

Territorial Systems in the Rural Areas of the European Union¹

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1. Introduction

Facing new enlargement and integration of eastern European countries, the EU may expect spatial impacts resulting from the new political scenarios. There is uncertainty related to job creation, environmental impositions and capital flows that do not allow concluding on the decrease in the lasting regional divergences within the Union. The complexity of the problem demands national governments to execute careful and targeted regional policies (Hart, Hardy, 1995). Contrarily to what could have been expected, increasing asymmetries within the different regions of the EU are being produced (Neto, 1999) and a clear justification was not found.

In general, these regions could be considered as lagging behind and have handicaps to be surmounted: locational disadvantages, structural adjustments and lack of consistent national development strategies. The choices made by investors not attracted by peripheral areas due to high risk in returns and lack of qualified human resources create the *circulus viciosus* that better explains the tendency for an increasing gap. European integration requires the development of dynamic forms of interdependent adjustment: convergence at a macro economic level, territorial articulation at a mesoeconomic level and integration of actors at the micro level of production, consumption and distribution.

The definition of a set of territorial systems is an important tool when evaluating the environmental conditions for firms to integrate in the socio-economic context of their regions. A territorial system is a rural area relatively homogeneous in what concerns its economic activities and social relations. The main goal of this paper is to identify the region, on a perspective of conditions for entrepreneurship.

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Abstract

The emergence of dynamic forms of interdependent adjustment demands new local development processes in terms of socio-economic change: regional activities have been rearranged not only by globalisation but also by a new financial and political logic that reduces territorial and consumer's specificities. Many different factors contribute to regional dynamism; they are mostly correlated to entrepreneurial activity. In this paper we try to observe the set of characteristics able to create adequate environments for the entrepreneurial activity of innovative firms.

Résumé

L'affirmation des formes dynamiques d'ajustement indépendant exige de nouveaux processus de développement local sur le plan du changement socio-économique : les activités régionales ont été modifiées non seulement en raison de la mondialisation mais aussi à cause d'une nouvelle logique financière et politique qui réduit les spécificités du territoire et du consommateur. De nombreux facteurs contribuent au dynamisme régional et ils sont en grande partie liés à l'activité d'entreprise. Dans le présent travail, on passe en revue les caractéristiques qui permettent de créer un environnement approprié pour les activités d'entreprise des firmes innovantes.

Schematically we have four main parts:

I. A theoretical framework

II. A description of each region involved in the research project.

III. A description of the used methodology to define and characterise the territorial systems.

IV. A discussion of results mainly based on the major variables responsible for clustering and on the co-relations observed.

2. The theoretical framework

2.1. Innovation and knowledge base

The emergence of the concept of the local (in our paper considered as environment) in different areas of social sciences is explained by the real evaluative conditions in Europe. It is the expression of a territory's community:

- resulting from convergence on the cultural and political conceptions of the European regions,
 - stressing new authorities created for the application of decentralisation policies and the management of new rules (subsidiaries principle),
 - proceeding from local initiatives of different kinds, that build new spaces and new solidarity concepts.
- The economists who have rediscovered the Marshallian industrial district started the analysis of these local development phenomena. It has been developed in theoretical streams, thoroughly analysing the technological change: on one hand the evolutionist theory, the regional economy on the other. Their analyses offer different approaches to the interaction between technology and territorial dynamics:
- the evolutionist approach: the learning game (Dosi, 1997),
 - the approach to the national systems innovation (Lundvall, 1988),

- the endogenous development,
- the approach to the innovating environments (Mailat, 1996).

The local development dynamics has led only to a few observations, but very often to contradictory analyses. What concerns us most, is the relationship between the "local" emergence and the small enterprises success. This relationship cannot be seen within enlarged market contexts. The globalisation both of markets and economy, the launching of a single market have stressed the pressure by competitive forces and the difficulties faced by less developed regions of the European Union. In a global sense the cohesion has maintained from 1989 to 1993, in spite of the important increase of the structural funds since 1988. Considering the unemployment rates, there are large disparities between the least favoured and the richest regions.

Bearing in mind the potentialities of a technological development, the paradoxes of the cohesion double the paradox on science and technology. When applying the R & D policy, the European Union has given preference to the most advanced regions and the so called high-tech industries. The cohesion goals have led to a considerable aid to the scientific research, but we don't know if there is a relationship between the means aimed at the scientific research and the technological advances, or what are the complex links between the technological development and the economic growth. The technological gap is enormous within the EC. The GERD/GDP (gross expenses in research and development related to gross domestic product) ratio is 98 times weaker in the region having the lower level of R & D expenses than in the region having the higher level of R & D expenses (European Commission, 1997). Even if the differences have tended to decrease during the latest years, and even if the financing from the Framework-programs for R & D has contributed to a catch-up in the cohesion countries, we wonder how a technological policy may be put into practice in the whole of peripheral regions without a minimum clarification of the technological development conditions for their SMEs and the consequences for the local development.

One of the problems of the Science and Technology's paradox is that science is often made without obtaining good technological performances. It is well known that in Europe the results of research projects are not often evaluated nor their findings are considered in the choice of future policies. In order that the investments in R & D should have positive impacts, it is necessary to understand and develop the complex relations among the innovation components. Now, the analyses that are commonly undertaken, between the inputs in R & D and the technological outputs are using only "proxy" indicators, the innovations not being taken into account. They are carried out just for the industries that appeal to scientific knowledge and are incorrectly qualified as high technology. Is it fair to classify the chemist's shop technologically higher than the electric equipment, be-

cause the former utilises more scientific references in its stock files.

