

40th Congress of the European Regional Science Association
Barcelona 29th August – 1st September 2000

SME's SUPPORT and REGIONAL POLICY in EU
The Norte-Litoral Portuguese Experience

Jorge Bateira
Programa ICPME
Portugal
icpme.porto@icpme.pt

Leonor Vasconcelos Ferreira
Faculdade de Economia do Porto
Portugal
leonorvf@fep.up.pt

Abstract

During the last decade the productive structure of Norte-Litoral area of Portugal, where small firms have a predominant role, has been object of new and profound research.

At our understanding, the use of a systemic approach, the study of self-organising systems, which stresses the importance of interactions, both inside the system and with broader systems, can bring new insights to industrial and regional analysis and policies.

Within this theoretical framework, our study starts with a critical review of the literatures on firms and territories, and proceeds with the evaluation of the strategic behaviour of SME in Norte-Litoral. Using data on SME Community Initiative and statistic models, we study emergent strategies of investment projects effectively supported. The results of our study stress the strategic relevance of a specifically regional co-ordination of policies (industrial, R&D, training), both for Norte-Litoral and national level.

SME's SUPPORT and REGIONAL POLICY in the EU

The Norte-Litoral Portuguese Experience

Introduction

This paper draws on the portuguese experience of SME Community Initiative (SME-CI), focusing on the competitive strategies of the firms localised in the northern coast, the Norte-Litoral sub-region.

Most probably, the present Community Support Framework (2000-2006) to Portugal is the last one of this size before the enlargement of EU to East. Therefore it is important to take into account the experience acquired with the previous instruments of policy. On the other hand, SME are at the crossroad of different policies (industrial, technology innovation, regional, employment). In a time of great changes, it is important to observe the way small firms face structural funds, in a region of diffuse industrialisation of southern Europe, and is also of most importance to reflect upon public policies addressed to them.

In the first part we discuss the theoretical framework, with particular attention to the progressive emergence of the complex systems paradigm which can be usefully applied both to the firm and the region. The second part develops the empirical analysis of the applications of industrial SME of Norte-Litoral to study the emergent strategies of investment projects effectively supported. In the last point we highlight the main conclusions and point out a few basic suggestions for the reshaping of regional policy.

1. THE ANALYTICAL FRAMEWORK

The growing importance of SME in contemporary economic science, both in industrial and regional economics, have been a subject of a large research, sometimes without an explicit reference to the theoretical assumptions made about the firm. In fact, underlying studies and policy proposals there is always a specific theory about the firm and the region.

In this paper we attempted to review the most relevant theories on the firm and tried to demonstrate how the conceptual framework has been evolving toward a new paradigm that also sheds light upon the understanding of the region.

1.1. A Paradigm Shift in the Theory of the Firm

1.1.1 *The Traditional Thought and its Criticism*

No matter how paradoxical it might seem, the firm does not constitute a true object which can be studied within the neo-classical economy framework, due to fact it has been turning into an abstract entity, thereby represented by a production function which establishes a mechanical relation between inputs and outputs. The theory relies upon three major assumptions: 1. The firm is considered as a single agent responsible for the decision process making; 2. The firm has one single objective, the profit; 3. To reach the prime objective, the firm uses optimising processes.

Nonetheless, the notions developed by Herbert Simon such as ‘bounded rationality’ and ‘procedural rationality’, the work of Cyert and March about the existence of several actors, with their own interests, and other more recent contributions (Hodgson, 1988), have seriously damaged the neo-classical assumptions. Hence, adopting part of the behaviourist thought, Williamson’s (1975) ‘transaction costs’ approach had a great influence in the theory of the firm.

Refusing to accept the neo-classical rational behaviour assumption, Williamson’s work and his followers has been designed as the ‘new-institutionalism’ although it corresponds to a compared static analysis. However, if we go any further, we may legitimately ask the following questions: How do entrepreneurs acknowledge and evaluate the relative advantages springing from each firm structure? How do they search for information on which they depend upon? How do entrepreneurs acquire new knowledge? The New Institutionalism has failed to analyse these issues.

Nevertheless, these aspects have thoroughly been studied by Nelson and Winter (1982); indeed, many others have widely contributed for this issue, thereby embodying the ‘neo-evolutionism’ within the study of technological innovation and change (Dosi *et al*, 1988).

As there are quite a few available synthesis (cf. Saviotti and Metcalfe, 1991; Dosi and Nelson, 1994), we will solely focus upon some of the most significant aspects, whilst unveiling the evolutionist thought on the firm:

- The firm develops collective learning, acquisition competence processes and selection of technologies as it has to adapt to the changing environment;

- The firm's orientation is strongly conditioned by the dominating cultural framework and by their leaders' habits and by the established routines, which favours the adoption of an ongoing and gradual change;
- The selection processes, either in the firm or in the market, do hardly conduce to optimal solutions even in the long run.

Although it has allowed to deepen analytically, the metaphor of the "natural selection" has brought in to the evolutionist authors several difficulties, making them to distance themselves in some aspects of the original naturalistic inspiration (De Bresson, 1987; Paulré, 1997). In light of this, we deem useful and important to point out two topics:

- Entrepreneurial innovations subjected to selection are not 'a result' of environment pressure. They emerge from firm's interactions with its environment, thereby being frequently based upon projects of competence acquisition (Prahalad and Hamel, 1990);
- The studies on the 'path dependency' phenomena and on the 'lock-in' effects (Arthur, 1989) have consolidated the idea that selection of technologies is strongly subjected to history, which made evolutionist thought to give little attention to radical change processes.

