicted in Figure 5, feedback loop R2 was one of the engines of opportunistic entrepreneurship development thanks to the absence of visibility and social consensus around innovative enterprises. To enhance the competitiveness of the Ticinese economic system it is necessary to change the polarity of this engine and build the renewal of the economic landscape on innovative companies.

Innovative enterprises can play a fundamental role in enhancing the region's competitiveness, thus helping the Canton Ticino to face the challenge of globalisation. Visibility and the creation of social consensus around the model of innovative enterprise can stimulate emulation phenomena which can contribute to the spread of innovative business models and can stop the action of the feedback loop R2 (Figure 5).

In the next session we will explore the dynamics of innovative enterprise inside a geographical agglomeration of firms providing evidence that shows the factors that can help the diffusion of innovative enterprise models.



### **Innovative enterprises and regional economic system competitiveness**

Our model for regional economic system development is built around three fundamental variables: innovative enterprises, human capital and attractiveness.

Innovative enterprises have been defined before and their dynamic features have been illustrated above and summarised in figures 1, 2 and 3.

Human capital consists of people who are the players who drive the firm's learning loops and strategy dynamics.

Attractiveness refers to the ability of an economic system to attract the entrepreneurial, managerial, technical and commercial competencies that are needed to sustain development of innovative enterprises (both established and new) and which will be embedded in human capital: experienced managers, well educated graduates, able technicians.

The first engine (Figure 7), represented by causal loop R1, describes relations between human capital and the creation and development of innovative enterprises. Human capital is the critical resource for developing innovative enterprises. Innovative enterprises need human capital with good technical, managerial qualification and experience. Human capital, characterised by entrepreneurial orientation and by strong commitment to firms' long term strategy and goals, enhances firms' ability to generate continuous flows of innovation.

Innovative companies constitute the natural environment in which entrepreneurial technical and commercial capabilities are enforced. Behavioural context characterised by great attention to human resources needs, where personal skills, characteristics and aspirations are taken into consideration, are more likely to generate strong commitment to the firm's strategy and entrepreneurial behaviour..

Such a context is the result of the continuous action of top managers/entrepreneurs who consider human capital an essential factor for building and sustaining an innovative business model.

One of the main problems that the Ticino experienced during its economic development, was the lack of well qualified managers and engineers. Young Ticinenses received their education in the north of Switzerland, typically in Zurich for engineering and other scientific faculties, in St. Gallen for business administration, and in Freiburg in law. After their university studies, they were attracted by job opportunities in German Switzerland. The lack of well qualified technical and commercial/financial managers jeopardized the development possibilities of innovative enterprises in the Ticinese economic system.

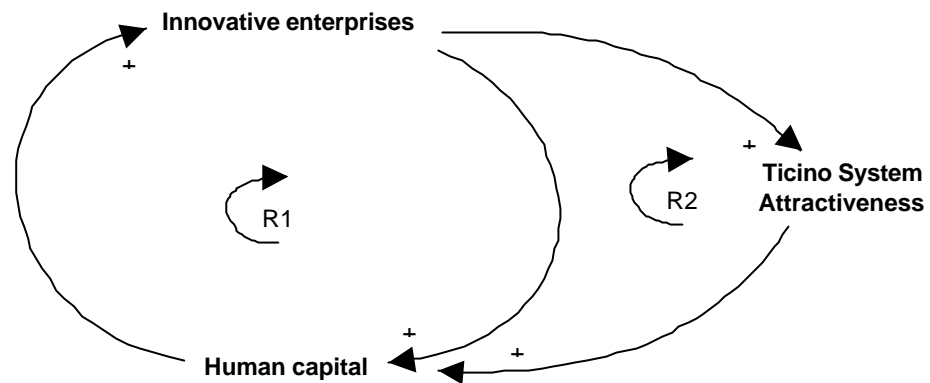
The second engine (Figure 7, feedback loop R2) is strictly related to the first one and it explains how the Ticino system's attractiveness is a key variable: it depends on the presence in the Ticinese territory of innovative enterprises and it influences the availability of well qualified human resources.