The interpretation of the technological change became a major theme focused by the economic literature about growth. The science-technology-development model based on a static concept of innovation, gives place to the interactive models. The innovative activities of the enterprises are fed by the "knowledge bases" that allow to discover the solutions to the technological problems (Nelson and Winter, 1982). Thus, a complex process combines different forms of learning. In the 90's, the evolutionist analysis focused mainly on the learning interactive dimensions (Lundvall, 1988). It also allowed to explain how the variations of productivity in the same industry are due to the diversified know-how and capacities to solve problems (Dosi, 1988). But it is necessary to distinguish all the technological regimens, on one hand the Schumpeterien entrepreneur's regimen, the routine regimen on the other (Nelson, Winter, 1992).

2.2. Territory, institutional co-operative choices and collective learning

Meanwhile regional science is supplying the experts with new tools. During the 1980's, empirical evidence on recent developments (of some regions like Emilia Romana, Toscana, Southern Germany, Southern California, Japan, and Silicon Valley) had shown growth patterns, based on production systems and institutional frameworks, whose characteristics were evidently distant from mass production and product standardisation and other concepts familiar to the Fordist approach. In most of the cases these examples accentuate the role of territorial agglomeration of production and the interconnections of social practices and institutions in the successful development of regions.

In general terms, a whole set of discussions emerged from research agendas concerned with the notion of geographical space, to conclude that its development is an endogenous procedure in which time dimension is an essential determinant. In the following pages we stress their main results, without details about empirical evidence which is provided in a huge number of studies.

The dynamics of a geographical space takes place when inside this space the agents perform relationships of different nature and a certain socio-economic behaviour characterises them. These relationships (we could call them transactions) can be described as external to the market or internal to the hierarchy, and co-operative.

All these three kinds of transactions matter to the development of that space where not only the economic agents interact but where the social structure also induces a knowledge capacity - the territory. Indeed, globalisation and the fact that each different space is submitted to its market rules do not allow the analyses to exclude the importance of relations exterior to the market or internal to the hierarchy structure. That is why most of the studies discuss co-opera-

tion as the most adequate relational choice within the spaces.

The introduction of time as a major factor of the territorial dynamics permits us to transform the previous concepts of behaviour and relationship into "learning" and "interacting", giving origin to very consistent and original new approaches. How may learning be introduced in the territory? How, as a consequence, do structural changes happen in the territory? How does the territory constitute itself to accept a different set of organisational or technical procedures, the innovations?

In order to develop answers to these questions we have to perceive that the territory can not be reduced to its spatial dimension. It should be understood as an historical construction in which the institutions function as a regulatory element of individual and collective practices, the principal assets being therefore of a relational nature (Kirat, 1993 in Sierra, 1997). One of the main characteristics inherent to the territory is the proximity among socio-economic agents (Breschi and Malerba, 1997). Whether the agents benefit or not from this attribute depends on their technological and social capacity to interact and co-operate.

There are discussions on the concepts of geographical and technological "proximity". While the first one indicates increases in the relation among economic activities and settles the idea of organisational and institutional proximity, the second one suggests the importance of the interaction among agents, particularly the one that results from learning. The complementarity between both concepts stimulates different forms for relations of proximity and can ease the enterprises to relate and institutions to integrate (Sierra, 1997). At this point we start to touch the already described theoretical context related with technological change and innovation. We do not intend to involve in the same subject again, therefore our remarks will focus on two main ideas close to technological changes: the acceptance that technical specificity is a continuous learned procedure and the need to support this procedure as an endogenous result.

Meanwhile intensive attention has been paid to the territorial dimension in the technological dynamics. Bellet (1992) discussed it presenting a review on the convergence of these two aspects.

Much earlier and developed by the GREMI, the concept of "innovative environment" had generated possibilities for interpretation of the phenomena of spatial dynamics exclusively based on innovative procedures and synergetic movements within the territories. We shall pay some detailed attention to the improvements in the analytical tools used by this group that since 1985, focused its main aim on the development of a common methodology and theoretical approach to the study of innovative behaviours within territories.

Aydalet's (1984) first preoccupation was related to the inefficiency of both theses: the convergence and the divergence of growth pattern among territories. While the first

one postulated the tendency of a similarity in the remuneration rates of the productive factors, the second defended the worsening of spatial hierarchies with cumulative negative consequences for the peripheral spaces. These two theses could not explain, however, a newly achieved economic dynamism in several European and American regions, reflecting an absence of analytical interpretation for spatial structural changes. Since then, several scholars have developed the definition inside the general conception of a "set of territorial relationships encompassing in a coherent way a production system, different economic and social actors, a specific culture and a representation system, and generating a dynamic collective learning process" (Grosjean and Crevoisier, 1998).

In a context of increased market competition and rapid innovation, firms and regions are faced with competition factors rather than price advantages, having clear benefits when able to systematically acquire new skills. A strong capability to learn and transform the organisational competencies (European Commission, 1997) is demanded. The learning region favours pre-conditions for learning, in the forms of common regional culturally-based rules of behaviour and co-operation often in which collective agents may be of great help (Keeble, 1997).