Attempting to solve such problems, new approaches were developed with the useful contribution of the cognitive sciences (Dodgson, 1993). Such opening from economics to life sciences allows for an understanding of the firm through the use of concepts that are more consistent with the behaviour displayed by the actors of the firm. On the other hand, it assimilates the crucial contributions of the contemporaneous evolutionist thought and, simultaneously, it also overcomes the inherent limitations to the neo-darwinist inspiration (cf. Allen, 1988:99; Conti, 1995:79).

1.1.2 The Firm as self-organising system

The convergence of models that conduct research in different fields of science (Corning, 1995) permitted to consolidate a new paradigm to interpret the complex systems' functioning. In fact, *far from the equilibrium, these systems display non-linear behaviours that creates conditions for the emergence of a new organisation, or for a qualitative change within the pre-existing organisation.*

Under this theoretical framework, the firm is designed as complex social system able to process information and realise choices, constituted by sub-systems and autonomous individuals in interaction, open to other autonomous systems (territorial, functional, institutional).

Before going any further, we deem important to emphasise that this perspective admits that there is conflict within social systems, due to the fact that conflict is beyond anyone's control whenever we are dealing with individuals or organisations that have their own goals and make their own choices. It seems that we are tackling with a characteristic which permits us to fundament the distinction between social systems and natural systems (Ackoff and Gharajedaghi, 1996).

Having into account the above mentioned definition, the firm's relation with the environment (other systems) might be understood as a structural articulation: the firm lives on its opening to the exterior, submitting itself to inevitable external disturbances; however, it closes itself to the external influence, in order to survive through the selection of compatible disturbances. Under these circumstances, it attempts to respond by promoting changes in its internal components and relations (changes within the structure) so as to preserve its identity (maintenance of the organisation). This process of simultaneous opening and enclosure is sustained by internal networks which support circular relationships among the parts and the whole system (irreducible to the parts) whilst ensuring the permanence of the system. Therefore, as long as the firm is understood as a complex system, its articulation with the environment is crucial for its survival (Conti and Dematteis, 1995).

The utilisation of a complex system's approach in the analysis of socio-economic systems suggests some necessary assumptions (cf. Paulré, 1997:143-146):

- Learning is a characteristic of open social systems. However, to allow the emergence of learning, the system must have a memory to register situations; on the other hand, it must have assessment criteria which allow for comparing outcomes and make options;
- Feedback mechanisms are necessary to assimilate innovations. As for the disturbing behaviours of the equilibrium of the system, or that they get it away from its path, they can either be strengthened/amplified by *positive* feedback or limited/eliminated by *negative* feedback. The existence of a memory in the system, combined with these feedback effects, explains either the assimilation or the elimination of innovations within the system.

- Redundancy is crucial for the survival of the system in the long term. It manifests itself through various forms, both in terms of information, material resources or competencies. Redundancy therefore permits the system to open widely the range of available responses to the environment change.

In the next point we try to deep the analysis of the first condition as long as we assume that collective knowledge emerges from a self-organising process inside the firm.

1.1.3 Emergence and Knowledge

On the assumption that the firm is a complex and adaptive system (Stacey, 1995; Church, 1999) we can understand the interactions which are set up within the firm and how they prove to be essential for a process where *(collective) learning emerges as a property of the system*. That is, as a reality where, although it does not imposes itself to the individual as a given, it does not also reduce itself to the sum of individual knowledge.

Adopting a constructive epistemology, Hatchuel (1999) studied the ‘activities of conception’ within the firms and pointed out the importance of the non-splitting between *learning* and *action*. On the other hand, Ngo-Mai and Rocchia (1999) studied further these interactions. They looked at the distinction between mental ‘*occurring*’ and ‘*type*’ representations as identified by the cognitive sciences. The interactions that are established among individuals in the firm depend upon the technical and functional division of labour that, on its turn, is conditioned by the need to ensure interaction between close or complementary competencies. In this case, the sharing of knowledge is made through the occurring representations of the individual. On the contrary, the coherence of the organisation is kept through the sharing of long-run memory; that is of the type representations of certain individuals working in different sectors of the firm. This most certainly creates the routines that frame the individual action.

Thus, from the complex and adaptive systems perspective, we may infer that the *individual acquisition of learning, action and interaction* among different actors play an essential role in what concerns the emergence of collective learning in the firm.

1.1.4 Emergence and Evolution

Many authors refer to the existence of a fundamental tension in the evolution process of the firm: *exploitation* of the current routines versus *exploration* of new routines; change of the *technical-economic paradigm* versus *technical trajectories* within a given paradigm. We are dealing with concepts that identify two types of evolution, a gradualist and a superficial one, a radical and a deep one.

Seeking to materialise a global explanation for the existing of incremental changes and radical ones in the socio-economic systems, Wollin (1999) puts emphasis upon the complex interaction (similar to the concept of 'structuration' by Giddens) among three most determining factors of change: *the environment* of the system, *the deep structure* of the organisation and the transforming *action of the actors*.