The Ticinese system should be able to attract Ticinese graduates from German Switzerland but also Ticinese middle and top managers that, after their university studies, decided to work for German Swiss companies. There are

many examples of Ticinese born people that attained top management positions in Swiss-based large pharmaceutical, transportation and chemical companies.

Human capital attractiveness generated by the presence of innovative enterprises reinforces the managerial and technical endowment of Ticinese companies and the possibility of generating further innovation.

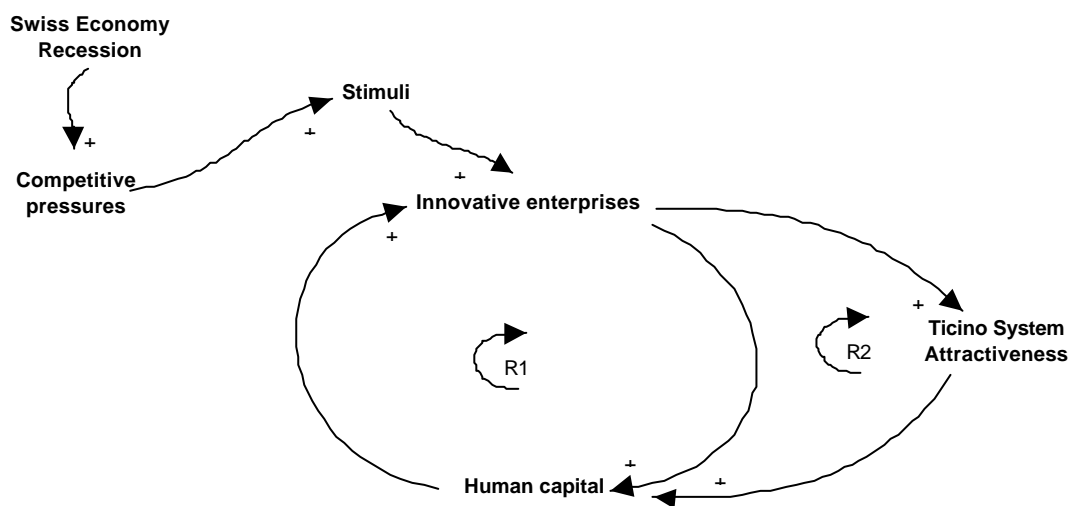
Figure 7



With the reduction of favourable factors and the emergence of Switzerland's economic recession competitive pressure increases and contributes to reinforcing the stimuli for the development of companies based on the model of innovative enterprise (Figure 8).

Firms with a business model based on opportunistic entrepreneurship are suffering more from the effects of the recession than innovative enterprises which have a strong international market position.

Figure 8



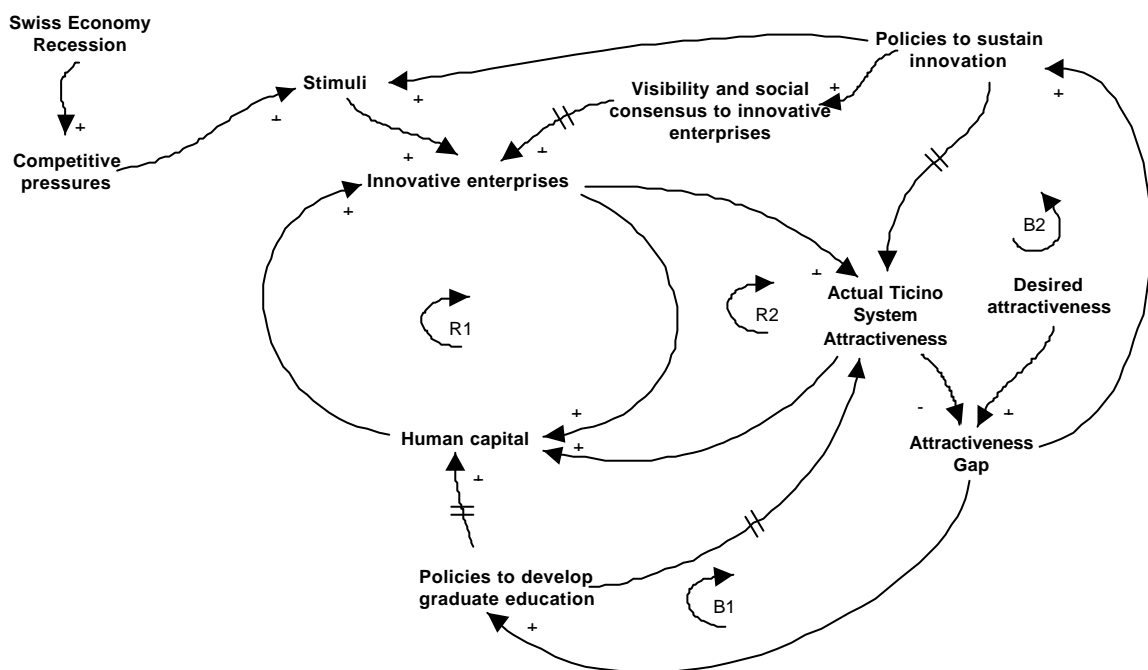
The presence of the two positive loops combined with external stimuli does not foster the competitiveness of the Ticinese economic system automatically, as