So that the innovative results, within the territorial space, could be considered as due to a collective user that reduces the degree of uncertainty for the firms by organising their functional and informational inter-dependence and informally performing functions like: search, signalling, selection, transcoding, transformer and control. The effect of uncertainty reduction upon SME's is very important generally because of their reluctance to co-operate in research activities.

The introduction of the concept of retournement gave useful explanations. First, an autonomous mechanism, detained by each territory (even peripheral) that could be able to change the hierarchical relation among spaces, was presupposed. Then, it was possible to conclude that the consequent effects upon the development of such territories were not simple repercussions related to growth in closely located rich regions but, results from specific dynamic procedures happening in these peripheries. For the GREMI researchers, that had come close to the theses of the industrial districts, the territorial development question became a central procedure in the composition of the global industrial system. The important issue being to know how the collective learning and the development of new know-how could emerge and reproduce in the territory.

There are two elements that theoretically define the role of the environment: the "collective learning" process, that enhances local creativity and capability to adapt behaviours due to environmental changes, and processes of reduction of dynamic uncertainty elements, intrinsic in technological development, innovative processes and contractual relations.

2.3. Networking and systems of territorial production

Storper and Harrison (1991) and other researchers advanced the notion of "production system" without interfering in generic terms with the major results obtained by the other research groups.

In his approach Storper does not introduce the territorial dimension of production without a previous discussion on the types of "input-output systems", functional cores of the economic activity. Scott and Storper, 1990 (in Storper, Harrison, 1991) had explained how, similarly to the production units, the different input-output systems are generators of external economies of scale or scope, if groups of units of production are fragmented and specialised on a basis of social division of labour.

This permanent decomposition in the productive forms demands at the same time an intensification of the interrelationships among the input-output systems and exalts the need for production flexibility, inducing the advantages of working together - networking or creating networks. In this case, spatial proximity matters not only in terms of reduction in physical distance, but rather in terms of easy information interchange, which can determine the efficiency of local production systems and their response capability to a changing external environment.

This organisational form has its own advantages, costs and risks. The main advantage is what Dirk Kamann (in Camagni, 1991) calls the "network surplus": scale economies in R&D, commercialisation and production, complementarity of know how and strategic synergies among firms. One risk concerns the possibility of easy opportunistic behaviours of some partners, which may profit from the co-operation alone. One major limitation regards the fact that the model is potentially highly profitable but also highly demanding in terms of organisational expertise and highly subject to costly failures. Network surplus is a quite interesting concept, still not very well formally defined but promising in terms of measurement, specially when the regional dimension is being taken in consideration.

Other contributions to the analyses were Antonelli (1995) explanations on the origin of co-operation. This is due to the existence of complementarity between different production units, whose relationships are not only based on competition. Facing an increase and more exacting demand, firms tend to be more specialised, inducing complementary and interdependency relations. Here, technological innovations emerge from the need for variety and differentiation, providing better levels of productivity to the firms.

In this logic sequence, co-ordination is not only allowed by the market system (based on prices), because this one doesn't transmit all the relevant information to keep the cycle active. The flow of information is only possible through ex-ante co-ordination among firms, leading us again to the concept of "networks".

Industries working in networks can be characterised by

the existence of a variety of firms, linked by a high level of technical complementarities and compatibilities and highly integrated due to the externalities provided (Camagni, 1995a and 1995b). The latter allow firms to have aggregate cost functions with increasing incomes, which can be interpreted as their benefits from belonging to the network.

Due to a problem of diversity, it has not been easy to adapt the reality of the regional productive bases to the theoretical conceptualisation of territories. Independently from the fact that in general the productive territories do not correspond to the administrative divisions, other problems bring limits to the analyses. One of those limits was observed and worked up by Grosjean and Crevoisier (1998). It concerns the fact that most of the available case studies refer to only one of the several concepts related to systems of territorial production, when indeed the region is seldom homogenous. In most of the cases different subsystems co-exist inside one same region.

The coexistence among such different subsystems could originate complementarities inside the territory. In this case, co-operations among firms are developed if the complementarities are organised through a common industrial strategy. What territorial strategy may result without a co-ordination of this territory? To understand the articulation between the subsets of a territorial system of production, we need a meso-economic framework. Regional proximity improves co-ordination and induces to agglomeration economies. Specialised small firms benefit from better market opportunities and competitive advantages when compared to bigger, but isolated, competitors (Becattini, 1987 in Antonelli, 1995).

As Fordist solutions loose strength, local environment specificity becomes more relevant, as it concedes to the productive organisation essential inputs, like labour force, entrepreneurial capacity, infrastructure, social culture and industrial organisation (Becattini and Rullani, 1995). The author's idea is in order to value mostly the aspects related to the milieu where firms are located, leaving behind scale economies and mass production as determinants to competitive advantages. Industrial districts serve again as example. Here, labour force division among the several specialised small and medium enterprises occurs, not due to the co-ordination of a big enterprise, but thanks to common entrepreneurial culture and a huge sense of interdependency. Because of being better adapted to the environment, this labour force division allows SME's, located in the industrial districts, to have competitive advantages when compared to big Fordist enterprises (Becattini and Rullani, 1995).

2.4. Governance and power in the organisations

The transaction cost approach, a model whose goal is the pursuit of efficiency, has as basic presupposition that the market and its atomistic organisation consolidates all the relations into transactions ruled by the rationality and the opportunism of agents (Williamson, 1975 and 1985 in Taylor,

1995). In this model, if transactions involve uncertainty they tend to take place in hierarchically organised firms saving greater costs in marketing transactions but using, at the same time, higher levels of bureaucratic organisation.