It is worth mentioning that beliefs, values, culture, technology, operational routines, structures, resources, core competencies and power sharing constitute a 'deep structure' which has different branches hierarchically structured. The dynamics of the change is subject to a complex interaction of factors which unveil the existence of different types of evolution:

"During punctuations, or periods of discontinuous change, it is the most fundamental levels of deep structure that are reconfiguring, and causing consequent reconfiguration of more marginal levels in the same branch. Change in the more marginal levels of deep structure is possible without changing the most fundamental levels, but these changes are constrained by the fundamental levels." (Wollin, 1999:361)

Briefly, it can be said that change may happen at any level (from the fundamental to the marginal ones) and at any of its dimensions (beliefs, technology, power), from which stems a wide range of potential changes, from the more superficial, incremental and frequent to the deeper and rare ones that affect the whole system. The environment is the cause of disturbances at any level of the 'deep structure', whilst originating adjustment behaviours or new forms of structure (*variety*) that are likely to occur. The survival of one of those forms, considering the sequence of favourable and unfavourable pressures of different types, means that this variety was embodied in the 'deep structure' while bringing along consequences which will be felt at other levels.

This self-organising ability of hierarchical complex systems is the basis upon rests their relative stability but it also explains the emergence of crisis. In this sense, the concept of 'complex system' gains a new status: *"Creativity and change find a place together with structure and function in this new scientific paradigm"* (Allen, 1988:118).

1.2. Self-Organisation and Territorial Dynamics

The environment of the firm is a heterogeneous reality that embodies multiple dimensions (territorial location, business networks, political-institutional regimes) and different scales (local, regional, national, global).

The territory where the firm is integrated may also be seen as a complex system where interactions among close firms, not only in what regards geographical proximity, but also in what concerns the technical, organisational and cultural related aspects (Sierra, 1997), strengthened by a dynamic local labour market (Capello, 1999) are at the origin of collective learning that springs from a self-organising process (Garnsey and Longhi, 1999).

In spite of the great diversity of spatial polarisation processes, industrial and regional economics have somehow been converging for the last years in the study of territorial systems (Rallet and Torre, 1995). From a wide range of research two theoretical streams stand out, the ‘industrial districts’, from a marshallian inspiration (Becattini, 1979), and the ‘milieux innovateurs’ (Ratti *et al*, 1997), among other contributions. More than one decade of research gives some insight whilst allowing to trace elements of convergence in those streams. In light of this, we deem useful to point out the following ones:

- Recognising that the articulation between the territorial system and the global economy is a most decisive element for developing the former one. Becattini and Rullani (1995) explicitly mention that a local productive system cannot exist/subsist without seeking to integrate itself in trans-territorial networks as they spread formal learning (from the outside) and tacit learning (contextual). Or, according to Camagni (1995:204): “...*being able to exploit external energy, in the form of technological, organisational and commercial information, is crucial*”;
- Recognising that the evolution of the territorial systems is conditioned by its aptitude for creating new productive abilities and the correspondent organisational strategies (Courlet and Dimou, 1995). In spite of focusing upon the ‘milieux innovateurs’, Camagni (1995) also refers that in the *milieux* also operate mechanisms with negative effects, namely the ‘lock-in’ effect, capable of blocking the acquisition of new forms of learning. In this sense other authors (Asheim, 1996; Maskell and Malmberg, 1999) have also stressed the importance of the schumpeterian idea of ‘*readiness for creative un-learning*’;

- Recognising that the temporal dimension (“... the pace of learning and *innovation/creation processes*”) (Camagni, 1995:195) is of paramount importance regarding the understanding of the evolution process of territorial systems. Taking the time dimension in another sense, we could say that the territorial systems’ viability depends upon its capability for building up a common vision of the future, based upon converging anticipations of the local actors (‘temporal proximity’) which stimulates long-run profitable behaviours (Lecoq, 1995);
- Recognising that the territorial governance may play a most important role in the collective process of learning. A changing competitive context calls out for the adoption of continuous processes of innovation and a qualitative leap for co-operation aiming at creating ‘collective goods’ that compensate the disadvantages associated with the small dimension. This process seems to be facilitated through the action of an institutional tissue capable of stimulating synergies thereby exerting a pilot function (Amin and Thrift, 1993; Morgan, 1997). In the same sense, Bramanti (1999:649) refers: “*There is increasing evidence that modifications in the learning processes, and in the governance structures sustaining them, are not the result of a spontaneous dynamic of territories and milieux; there is a growing need for 'systems integrators' ”.*

The paradigm of the complex and adaptive systems assimilates these points of convergence and, at the same time, offers a wider theoretical framework to the ‘*competence perspective*’, upon the firm (Teece and Pisano, 1994) and upon the region (Lawson, 1999). More than a cumulative productive resource, knowledge becomes *a strategic resource in the dynamic of the relation between the system and its environment* (Conti and Dematteis, 1995).

As an attempt to sum up this theoretical analysis, we deem of importance to remind that the use of the concept of complex adaptive system is based upon the progressive emergence of a new paradigm in the social sciences related area (Dupuy 1982; Radzicki, 1990; Le Moigne, 1995) that constitutes a common theoretical background for the understanding of human systems, of living systems and the rest of the nature (Wicken, 1998). It is our understanding that we are dealing with an analytical framework which seems to be more adequate to studying the systems where there occur interactions (never fully explained), due to chance, necessity, design and human creativity (Delorme, 1997).