shown by the empirical evidence on the crises from 1992 to 1998 (Alberton, 2000).

Our hypothesis is that the dynamics of the two engines must be activated by specific actions managed by politicians and other institutions (university management departments, research centres, industrial associations, unions, foundations supporting entrepreneurial development and innovation and so on). Actions must be directed at accelerating human capital development and the spread of innovative enterprises.

As shown in Figure 9, there are two more feedback loops (B1 and B2) which accelerate the action of the two positive engines. These two circuits are activated by the gap between the real attractiveness and the desired attractiveness of the Canton Ticino. Desired attractiveness defines the level of attractiveness of human capital that can be considered optimal to assure the better competitiveness of the Canton Ticino's economic system.

Figure 9



The first line of action is directed at promoting the development of graduate education, which enables the Ticinese economic system to have well trained managers and technicians that reinforce firms' innovative capabilities (Figure 9, feedback loop B1). The creation, in 1996, of the University of Italian Switzerland is an action that can be interpreted according to this loop. The University was created thanks to the combined actions of politicians and of a private foundation. The recent creation of a Faculty of Information Science - in addition to the Faculties of Economics, Architecture and Communication Sciences - will reinforce the availability of well trained employees with both a managerial and technical curriculum.

Policies to develop graduate education play a major role also in directly enforcing the attractiveness of the Ticino. A top level educational institution attracts students also from other Swiss cantons and from neighbouring countries, and contributes to enhancing cultural life and the environment thanks to the organisation of relevant cultural events like congresses and scientific seminars.

The second line of action is the implementation of policies for sustaining innovation directly (Figure 9 feedback loop B2). During the second half of the 90's the government promoted initiatives to sustain entrepreneurial high-tech projects. The government financed the creation of two business innovation parks destined not only to young entrepreneurs but also to non-Ticinese companies that want to establish a high-tech facility in the Canton. Specific legislation was approved to sustain, through public funds, research projects characterised by the active collaboration between Swiss universities and private companies. All these initiatives can contribute to reinforcing the stimuli to innovate for Ticinese enterprises and to increase the current attractiveness of the Ticino

However contributions to reinforce stimuli and attractiveness are not sufficient to accelerate the development of innovative entrepreneurship. Policies to sustain innovation cannot ignore that virtuous and sustainable development is based on an innovative business model emulation process. Emulation translates into the development of new companies adopting the business model of innovative enterprise in different sectors of the economy.

Political and other institutions should contribute to give visibility to innovative enterprises that operate in Canton Ticino. Visibility will contribute towards creating a strong consensus around these companies and new innovative entrepreneurial initiatives, and it will encourage emulation processes. These institutions should involve top managers and entrepreneurs of innovative enterprises in the public debate on the renewal of the Ticinese economic system; furthermore they should design specific initiatives to give public rewards (not monetary rewards) to innovative companies and their leaders. The social climate of high consideration for the role and the job of innovative entrepreneurs and managers constitutes the ideal "humus" where innovative companies can be born and develop.

Feedback loops B1 and B2 the accelerators of the development of the Ticinese economic system that, acting on human capital and innovative enterprise development, boost the two positive engines (R1 and R2). Without these accelerators, positive engines are destined to be inactive, as happened during the 60's and the 70's, when economic development was boosted by favourable factors.