Notwithstanding the limitations of the transaction cost model, the same was used to better understand the functioning of "production systems", identifying new industrial spaces. Taylor (1995) referred to flexible specialisation and flexible accumulation in the context of agglomeration as processes dismantling hierarchies and replacing them with localised market transactions.

Storper and Harrison (1991) draw attention to the structure of the supply chains where the number of suppliers is different from the number of customers, to explain the asymmetry of power and develop a typology of governance structures. The role of power or unequal power relationships within and between firms seems to influence patterns of geographical industrialisation and therefore speed development in the territories. Taylor (1995) refers to the fact that the empiricist tradition in the industrial geography simply separates small firms from large corporations creating a dichotomy that neglects the appreciation of the full significance of business enterprises, their structures and the nature of networks within which they are situated. In this context the full understanding of the capital/capital relationship and the circuits of power that these relations trace are devalued in comparison with the capital/labour relationship and job creation that is generally an over-evaluated argument. Also a criticism from the author is made of the restrictive character of the transaction cost model. Assuming transactions to either external markets or internal hierarchies, where the equilibrium is established whenever the efficiency is obtained through the minimisation of transaction costs, the model reduces the discussion of the dominance of power almost only to the neo-classical least cost location models.

To better understand networks of power, theoreticians should depart from the complexity of entrepreneurial tissue and distinguish all kind of productive organisations. Large firms from small firms, transnational corporations from national based corporations, foreign owned from domestic owned, craft from mass producers, high technology from low technology companies, head offices from branch plants. All those enterprises develop interrelationships, sometimes not necessarily contractual or transactional, at different functional levels with other organisations or agents in a constellation where place, time and strategic decision influence.

2.5. Industrial models and structural change

Lung (1995) presents a positive contribute to the discussion on spatial distribution (geography) of production, advancing the idea of industrial models directly linked to the regulationist approaches from Boyer and Saillard, 1995 (in Lung, 1995). He tries to handle problems related to a new economic order resulting from the post-Fordist era. Based

on two main characteristics, the flexible specialisation (Piore and Sabel, 1984 in Lung, 1995) and the flexible accumulation (Scott, 1988 in Lung, 1995), the theoretical view synthesised by Lung expects to create new tools to analyse the meso-economic space.

As uncertainty and stability are the constitutive bases of those models, both notions deal essentially with the management of the relations under a confidence level. Multiple reasons may justify uncertainty that can derive mainly from different forms of labour relations (Leborgne and Lipietz in Lung, 1995) or from changes in productive organisation created by the market. Examples are material or informational flows, market, and entrepreneurial relations.

The previous discussion brings up new, very important vectors into the analyses:

- the model can not be defined independently from its specific spatial and historical context, and the stability pre-defines reactions (Llerena in Lung, 1995);
- in the model and for each context, in contrast to uncertainty, stability helps the anticipations, therefore creating certain reactions to expected levels of performance;
- in a transition period different industrial models coexist independently of the dominance of one of them;
- the models have evolutionary tracks with national nuances (Boyer, 1991 in Lung, 1995). So that the Fordist model can be associated with labour division and the post-Fordist model to territorial re-composition, which means that to each model corresponds a specific geography of production.

Regulationist justifications attribute to the Fordist model the loss of identity of the territories. But, they explain how the new productive forms ("production systems" in the terminology of Storper and his group) in the post-Fordist era may develop a new economic status for the local space. Once new flexible forms of productive organisation have been introduced, the closed articulation to the market on one side and externalities and development networks of firms on the other, impose co-operation in conception and production procedures. Indeed, the increasingly strong rivalry and permanent competitive fluctuations impose new articulation forms between the local and global contexts in a way where production requires permanent adaptation to local specificities. To better understand the market expectations the firm relocates, at least, one part of its conception and production procedures, putting an end to a regime in which the firm assortment of supplies are identical for all geographic spaces (Lung, 1995).

We have described a major logic that justifies a great part of the spatial dynamics in the post-Fordist industrial models. In the previous paragraph we have explained why the new principles of productive organisation require simultaneously stability and flexibility in the economic activity, also in terms of employment, orienting the territorial implantation of firms. Indeed, the need of firms for new competencies (Malerba, 1992), more specific and systematically adaptable workers - absorbing the most recent innovations

Table 1. Territorial systems by nuts level, terminology and size

| | | Nuts level | Terminology | Size (km ²) |
|----|-------------------------------|------------|-------------------|-------------------------|
| 1 | Alentejo Central (Pt) | Nuts III | Region | 7.228 |
| 2 | Aude (F) | Nuts III | Departments | 6.139 |
| 3 | Northern Border (E)* | Nuts III | Region | 12.341 |
| 4 | Cremona (I) | Nuts III | Province | 1.770 |
| 5 | Devon and Cornwall (GB) | Nuts II | Group of counties | 10.262 |
| 6 | Gard (F) | Nuts III | Department | 5.853 |
| 7 | Hainaut (B) | Nuts II | Province | 3.785 |
| 8 | Hereford and Worcester (GB)** | Nuts II | Group of counties | 3.923 |
| 9 | Kuzawsko-Pomorskie (P) | n.a. | Province | 20.099 |
| 10 | Piacenza (I) | Nuts III | Province | 2.589 |
| 11 | Oeste (Pt) | Nuts III | Region | 2.512 |
| 12 | South West (E) | Nuts III | Region | 12.306 |
| 13 | West Flanders (B) | Nuts II | Province | 3.134 |

Source: National statistics
 * Only a part of the Nuts III region has been selected.
 **Nuts II region includes county Warwickshire. However, in this research, Warwickshire is excluded.

or dealing with fast informational flows - demands qualified human resources. The territories, sometimes the towns (also the medium sized ones) are involved into productive organisational complexes. Such productive organisational complexes, called territorial systems, should be carefully observed and the determinants of their dynamism clearly defined. The second point of this paper is a trial on such direction.