2. FIRM'S STRATEGIES IN NORTE-LITORAL

The Norte-Litoral sub-region (3 million inhabitants) is the more developed part of Região do Norte, a policy and investment co-ordination space under the Ministry of Planning of Portugal. It is a diversified territory with the city of Porto as the leader of the correspondent metropolitan area. This sub-region accounts for about 98% of the industry of Região do Norte and has 52 % of manufacturing employment of Portugal. The territory has some well defined local productive systems (Silva, 1988) which concentrate the most part of 'low tech' industries of Região do Norte (textiles, apparel, leather/footwear, wood, cork) while the metropolitan area of Porto presents a diversified structure with an important Machinery and Metal Products industry and a more significative presence of 'high-tech' firms.

2.1 Entrepreneurial model and recent policies

Important research has been produced on the entrepreneurial model of Norte-Litoral (Costa and Silva, 1993; Figueiredo, 1993; Silva and Mota, 1996) and the innovative behaviour of its SME. The main conclusions of these studies may be summarised as it follows:

- Under Community Support Framework I (CSF I) (1989-1994), firms' investment was directed mostly to modernisation of infrastructure and productive equipment, associated with some product and process incremental innovation;
- R&D and marketing innovation were rare, and purchasing of real services was almost limited to the basic services (accounting, taxes, law);
- Suppliers of machinery and clients were the main sources of innovation; management reorganisation and improvement of qualifications deserved minor attention in investment projects;
- More recently, Silva and Mota (1996) found evidence and pointed out some signs of change in the first two years under CSF II (1994-1999). Some of the firms inquired by the authors mentioned more radical process innovations, technological audits and quality certification as new investment directions, sometimes associated with external services of technological agencies.

Another study on the effects of industrial policy in Portugal (Mateus *et al*, 1995) mentioned that, according to a threefold classification of the restructuring potential of industrial projects supported by CSF I (offensive, modernising, defensive), although *defensive* projects were largely dominant in number, the largest amount of investment was associated with *offensive* projects (40% versus 35%). They conclude that the portuguese integration in the European Union put a pressure on the dynamic restructuring of industries which is still at an initial stage (cf. Mateus *et al*, 1995:209).

At the same time, a thorough study about portuguese manufacturing SME reached to conclusions consistent with those summarised above about the Norte-Litoral entrepreneurial model (cf. Simões, 1995:73): “...*there is a strong correspondence between the type of competitive strategy pursued and the attitude of the firm to innovation: cost strategies dominate in passive firms, while differentiation strategies are typical of actively innovating firms.*”

By 1996 Portugal established a specific program addressed to SME, as proposed by the *SME Community Initiative* (SME-CI) (Official Journal n° C 180 of 1.7.94), in order to stimulate firms with less than 250 workers to adopt strategies based on competitive dynamic factors such as technological and organisation innovations, information and communication technologies, management reorganisation, new marketing strategies, quality management, design, business network projects, internationalisation and training. The SME-CI asked firms to situate the proposed investment project in a (more or less) stated strategy and introduced a clear discrimination as far financial support was concerned: high percentage grants over dynamic competitive factors; interest grants in credit over infrastructure and operations investment. The main objective of this different treatment was to give a hard push to differentiation strategies of firms and new forms of building up competitive advantages all over the value chain (not only in operations activities) and to networking in industrial chains. Besides this ‘*competitiveness measure*’, SME-CI also had a specific ‘*measure for technological competence acquisition*’ (R&D projects involving partnership with national system innovation).

These brief notes about portuguese SME entrepreneurial model set the stage for our research questions:

- What kind of strategies SME-CI projects of Norte-Litoral reveals? Is there a path of change in line with new trends in competitive environment?
- What are the profiles of investment that underpin these strategies? Is there a recognisable move towards offensive strategies associated with radical innovations?

- What are the effects of SME-CI in terms of industrial policy objectives? What instruments of regional policy does the evidence put forward by these effects?

3.2 SME competitive behaviour

To address these questions we develop, in this point, an empirical analysis of 106 dossiers of investment projects effectively supported by the SME-CI ‘competitiveness measure’ in Norte-Litoral, most of them belonging to the local productive systems of the sub-region. Small firms (less than 50 employees) are predominant in total and in each branch. Traditional ‘low tech’ industries are strongly represented, following the industrial regional structure, although other industries, like chemicals and machinery, also have a significant presence.

In order to investigate the strategies addressed by firms we used exploratory statistical techniques to analyse firms characteristics, strategy direction and the application’s investment profile. As a result of this exploratory analysis, and taking into account the theoretical framework, we selected variables that have a clear association with operational competitive strategies to perform a cluster analysis. Given the fact that cluster analysis extracts groups of similar attributes, regardless of grouping rationale, the definition of the set of variables that identify the ‘emergent strategy’ of the firm (Mintzberg *et al*, 1998; Campbell-Hunt, 2000) is of core importance. Several specifications and cluster algorithms were tested in order to achieve robust and meaningful results, both theoretically and statistically. The retained set of variables refers to competitiveness investment, taking into account four operational dimensions of strategies, namely *efficiency*, *client’s satisfaction*, *innovation and quality* (Hill and Jones, 1995) and a theoretical distinction between *static* and *dynamic* competitive factors.

We define as static factors the investment in modernisation of productive equipment and logistic infrastructure (IPROD2), and as dynamic factors the investment in new input economies (INPUT2), management modernisation (GEST2), client’s satisfaction (SATIS2), quality systems (QUALI2) and R&D activities (RD2).