The activation of accelerators depends mainly on the perception of the gap between real and perceived attractiveness. Only if the gap is perceived, will it stimulate specific actions to reduce it.

Politicians and other institutions could not perceive the loss of competitiveness of the Ticinese economic system and they could not realise that the competitiveness of their region is strictly related to the presence of innovative

enterprise and to the availability of qualified human resources. If they feel that the current attractiveness is at the desired level, they will not promote any action to activate feedbacks B1 and B2.

If the gap is correctly perceived and if the appropriate actions are implemented effectively, it will progressively reduce until actual and desired attractiveness will have the same value. This will happen when the Ticinese system enters a virtuous circuit of economic development sustained by the two positive feedbacks R1 and R2.

Finally it is necessary to consider that negative feedback loops dynamics (B1 and B2) are characterised by the presence of temporary delays. Actions to give visibility and social consensus to innovative enterprises do not produce immediate effects. Emulation processes become active after a certain period of time; the length of delay is strictly related to the effectiveness of the measures implemented by politicians and other institutions to give visibility and to encourage innovative entrepreneurship.

The same behaviour characterises actions to stimulate graduate education. A long period of time is needed until the University of Italian Switzerland can provide its contribution directly and indirectly to the renewal of the Ticinese Economic System through graduate education, applied research, the dissemination of scientific knowledge.

The presence of delays, according to System Dynamics literature [Richardson and Pught 1981; Sterman, 2000] may cause oscillations in the behaviour of the system until equilibrium is reached. In our model the equilibrium situation is reached only when real and desired attractiveness reach the same value. The adjustment process, through which equilibrium will be reached, could be characterised by oscillations, for instance in the rate at which innovative companies develop and in the rate of human capital development.

## **Conclusions**

The findings of our analysis are consistent with contributions in literature [Coda, 1983; Varaldo and Ferrucci, 1993; Minoia, 2003] focused on a single company or on a group of companies as the unit of analysis. We highlighted how a particular class of companies, so called “innovative enterprises”, can actively contribute to enhance the development of a regional economic system .

We highlighted the role played by political and other institutional actors who have to manage processes finalised at creating visibility and social consensus around innovative entrepreneurship values and culture. The problem of the development of the Ticinese economic system is strictly related to the quality of the consensus. Politicians and other institutions can play a major role in addressing consensus from the model of opportunistic entrepreneurship, based on “easy profits”, to the model of innovative entrepreneurship.

Our study represents a first step in the exploration of processes through which it is possible to enforce the competitiveness of the Ticinese economic system.

Further research should be conducted to understand in depth the structure of the Ticinese Economy, to improve a conceptual model and to operationalise it so that it will be suitable to be used to govern the spread of current economic development and innovative entrepreneurship.