3. General overview of territorial systems

For the identification of territorial systems, the NUTS classification (Nomenclature of Territorial Units for Statistics) is adopted. This classification system was established by Eurostat and is widely used in Community legislation since 1988. However, NUTS has no legal value per se. The territorial systems are either nuts II or nuts III level regions. An overview of the nuts level, terminology and size of each territorial system is provided in table 1. Within the countries, regions of comparable size are selected. Sizes of the territorial systems vary from 1.770 km square for the Cremona region up to 20.099 km square for the province of Kuzawsko-Pomorskie

(Noronha, Cesá-rio, Avermaete, 2001).

Since the spread of the industrial revolution, Western European economies have grown on average by 2 - 2.5 percent a year (European Commission, 1999). However, there are striking disparities between countries and more in particular between regions. National statistics on GDP, the standard measure for economic performance, show that there is a gap between GDP in Spain, Greece and Portugal compared to the GDP of other Member states (European Commission, 2001). However, of even greater concern to the European Commission is the increasing disparity between European regions. While some regions tend to grow, other seems to lag behind.

Following, two indicators of economic performance are presented. The first indicator is Gross Regional Product per head. GRP is de-

Table 2. Indicators of regional economic performance

| Indicators | GRP per head (1997) | | Employment by sector (1997) | | |
|-----------------------|--------------------------|---------------------------------|-----------------------------|-----------------------|-----------------------|
| | GRP per head 1.000 euros | GRP per head growth 1994 - 1997 | Agriculture (% of total) | Industry (% of total) | Services (% of total) |
| <i>Belgium</i> | | | 2.7 | 27.5 | 69.8 |
| Région Wallonne | | | 2.9 | 24.5 | 72.6 |
| Hainaut | 16.0 | +0.16 | 2.7 | 26.9 | 70.5 |
| Flanders | | | 2.9 | 30.6 | 66.5 |
| West Flanders | 21.9 | +0.18 | 5.1 | 33.1 | 61.8 |
| <i>France</i> | | | 4.6 | 26.6 | 68.7 |
| Languedoc-Roussillon | | | 7.8 | 19.4 | 72.8 |
| Aude | n.a. | +0.03 | 8.8 | 27.2 | 64.0 |
| Gard | n.a. | +0.03 | 7.0 | 38.5 | 54.5 |
| <i>Ireland</i> | | | 10.9 | 28.5 | 60.4 |
| Northwest Border | 13.4 | +0.23 | 14.3 | 35.9 | 49.7 |
| South West | 19.0 | +0.34 | 12.2 | 29.9 | 57.8 |
| <i>Italy</i> | | | 6.5 | 31.7 | 61.8 |
| Emilia Romagna | | | 6.3 | 34.6 | 59.1 |
| Piacenza | 18.7 | +0.16 | 7.2 | 35.5 | 57.2 |
| Lombardia | | | 2.7 | 40.6 | 56.6 |
| Cremona | 16.6 | +0.13 | 7.6 | 40.5 | 51.9 |
| <i>Poland</i> | | | - | - | - |
| Kuzawsko-Pomorskie | 3.0 | +0.07 | 26.4 | 31.0 | 42.6 |
| <i>Portugal</i> | | | 13.3 | 31.0 | 55.7 |
| Alentejo Central | 7.8 | +0.27 | 14.2 | 24.5 | 61.2 |
| Lisboa e Vale do Tejo | | | 3.8 | 25.2 | 71.0 |
| Oeste | 8.0 | +0.18 | 8.7 | 38.9 | 50.0 |
| <i>United Kingdom</i> | | | 1.9 | 26.8 | 71.1 |
| South West | | | 3.2 | 25.4 | 71.2 |
| Cornwall, Devon | 13.5 | +0.00 | 5.0 | 24.1 | 70.7 |
| West Midlands | | | 1.9 | 34.3 | 63.7 |
| Hereford & Worcester | 16.1 | +0.08 | 2.8 | 29.8 | 67.2 |

Source: Data collected from regional and national statistics, European Commission (1999)

signed to measure total output in a particular area, including services. The second indicator is employment by sector. While rural areas generally have a high percentage of employment in agriculture, urban networks are characterised by an important contribution of employment in the services sector. Further, agricultural activities may be providers of ingredients for local food manufacturing enterprises. There is evidence that food SME's are particularly situated in rural areas where they have developed to process the products of local agriculture (Traill, 1995; Noronha Vaz and Nicolas, 2000). Figures on GRP and employment are presented in table 2.