Table 1

CLUSTERS		IPROD2	INPUT2	GEST2	SATIS2	QUALI2	RD2
1 (2)	Mean	5,3190	,0000	19,2879	,0000	,3849	75,0081
	Std. Deviation	7,5223	,0000	25,0297	,0000	,5444	32,0076
2 (39)	Mean	22,4722	1,0203	57,9756	9,4461	8,7413	,3444
	Std. Deviation	19,4968	4,7546	29,7236	19,3984	13,2593	2,1508
3 (60)	Mean	76,2450	1,3275	10,6318	3,1458	7,9822	,6678
	Std. Deviation	14,6678	6,3005	8,0364	5,6924	10,5086	3,4449
4 (5)	Mean	11,7043	,0000	6,3029	6,5700	75,4228	,0000
	Std. Deviation	16,0550	,0000	5,3888	10,8515	17,5992	,0000
TOTAL (106)	Mean	52,0780	1,1268	28,0099	5,5660	11,2993	1,9199
	Std. Deviation	32,3633	5,5316	29,8845	12,9790	18,5545	11,0383

The clusters presented in *Table 1* are relatively stable over method variations and reveal some interesting relations. We can observe that two clusters concentrate 94% of the 106 firms studied, with two others of minor importance in terms of number of firms. The results highlight the following aspects:

- *Cluster 3* shows an investment profile in which IPROD2 is very high and clearly above the mean. It corresponds to *static modernisation* of firms based on new productive equipment (with effects also on INPUT2), which is in line with the dominant SME entrepreneurial model. It seems that these firms are not changing their understanding of the new rules of competition;
- *Cluster 2* exhibits a largely dominant role of variables GEST2 and SATIS2. Firms of this cluster are investing in new technologies to modernise management activities and are more client oriented. This corresponds to *dynamic modernisation*, which means that these firms have begun to change, but the dynamic factors that were chosen are not strong enough to sustain competitive advantages;
- *Cluster 4* displays a great relevance of variable QUALI2 and a significative importance of variable SATIS2. Firms of this group have chosen *offensive* investment in order to prepare themselves for the new competitive conditions;
- *Cluster 1* presents exceptional values in variable RD2. The two firms in this cluster were able to apply for an investment project with a large R&D component outside the specific SME-CI ‘measure for technological competence acquisition’. Just as in Cluster 4, this corresponds to an *offensive* investment policy.

Taking Johnson and Scholes (1993) strategy directions, we classified them in three types according to the attitude of the firm towards change in the environment: *passive* (consolidation of the market position), *active* (growth in the present market, diversification) and *innovative* (product development, market development).

The analysis of *Table 2* shows two ‘composite groups’: 57% of the firms have invested in their *modernisation*; 31% of the firms develop an *innovative strategy* and/or show an *offensive investment policy*. The remaining firms (12%) are in the middle of these two groups - they pursue an *active strategy* based on a *dynamic modernisation*.

Table 2

<i>Strategy Direction</i>		<i>Clusters</i>				<i>TOTAL</i>
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	
<i>Consolidation</i>	Count	1	17	24	2	44
	% within Strategy Direction	2,3%	38,6%	54,5%	4,5%	100,0%
	% within Clusters	50,0%	43,6%	40,0%	40,0%	41,5%
<i>Market growth</i>	Count		11	18	3	32
	% within Strategy Direction		34,4%	56,3%	9,4%	100,0%
	% within Clusters		28,2%	30,0%	60,0%	30,2%
<i>Product development</i>	Count	1	3	13		17
	% within Strategy Direction	5,9%	17,6%	76,5%		100,0%
	% within Clusters	50,0%	7,7%	21,7%		16,0%
<i>Market development</i>	Count		6	4		10
	% within Strategy Direction		60,0%	40,0%		100,0%
	% within Clusters		15,4%	6,7%		9,4%
<i>Diversification</i>	Count		2	1		3
	% within Strategy Direction		66,7%	33,3%		100,0%
	% within Clusters		5,1%	1,7%		2,8%
<i>TOTAL</i>	Count	2	39	60	5	106
	% within Strategy Direction	1,9%	36,8%	56,6%	4,7%	100,0%
	% within Clusters	100,0%	100,0%	100,0%	100,0%	100,0%

Figure 1 presents the percentage of firms in each cluster investing in four different types of innovation. In general terms, a large majority of firms in each cluster invested in *modernisation of management* and, by contrast, a few firms invested in *new services to clients*, which is a more sophisticated factor of competitiveness. As expected, *product innovation* dominate in Cluster 1 which is associated predominantly to R&D investment, and greater incidence of *process innovation* in Cluster 3 is associated with the preference of firms in that cluster for productive equipment.

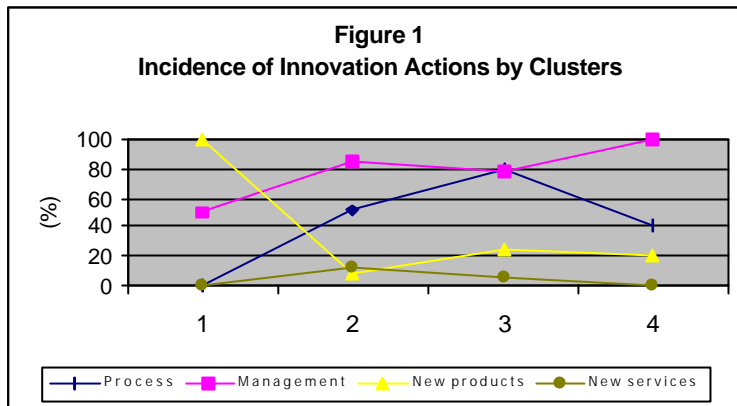


Figure 2 shows the percentage of firms in each cluster pursuing professional training and its mean share of top qualified workers. A higher percentage of *professional training* in Clusters 1 and 4 is understandable because they present offensive investment policies. As shown by Figure 3, all clusters are *export oriented*, in line with the regional export background.