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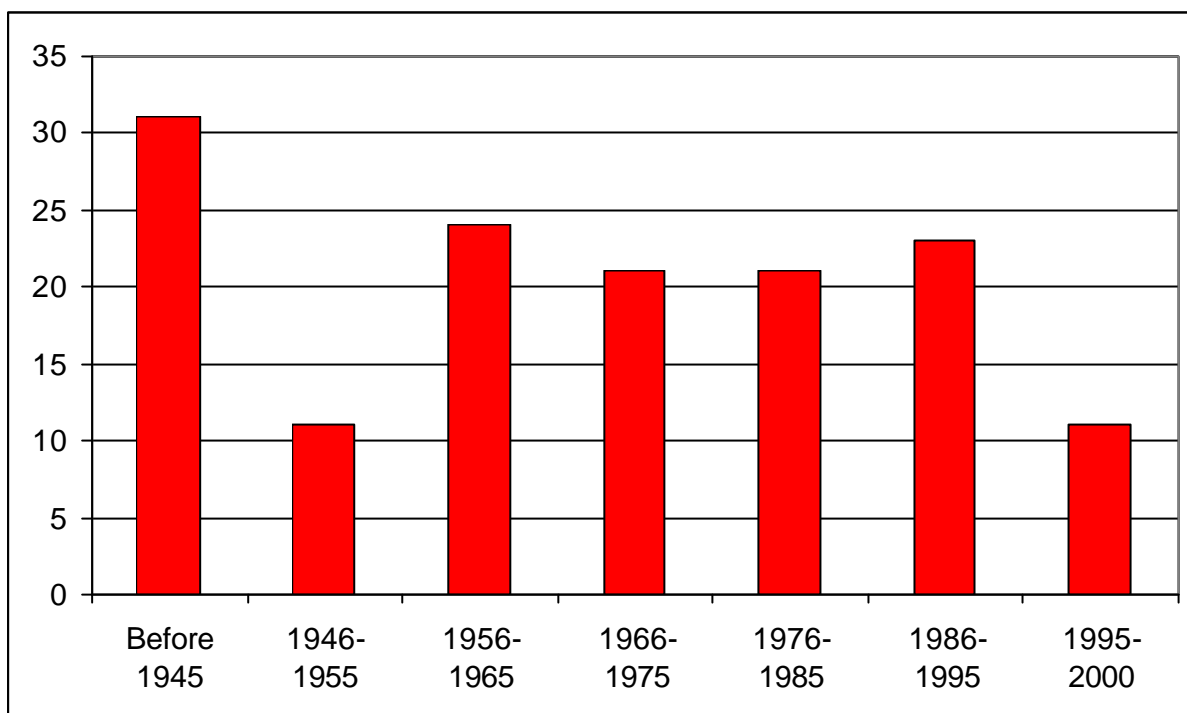
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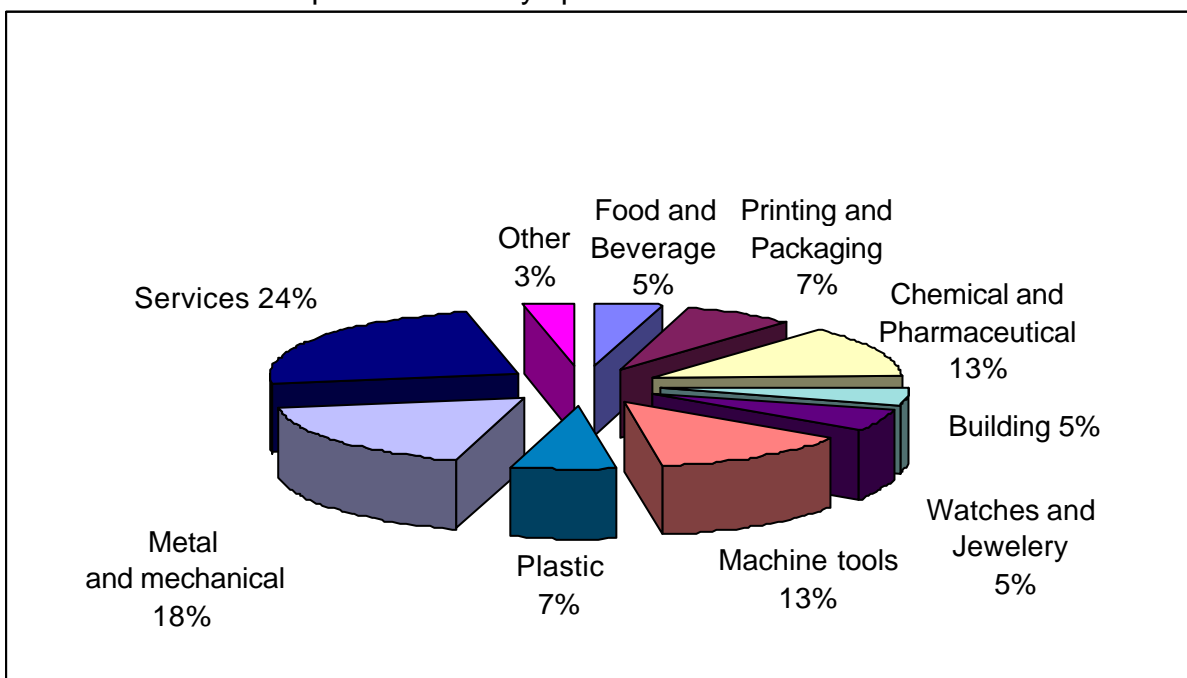