West Flanders marks the highest GRP per capita of all territorial systems. Moreover, West Flanders belongs to the top 25 percent of the richest regions in the EU. This province has a high proportion of employment in agriculture, over 5 percent. The unemployment rate of West Flanders is under the national average. Another situation is observed in Hainaut. Hainaut also has a relatively high GRP per capita compared to the other territorial systems. However, the economic performance of the province is low compared to other Belgium provinces. The services sector is of major importance for employment in Hainaut. Nevertheless, the unemployment rate in Hainaut exceeds 13 percent and is therefore the highest in Belgium. There are no figures available for the actual GRP per capita in Aude and Gard. Figures for the Languedoc-Roussillon region indicate a GRP below the European average (European Commission, 2001). In both departments, agriculture is an important source of employment. Compared to other regions in France, the industry in Languedoc-Roussillon is lagging behind.

Piacenza and Cremona show a similar economic performance. Employment in agriculture exceeds 7 percent of total employment. In Piacenza, the industrial sector is principally based on the processing of agricultural products. Pasta, cheese, salami and canning factories are the most important products of the region. Similar, the industry in Cremona is closely linked to the primary sector with the production of pasta, salami, cheese and cakes as well as the construction of farm machinery. Cremona also has a tradition in the manufacturing of musical instruments. Both Emilia Romagna and Lombardy have low unemployment rates, compared to other EU regions.

Kuzawsko-Pomorskie has the lowest GRP. Within Poland, the region contributes to 5 percent of total GDP. However, GDP growth in the province is very low. Over one fourth of the population in Kuzawsko-Pomorskie is employed in agriculture. Finally, the region has an unemployment rate that exceeds 13 percent.

GRP is also low in both the Portuguese regions. However, growth rates in these regions are rather high, especially in Alentejo Central. In both Alentejo and the Lisboa e Vale do Tejo region, the service sector is strongly developed. The Lisboa e Vale do Tejo region has a dynamic agri-food industry. Alentejo is characterised by a high proportion of

employment in agriculture and a lack of industrial tradition. Unemployment rates of both regions fall into the same category.

The regions of the United Kingdom show intermediate per capita GRP figures. The South West region as a whole is one of UK's best performing and most rapidly expanding regions in terms of the rate of economic growth. However, there are considerable sub regional disparities. The north - east of the region is relatively prosperous and its location of the high added value wealth-generating businesses contrasts the more remote areas of Dorset, Devon and Cornwall. The GRP of Cornwall is second lowest in England. As indicated in table 2, Cornwall and Devon have no GRP growth for the period 1994-1997. The primary sector provides 5 percent of employment in these counties. Traditional industries in the region have undergone a severe decline in traditional industries. The main industry in Cornwall was formerly tin mining, but with the fall in tin prices, the last mine in the region has closed. Agriculture, fishing, china clay extraction and defence have undergone reduction in employment. Nevertheless, the traditional industries remain highly important industries. The GRP of the counties Hereford and Worcester is higher than in Cornwall and Devon, with a very low growth rate. The largest employment sector in Hereford is manufacturing, both food and non-food. The employment structure in Worcestershire is primarily made up of three sectors that account for 75 percent of all employees in Worcestershire. These are manufacturing; public administration, health and education; and distribution, hotels and catering (Noronha, Cesário and Avermaete, 2001).

4. A description of the methodology to define and characterise the territorial systems

The methodology assembles all the 13 observed regions based on a set of 17 indicators out of a composition of 20 initial variables (in opposition to the simplistic criteria related to the exclusive use of the level of the domestic regional product). It applies a multivariate statistical analysis.

The method shows the advantage of admitting as many variables as necessary to theoretically better approach the major determinants of regional growth.

Multiple considerations related to the choice of the variables could be presented. There are restrictions to be considered. First, the model does not easily allow a number of variables far superior to the number of the observed regions. In this case, the enlargement of the sample to a higher number of observed regions is a positive contribution to the specificity of the classification. The second imposition is that all the variables do have to be obtained for each region and observed for the same period of time. This can be a very difficult task, since the sample is composed of many different countries that do not use compatible statistical data for a non negligible number of variables (consumption

Table 3. *Variables of Local Development*

| Indicator | Description |
|----------------------|---|
| IRPpc | Internal Regional Product per capita |
| GAV / Employment | Productivity |
| GAV 1 / Employment 1 | Productivity in primary sector |
| GAV 2 / Employment 2 | Productivity in secondary sector |
| GAV 3 / Employment 3 | Productivity in tertiary sector |
| LFQsec/ active pop. | Labour force qualification (number of students in secondary level) in proportion of active population |
| LFQhig/ active pop. | Labour force qualification (number of students in higher level) in proportion of active population |
| Trans-com | Investments in transports/ communications in relation to surface |
| % empl 1 | Percentage of employment in primary sector |
| % empl 2 | Percentage of employment in secondary sector |
| % empl 3 | Percentage of employment in tertiary sector |
| New 1 | Nº of constituted enterprises in relation to total, primary sector |
| New 2 | Nº of constituted enterprises in relation to total, secondary sector |
| New 3 | Nº of constituted enterprises in relation to total, tertiary sector |
| Exp food | Proportion of household expenses in food |
| Exp drinks | Proportion of household expenses in drinks |
| Exp catering | Proportion of household expenses in catering |

Source: Own elaboration.

patterns or creation and disappearance of enterprises are examples). Another restraint is related to the dynamic study as the one that we are proposing; the observations have to be made in regular time lags that do not always compromise the statistical possibilities of all countries or regions.