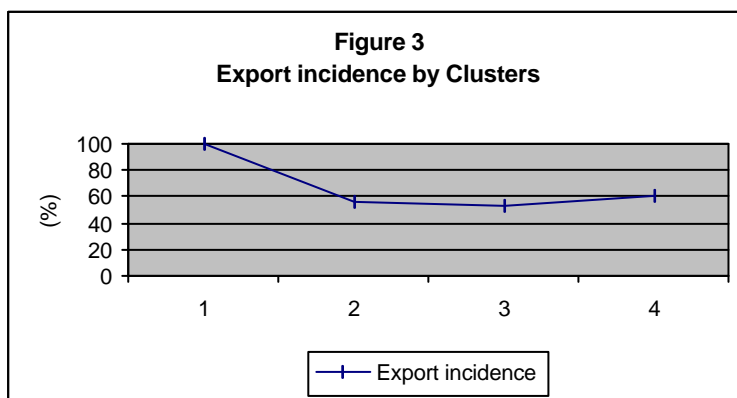
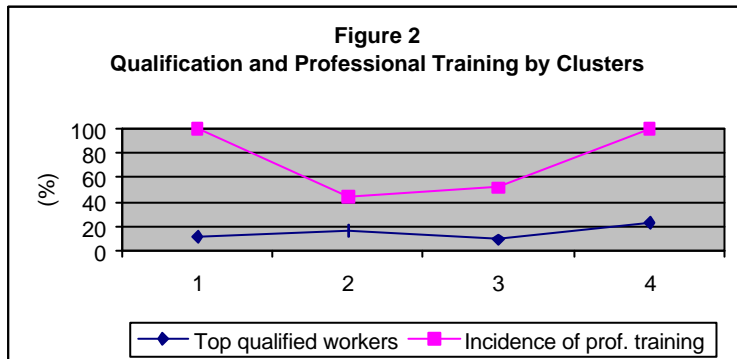


Table 3

	<i>Cluster 1</i>	<i>Cluster 2</i>	<i>Cluster 3</i>	<i>Cluster 4</i>	<i>TOTAL</i>
Food industries		3	2		5
Textiles		4	8		12
Leather and Footwear		9	6		15
Wood and Cork			3		3
Paper		2	4		6
Edition and Printing		1	1		2
Chemicals		6	4		10
Rubber and Plastics		3	1	1	5
Non Metallic Minerals		1	2	1	4
Basic Metallurgy industries			6		6
Metal Products			1		1
Machinery and Equipment	1	1	4	1	7
Machinery and Electronic Appliances	1	5	4	2	12
Medical and Precision Appliances		1			1
Other Transport Material			1		1
Furniture and other industries		3	13		16
<i>TOTAL</i>	2	39	60	5	106

Finally, *Table 3* presents the distribution of firms by sectors of activity and clusters. While the minority innovative clusters (1 and 4) concentrates in Machinery sectors, Rubber and Plastics and Non Metallic Minerals, the majority clusters (2 and 3) has a diversified productive structure which show that *these investment profiles are not determined by sector characteristics but by a cognitive framework about competitiveness that crosses all sectors.*

3. CONCLUSION

How actively are SME of Norte-Litoral innovating under the competitive pressure of a globalising economy? From our research we have materialised the following conclusions:

- A slow move of the small firm population from a ‘production centred’ concept of competitiveness towards a ‘client centred’ one;
- A minority of firms (those included in clusters 1 and 4 of this study summed up with a group of 20 supported by SME-CI ‘*measure for technological competence acquisition*’) is engaged in a process of building competitive advantages upon dynamic factors, including R&D activities within more radical innovating networks;

- There is evidence that a large majority of small firms applications to EU funds are structured to meet their '*perceived strategic needs*'. Our study emphasises modernisation investments as the answer of small firms to environment competitive change that fits their cognitive framework.

The conclusions as above summarised have some policy implications that we can put in abridged form:

- *As for industrial policy*, it is crucial to speed up the paradigm change of competitiveness that remains rooted in SME's culture. Taking stock of the theoretical framework expressed in the previous points, it is necessary to build a *network architecture of real interventions* directed to regional 'infrastructure' and 'infostructure', rather than to generic financial support to firms (cf. Bramanti and Maggioni, 1997:335). The complexity of this new model "*requires that industrial policies are defined and implemented at a regional level, in order to adapt to the very specific characteristics of each production and technological system.*" (cf. Cappellin, 1995:20);
- *Innovation policy* must address the new challenges of the knowledge economy and should be guided by a deep understanding of the firms' needs. The competitive weaknesses of small firms ask for an *enlarged concept of innovation* that, besides I&D, must address *commercial* and *organisational* dimensions. Once more, the complexity of these new dimensions requires a regional level of policy management, in line with recent experiences of "Regional Innovation Strategies" in other regions of EU (CE, 1999:101);
- *Regional policy* needs a new paradigm guided by the concepts of 'systems complexity' and 'collective learning'. This means that the effectiveness of industrial and innovation policies require an autonomous territorial governance, a regional policy conducted by the regions, backed by national policies, and oriented to the promotion of 'learning by interacting' so that the Norte-Litoral *milieu* engages in a path to become an *innovative milieu* (Maillat and Kebir, 1999).

