From specialization to trademarks: the evolution of industrial districts

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Abstract
The degree of competitiveness of an industrial district traditionally depends on economies of specialization. However, economies of specialization may not be sufficient to face the new forms of market competition, namely globalization and demand sophistication. A frequent business strategy to create new competitive advantages consists in investing in product differentiation strategies through R&D activities, marketing and advertisement and by developing commercial networks, etc. The search for a new source of the competitive advantage actually risks to change the nature of industrial districts if local firms increasingly rely on firm-specific assets in alternative to the external-local ones, the latter to be interpreted as local public goods. In this paper we discuss some aspects of such a shift, with particular regard to the changing internal structure of the local production systems and to the possibility for a district to preserve its own identity and size. The analysis is mainly developed from a theoretical perspective and it makes use of the imperfect competition approach; some evidences are provided with reference to the actual experience of Italian industrial districts.

Content

1. INTRODUCTION

The strength of an industrial district is its specialization[1].

Unlike scale economies, which give rise to large firms, specialization economies lead to the creation of a high number of small firms linked to each other in a close *network* of exchanges of intermediate products. When scale economies predominate, large firms, as demand growth, increase their size to gain more profits from the reduction of unit prices. By contrast, in the case of specialization economies, a growth of demand induces the entry of new firms, because firms already present externalize production phases for execution by new entrants. In fact, pre-existing firms find it more convenient to increase their focus on their own core of specialization.

A closely-knit socio-economic environment allows the efficient solution of static and dynamic coordination problems within the district. Reputation-based mutual trust reduces the risk of opportunism and the related transaction costs (Dei Ottati, 1986). The presence of specific operators, such as buyers, reduces transaction costs and favours forms of cooperation among firms; the culture of productive work enhances flexibility and work commitment and fosters the reproduction of professional skills, often within the same household; a common social origin creates consensus on the local development model, amplifies the propensity to micro-entrepreneurship, and promotes social mobility; the proximity among agents allows the circulation of information, emulation, cross-fertilization and, in short, a widespread innovative capability (Bellandi, 1989); etc. [2].

According to Folloni and Gorla (1996), a district's location advantage depends on the presence of a local public good able to increase production efficiency.This public good does not involve operating costs, only "historical" ones, no longer calculated by individual firms in the district. The latter assumes the form of a heritage from the past enjoyed by all members of the local community. The organization of activities, that is to say the nature of firms and of inter-company relations within the district, allows consideration of the district as a single production system, or a single unit of enquiry (Becattini, 1979), although it has no power in the market. As a consequence, it is possible to specify a cost function for the district or the local firms system as follows:

[1] The term "specialization" is to be understood not only with reference to the predominance of an industry or a filière of production units within a certain area - as evidenced, for instance, by *location coefficients* - but in particular with reference to the division of labour among highly specialized activities, exactly as originally meant by Smith. Systematic quantitative evidence concerning Italy at the beginning of the Eighties is discussed by Sforzi (1990).

[2] For a stylised representation of the features of industrial districts drawn from the vast literature on the subject, see Bianchi (1994), chapter 2.

$$LD = \{F\} + \beta x_D \quad \rightarrow \quad x_D = -\{F\}/\beta + LD/\beta$$

where LD denotes the amount of labour engaged in production of x_D, while $\{F\}$ is the sunk cost.

Obviously, although this correlation consistently reflect the asset endowment that means (higher) fixed costs for an isolated firm, it only partly shows the presence of specialization economies, diluting them in the more general context of locational advantages inherited from history; in fact, its linearity obscures the existence of increasing returns from specialization.

In this context, district firms can react to a generic exogenous stress (specified by Folloni and Gorla, 1996) which initially causes a decline in the relevant market and, as a consequence, in the district's size itself, by following one of two conceptually opposed paths. The first is based the re-creation of a local public good able to induce the specialization of the district to evolve into new and more numerous specializations, similar to the original one, maintaining in this way one of the distinctive features of the district[3]. The second alternative is to generate exclusive assets within district firms, shifting in this way the source of the competitive advantage from the external environment to that within the firm; clearly, this second way may lead to the

[3] There are different not mutually exclusive paths towards diversification.