The use of cluster, discriminant and correlation statistical analyses allowed the constitution of different set of regions, composed of elements the most homogeneous possible. We called those sets "territorial systems" and we observed their formation in two different time periods: 1994 and 1997. Secondary data has been used to classify in clusters all the observed regions and a correlation analyses has been made to establish the most significant variables in the clustering process. Theoretically, there are multiple variables to describe the environmental context of small firms. We have selected those that within a region could better reflect the lo-

cal capacity of industrial growth as well as the financial support structure to regional development. We called them the Variables of Local Development (VLD).

4.1. Multivariate Analysis

Cluster Analysis has been chosen as the adequate method to classify the regions, grouping them in sets composed of elements the most homogeneous possible. For us such sets shall be called from now on territorial systems.

The procedure to measure the similarity between these elements is based on Distance Measures. In our case we used the Square Euclidean Distance given by:

$$d_{ij}^2 = \sum_{v=1}^p (X_{iv} - X_{jv})^2$$

According to this measure, distance between two elements (i and j) is defined as the sum of the square distances between the values of all variables for i and j (v=1,2,...,p). The procedure used to constitute groups was the Hierarchical one. In our case, we select among all the hierarchical options the Nearest Neighbour, which consists in grouping first the elements with the smallest distance.

As it can be observed in table 4, in a short 3 years' period, the factors for grouping changed and different clusters were constituted by different regions. This proves that territorial systems have an unstable nature and respond fast to external or internal impulses.

Given the inclusion in the clusters, discriminant analyses allow the identification of the variables that most have contributed to the differentiation between the groups. In our case, we have used the discriminant analyses in order to observe the average value for each variable in each group, which indicates the discriminate power of each variable. The analyses of the importance of some main variables to the constitution of the cluster classification provided some conclusions:

For the year 1994, the regions belonging to Cluster 1 show (on average) better performance in the following variables:

- Productivity levels (in general),
- Labour force qualification (secondary level),
- Proportion of employment in primary sector,
- Proportion of new enterprises in secondary sector,
- Proportion of household expenses in food

However, the regions belonging to Cluster 2 show (on average) a better performance in the following variables:

- Productivity levels in primary and secondary sectors,
- Labour force qualification (high level),
- Proportion of employment in tertiary sector,
- Proportion of new enterprises in primary and tertiary sectors,
- Proportion of household expenses in drinks.

Table 4. *Classification of the territorial systems*

| Cluster | Regions included in 1994 | Regions included in 1997 | Regions included in 1994 - 1997 |
|---------|---|---|--|
| 1 | Alentejo Central; Kuzawsko-Pomorskie; Oeste; South West; Hereford and Worcester; Border; Devon and Cornwall; Gard; West Flandria; Aude; Cremona | Alentejo Central; Kuzawsko-Pomorskie; Oeste; Devon and Cornwall; Border; Hereford and Worcester; South West; Gard; Hainaut; Aude; West Flandria | Border; South West; Oeste; Hainaut; West Flandria; Gard; Cremona; Devon and Cornwall; Hereford and Worcester; Alentejo Central; Kuzawsko-Pomorskie |
| 2 | Hainaut | Cremona | Aude |
| 3 | Piacenza | Piacenza | Piacenza |

Source: Own elaboration.

Considering Cluster 3, the following variables express to be the more significant:

- Levels of development in terms of IRP per capita,
- Productivity levels in tertiary sector,
- Transports and communications
- Proportion of employment in the secondary sector.
- Proportion of household expenses in catering products.

Based on the consideration that there is not a statistical composition for the territorial systems, we have tried to confirm that impulses for change have been motivated by different determinants. Indeed, the results show different sets of variables responsible for the three clustering formations as well as a different ranking for variables in the cases for which they still have an influence.

So, for the year 1997, Regions belonging to Cluster 1 show (on average) better performance in the following variables:

- Productivity levels for primary and secondary sectors,
- Proportion of employment in primary and tertiary sectors,
- Proportion of new enterprises in secondary and tertiary sectors,
- Proportion of household expenses in food and drinks.

Still, regions belonging to Cluster 2, cluster as a result of the behaviour of the following main variable:

- Proportion of employment in secondary sector.

In the case of regions belonging to Cluster 3, the higher performance is observed in the following variables:

- Levels of development in terms of IRP per capita,
- Levels of productivity (in general and in tertiary sector),
- Labour Force Qualification (secondary and high level),
- Transports and communications,
- Proportion of new enterprises in the primary sector.

All together and considering the miscible nature of the territorial systems, we have decided to observe the clustering reaction within a short time period: 1994-1997, considering that the ideal would have been to disperse time series on secondary data for at least a 10 year time lag.

In this dynamic observation, the results are the following:

Regions belonging to Cluster 1 show (on average) better performance in the following variables:

- Productivity levels (in general and for tertiary sector) (less accentuated decrease in the growth rate of the less one),
- Growth of expenses in transports and communications,
- Proportion of employment in secondary sector,
- Proportion of new enterprises in tertiary sector,
- Proportion of household expenses in drinks and catering products.

Regions belonging to Cluster 2 show (on average) better performance in the following variables:

- Labour force qualification (high level),
- Proportion of employment in primary sector (less accentuated decrease in the growth rate of this indicator),
- Proportion of new enterprises in secondary sector (less accentuated decrease in the growth rate of this indicator),
- Proportion of household expenses in food (less accentuated decrease in the growth rate of this indicator).