To highlight the spirit of this paper we finish with a quotation from a distinguished professor of marketing (Ford, 2000): "The unit of analysis is not the sale, product, market, project or territory. *It's relationship.*"

REFERENCES

- ACKOFF, R.L. and GHARAJEDAGHI, J. (1996) Reflections on Systems and their Models, *Systems Research*, 13, 1.
- ALLEN, P.M. (1988) Evolution, innovation and economics, in DOSI *et al* (eds) *Technical Change and Economic Theory*, Pinter, London.
- AMIN, A. and THRIFT, N. (1993) Globalization, Institutional Thickness and Local Prospects, *Revue d'Economie Régionale et Urbaine*, 3.
- ARTHUR, W. B. (1989) Competing Technologies, Increasing Returns and Lock-in by Historical Events, *Economic Journal*, 99,1.
- ASHEIM, B.T. (1996) Industrial Districts as 'Learning Regions': a Condition for Prosperity, *European Planning Studies*, 4, 4.
- BECATTINI, G. (1979) Dal settore industriale al distretto industriale: alcune considerazioni sull'unità di indagine della politica industriale, *Rivista di economia e politica industriale*, 1.
- BECATTINI, G. and RULLANI, E. (1995) Système Local et Marché Global – Le District Industriel, in RALLET, A. and TORRE, A. (eds) *Economie Industrielle et Economie Spatiale*, Economica, Paris.
- BRAMANTI, A. (1999) From Space to Territory: Relational Development and Territorial Competitiveness – The GREMI Approach within the Contemporary Debate, *Revue d'Economie Régionale et Urbaine*, 3.
- BRAMANTI, A and MAGGIONI, M. A. (1997) The Dynamics of Milieux: The Network Analysis Approach in RATTI, R., BRAMANTI, A, GORDON, R. (eds) *The Dynamics of Innovative Regions – The GREMI Approach*, Ashgate, Aldershot.
- CAMAGNI, R. (1995) Global network and local milieu: towards a theory of economic space, in CONTI, S., MALECKI E., OINAS, P. (eds) *The Industrial Enterprise and Its Environment: Spatial Perspectives*, Avebury, Aldershot.
- CAMPBELL-HUNT, C. (2000) What have we learned about generic competitive strategy? A Meta-Analysis, *Strategic Management Journal*, 21.
- CAPELLO, R. (1999) Une mesure des effets de l'apprentissage collectif dans les milieux de haute technologie en Italie, *Revue d'Économie Régionale et Urbaine*, 3.
- CAPPELLIN, R. (1995) Regional Embeddedness and International Integration: The Case of SME's in North Italy, Paper presented to III Encontro Nacional da APDR, 27-29 Abril, Porto.
- CE (1999) Sexto Relatório Periódico relativo à situação socio-económica e ao desenvolvimento das regiões da União Europeia, Luxemburgo.
- CHURCH, M. (1999) Organizing Simply for Complexity: Beyond Metaphor Towards Theory, *Long Range Planning*, 32, 4.
- CONTI, S. (1995) Four paradigms of the enterprise system, in CONTI, S., MALECKI E., OINAS, P. (eds) *The Industrial Enterprise and Its Environment: Spatial Perspectives*, Avebury, Aldershot.