## Annexes. Descriptive statistics on the sample of 154 companies

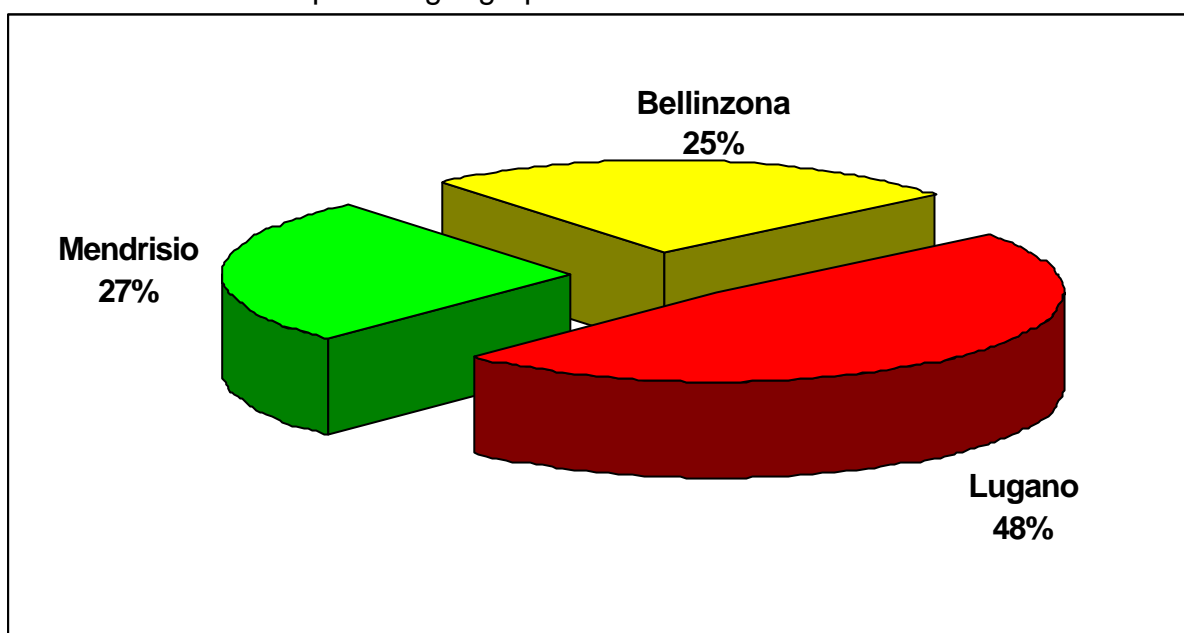
### Annex 1 Ticinese companies: year of establishment



### Annex 2 Ticinese companies: industry specialization



### Annex 3 Ticinese companies: geographical distribution



### Annex 4 Ticinese innovative companies in our sample

	Product	District	Est.	Founder's Nationality	Employed	Remarks
<b>Enterprise 1</b>	Food Packaging	Lugano	1932	Ticinese	130	North Europe leader
<b>Enterprise 2</b>	Precious Metal	Lugano	1970	Ticinese	90	
<b>Enterprise 3</b>	Micro-electronics	Lugano	1945	Ticinese	200	
<b>Enterprise 4</b>	Electronic machine tools	Bellinzona	1954	Ticinese	500	world leader in electronic-erosion machines
<b>Enterprise 5</b>	Electronic machine tools	Bellinzona	1981	Ticinese	115	
<b>Enterprise 6</b>	Electronic machine tools	Mendrisio	1955	German Swiss	80	
<b>Enterprise 7</b>	Electronic machine tools	Lugano	1998	Ticinese	60	
<b>Enterprise 8</b>	High-performance castings	Mendrisio	1970	Ticinese	240	leading company*
<b>Enterprise 9</b>	Zippers	Mendrisio	1950	German Swiss	250	leading company*
<b>Enterprise 10</b>	Marine propellers	Mendrisio	1995	Italian-American	15	world leader in surface propellers
<b>Enterprise 11</b>	Ball point tips	Lugano	1961	Ticinese	150	leading company*
<b>Enterprise 12</b>	Bank (Regional)	Lugano	1952	Italian		

*leading company means that the company is among the top five global competitors (in terms of revenues)*