Regions belonging to Cluster 3 show (on average) better performance in the following variables:

- Growing rates in IRP per capita,
- Levels of productivity for the primary and secondary sectors,
- Labour force qualification (secondary level),
- Proportion of employment in tertiary sector,
- Proportion of new enterprises in the primary sector.

4.2. The correlation among variables

Correlation analysis among variables is a useful instrument to evaluate possible connections among the observed data. Most important in this process is the analysis of how much and which variables have altered their influence upon others during the short period observed.

Annex 1 supplies the highest directly correlated variables (HDCV) as well as the highest inversely correlated (HICV) ones. We call the attention for the fact that the analyses do not correlate the variables for each cluster but for the whole of regions.

5. Conclusions

The determinant factors for clustering changed within a short time period, three years, proving that territorial systems (when defined by an enlarged number of variables) have an unstable nature and can respond fast to external or internal impulses.

Within the short period considered, a change in the regions composing the second and the third period has been observed. Hainaut, placed in 1994 in the second cluster, moved to the first cluster, where most of the regions belong. Its place was taken by Cremona, belonging then, in 1997, to the second cluster.

Getting different discriminant functions for the two referred time periods and for the interval 1994-1997 allowed the identification of the variables that represented the most positive contribution to clustering. The method constituted three clusters. In all the cases the several responsible variables, pointed out by the discriminant functions, were replaced by others:

- This was the case of labour proportion of new enterprises and employment in the third sector as a determinant for grouping the regions belonging to first cluster. The first cluster has a stable composition.

- In cluster two, the important factor to be observed is that while, in 1994, there was a set of five variables responsible for clustering, in 1997, such determinants were substituted by only one: proportion of employment in the secondary sector.

- And finally, in cluster three, for which the determinant factors almost remain constant, the labour force qualification and proportion of new enterprises in the primary sector arise, as complements to be considered too.

Regarding the dynamic analysis, the observation of 1994-1997 time period calls the attention to the separate cluster composed by Aude: a region whose determinants for

growth are mostly the labour force qualification (high level) and the proportion of employment in primary sector.

A correlation analysis was a major contribution to the results of this research paper. Directly and inversely correlated variables have been diagnosed and a sequence of tables shows the different closed relations among, for example, the internal regional product and productivity or investment in transports. To observe these results in detail, we have selected the following variables: internal regional product, global productivity, highly qualified labour force, investment in the transport sector, employment by activity sector and creation of new enterprises.

The internal regional product is directly correlated with productivity in industry, agriculture, and services and the global productivity for the period 1994. Major changes happened in 1997, when labour force qualification and employment in services became highly correlated too. The inverse co-relations with employment and food exports maintain in both periods. What seems to be interesting is that the dynamic observation made between 1994 and 1997 shows the creation of new enterprises in the services and agriculture sectors as important co-related variables.

Regarding the internal regional product, the directly co-related variables are the productivity (all kinds) as well as the internal regional product but their order of importance changed. The dynamic observation points out the investment in transports as co-related too. The inverse co-relations with employment and food exports maintain in both periods.

The highly qualified labour force is an interesting variable, because the number of direct co-related variables is decreasing in time. For the first period, they were the labour force qualification secondary, the export of drinks, the employment in services, the formation of new enterprises and the internal product. As time passed by, the co-relations decreased to only three significant variables: the export of drinks, the labour force qualification secondary and the internal product. The dynamic observation points out only two significant variables: export of drinks and catering.

Investments in transports are not inversely correlated with almost any of the other considered variables (exceptions for employment in agriculture and labour force qualification secondary). This means that increases in such investments can only generate positive changes in the set of other variables. A statistical high co-relation kept constant for the two observed periods and was found only for the following variables: internal regional product and creation of new enterprises in agriculture. The dynamic observation for the period 1994-1997 indicates co-relation with higher number of variables, namely: Creation of firms in the services, industrial productivity, creation of new firms in agriculture and global productivity.

Regarding the behaviour of employment in agriculture, employment in industry and employment in services, the results are as follows. As it was to be expected, direct co-relations exist for the first and secondary sectors with export

of food and creation of new firms in the services sectors. The services sector presents different determinants than the other sectors; in this case, the employment is co-related with labour force qualification, from both types high and secondary, and the internal regional product, for the period 1994. However in 1997, investment in transports substituted the importance of labour force qualification. Most important we consider being however, the inverse co-relations. They show that increases in employment in industry and services and global productivity or agricultural productivity do determine less employment in the agricultural or other sectors.

The last group of variables to be observed concern the creation of new firms in agriculture, industry and services. Indeed, groups of different factors seem to determine the creation of new firms at each of the three sectors of the economic activity. In the case of agriculture and for 1994, productivity in agriculture, investments in transports, creation of firms in the services and labour force qualification high are variables highly co-related to firm creation. In the case of industry the only positive co-relations are related to labour force qualification secondary. However, in the case of the services sector, productivity (global or by sector) is the co-related variable.

Having observed thirteen regions, territorial systems, located in seven European countries, we come to the conclusion that the dynamics of growth in the rural areas is permanently taking place, also in short time periods demanding, therefore, regular and variable accompanying measures.

The results induce the need for a continual observation of the economic dynamics within the different rural areas of the European Union.

6. References

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