- CONTI, S. and DEMATTEIS, G. (1995) Enterprises, systems and network dynamics: the challenge of complexity, in CONTI, S., MALECKI E., OINAS, P. (eds) *The Industrial Enterprise and Its Environment: Spatial Perspectives*, Avebury, Aldershot.
- CORNING, P. A. (1995) Synergy and Self-organization in the Evolution of Complex System, *Systems Research*, 12,2.
- COSTA, J.S. and SILVA, M.R. (1993) *Modelo Empresarial e Dinâmica de Inovação*, CEDRES e Associação Industrial Portuguesa, Porto.
- COURLET, C. and DIMOU, M. (1995) Les Systèmes Localisés de Production: Une Approche de la Dynamique Longue, in RALLET, A. and TORRE, A. (eds) *Economie Industrielle et Economie Spatiale*, Economica, Paris.
- DE BRESSON, C. (1987) The Evolutionary Paradigm and The Economics of Technological Change, *Journal of Economic Issues*, XXI, 2.
- DELORME, R. (1997) Evolution et complexité: l'apport de la complexité de second ordre à l'économie évolutionnaire, *Economie Appliquée*, L, 3.
- DODGSON, M. (1993) Organizational Learning: A Review of Some Literatures, *Organization Studies*, 14, 3.
- DOSI, G., FREEMAN, C., NELSON, R., SILVERBERG, G., SOETE, L. (eds) (1988) *Technical Change and Economic Theory*, Pinter, London.
- DOSI, G. and NELSON, R. (1994) An introduction to evolutionary theories in economics, *Journal of Evolutionary Economics*, 4.
- DUPUY, J.-P. (1982) *Ordres et Désordres – Enquête sur un nouveau paradigme*, Seuil, Paris.
- FIGUEIREDO, A. (1993) Perspectivas de Evolução da Indústria da Região Norte – Política Industrial e Tecnológica, CEDRES e Associação Industrial Portuguesa, Porto.
- FORD, D. (2000) *What goes wrong in Marketing Strategy and what to do about it*, Seminário de Marketing Estratégico, 14 de Junho, Faculdade de Economia do Porto.
- GARNSEY, E. and LONGHI, C. (1999) Auto-Organisation et Émergence des Milieux Innovateurs, *Revue d'Economie Régionale et Urbaine*, 3.
- HATCHUEL, A. (1999) Connaissances, Modèles d'Interaction et Rationalisations – de la théorie de l'entreprise à l'économie de la connaissance, *Revue d'Economie Industrielle*, 88, 2.
- HILL, C. W. and JONES, G. R. (1995) *Strategic Management – An Integrated Approach*, Houghton Mifflin C., Boston.
- HODGSON, G. M. (1988) *Economics and Institutions – A Manifesto for a Modern Institutional Economics*, Polity Press, Cambridge.
- JOHNSON, G. and SCHOLE, K. (1993) *Exploring Corporate Strategy*, Prentice Hall, New York.
- LAWSON, C. (1999) Towards a competence theory of the region, *Cambridge Journal of Economics*, 23.
- LECOQ, B. (1995) Des Formes Locales d'Organisation Productive aux Dynamiques Industrielles Localisées: Bilan et Perspectives, in RALLET, A. and TORRE, A. (eds) *Economie Industrielle et Economie Spatiale*, Economica, Paris.
- LE MOIGNE, J.-L. (1997) L'économie entre énergétique et pragmatique: évolution, rationalité et téléologie, *Economie Appliquée*, L, 3.
- MAILLAT, D. and KEBIR, L. (1999) "Learning Region" et Systèmes Territoriaux de Production, *Revue d'Economie Régionale et Urbaine*, 3.

- MASKELL, P. and MALMBERG, A. (1999) Localised learning and industrial competitiveness, *Cambridge Journal of Economics*, 23.
- MATEUS, A., BRANDÃO DE BRITO, J. M., MARTINS, V. (1995) Portugal XXI – Cenários de *Desenvolvimento*, Bertrand, Lisboa.
- MINTZBERG, H., AHLSTRAND, B., LAMPEL, J. (1998) *Strategy Safari – A Guided Tour Trough the Wilds of Strategic Management*, Prentice Hall Europe, Hertfordshire.
- MORGAN, K. (1997) The Learning Region: Institutions, Innovation and Regional Renewal, *Regional Studies*, 31, 5.
- NELSON, R. R. and WINTER, S. G. (1982) *An Evolutionary Theory of Economic Change*, Harvard University Press, Cambridge Mass.
- NGO-MAI, S. and ROCCHIA, S. (1999) Auto-organisation et connaissance dans la firme, *Revue d'Economie Industrielle*, 88, 2.
- PAULRÉ, B. (1997) Evolutionnisme contemporain et auto-organisation, *Economie Appliquée*, L, 3.
- PRAHALAD, C. K. and HAMEL, G. (1990) The Core Competence of the Corporation, *Harvard Business Review*, May-June.
- RADZICKI, M. J. (1990) Institutional Dynamics, Deterministic Chaos and Self Organizing Systems, *Journal of Economic Issues*, XXIV, 1.
- RALLET, A. and TORRE, A. (eds) (1995) *Economie Industrielle et Economie Spatiale*, Economica, Paris.
- RATTI, R., BRAMANTI, A, GORDON, R. (eds) (1997) *The Dynamics of Innovative Regions – The GREMI Approach*, Ashgate, Aldershot.
- SAVIOTTI, P.P. and METCALFE, J.S. (1991) Present Development and Trends in Evolutionary Economics, in SAVIOTTI, P.P. and METCALFE, J.S. (eds) *Evolutionary Theories of Economic and Technological Change – Present Status and Future Prospects*, Harwood Academic Publishers.
- SIERRA, C. (1997) Proximité(s), Interactions Technologiques et Territoriales: Une Revue, *Revue d'Economie Industrielle*, 82, 4.
- SILVA, M. R. (1988) Industrialisation et Développement Local – Une interprétation à partir du cas portugais, Thèse de Doctorat, Université des Sciences Sociales de Grenoble.
- SILVA, M.R. and MOTA, I. (1996) Política de Inovação em Regiões Industriais Atrasadas, IV Encontro Nacional da APDR, Covilhã.
- SIMÕES, V. C. (1995) *Inovação e Gestão em PME Industriais Portuguesas*, Centro de Estudos e Documentação Europeia, Lisboa.
- STACEY, R. D. (1995) The Science of Complexity: An Alternative Perspective for Strategic Change Process, *Strategic Management Journal*, 16.
- TEECE, D. and PISANO, G. (1994) The Dynamic Capabilities of Firms: an Introduction, *Industrial and Corporate Change*, 3, 3.
- WICKEN, J.S. (1998) Evolution and Thermodynamics: The New Paradigm, *System Research and Behavioral Science*, 15.
- WILLIAMSON, O. E. (1975) *Markets and Hierarchies: Analysis and Antitrust Implications*, The Free Press, New York.
- WOLLIN, A. (1999) Punctuated Equilibrium: Reconciling Theory of Revolutionary and Incremental Change, *System Research and Behavioral Science*, 16.