The first is the development of instrumental engineering; this is a consolidated, although non-systematic, evolutionary rule of many districts: for instance in the textile district of Biella, where today about 20% of looms for the processing of wool are produced; Prato, where "... textile machinery systems are sold all over the world" (Moussanet, Paolazzi, 1992, page 102); Vigevano, where the production of machinery for shoe-manufacturing is by now the predominant connotation of a district classified as a shoe-industry area.

A second path derives from the control of technologies and *know-how*, or from the knowledge of products and of the supply and outlet markets. For instance, in the agricultural machinery district of Reggio Emilia, the generic carpentry activities developed after the second World War were followed by such specializations that today it is possible to distinguish at least four separate manufacturing segments: tractors, motors, pumps and instrumental machinery (Nardin, 1993). In turn, they were conducive to internal segments such as small gardening machinery. Another example is Prato, where the production of carded wool yarn was joined by that of worsted wool during the Sixties; then, in the following decade by that of "articles in fibres not traditional for Prato, such as cashmere and mohair, linen, cotton and silk for summer fabrics ... , imitation leather, imitation fur, fabrics for furnishing, nonwoven fabrics, and so forth" (Dei Ottati, 1995, page 155). Textile diversification was one of the main strategies pursued during the Eighties, in this case to react to the recession of the second half of the period (*ibid.*, page 163); a feature shared by the silk district of Como, where imitation silk was introduced (polyester) and unions with natural and synthetic fibres. A case deriving from the control of technologies is the keyboard instruments district of Castelfidardo in the Marche Region. The original specialisation was gradually abandoned during the Eighties to a few large operators, the majority of which were already present in the sector at worldwide level, but it generated new specializations in the field of moulds for plastics and, in particular, printed circuits (Arona, 1996).

disappearance of the district as a systemic entity[4]. Since both strategies are expensive, it can prove that, under very general conditions, the number of firms maintaining their district features decreases in the course of time, to the extent that they disappear in the long term (evidence in Folloni and Gorla, 1996).

During the transition process there are, at the district level, firms of the first and second type. By contrast, at the individual firm level, they can univocally belong to the first or second group. There is no intermediate possibility of a mixed strategy. Indeed, district firms can simultaneously pursue a strategy of exclusive assets creation, for instance to increase their market power, without having to give up the advantages deriving from operating in a favourable environment such as that of the district.

2. THE SEARCH FOR MARKET POWER

This essay therefore focuses on this latter aspect.

The starting point does not change: firms operating in the district enjoy a competitive advantage because of a local public asset which can be represented by the advantages deriving from the specialisation of intermediate suppliers present in abundance and variety in the district. The combination of a large, but finite number of specialised intermediate inputs easily found in the district, allows final firms (*ie* firms which manufacture final goods) to transform them into finished products with efficiency gains, although them do not enjoy internal scale economies.

[4] A direct way to realize this is the incorporation of a district firm within a larger firm, often a multinational one, able to provide the strategic assets required. For instance, in the bio-medical district of Mirandola in the Emilia Region, the inability of small local firms, because of their limited size, to develop adequate marketing strategies and organize distribution networks in worldwide markets, leads to their frequent acquisition by large multinational firms of the sector (Plateroti, 1992). Similarly, in the keyboard instruments district of Castelfidardo, the need for consistent capital expenditure and investments in R&D, due to the introduction of micro-electronics (Magrini, 1992), favoured the entry of large groups such as General Music, Roland, Yamaha, Casio, Bontempi, which have little to do with the traditional district organizational model. It was not by chance that Bontempi opened its R&D laboratory in the Lazio Region, close to Rome.
A second model of internalisation is paradoxically company re-organizations designed to decentralise part of their local productions out of the district, even to develop an internationalisation strategy. For instance, in the shoe-manufacturing area of Barletta in the Puglia Region, some firms have started to relocate their activities, typically in the medium-low segment, towards ex-Yugoslavia and close-by Albania. A variation on internationalisation through direct external investment is the market internationalisation of intermediate supplies (for a more detailed analysis of this subject, see Cavalieri, 1995).
Acquisitions from outside and internationalisation of production or of intermediate supplies are the most obvious forms of the shifting of the competitive advantage barycentre from the outside environment to the one inside the firm.
However, these are not the most frequent cases which, on the contrary, pivot on product innovation and marketing strategies, which will be discussed in the following section.

Final firms produce a homogeneous product; there are no gains to be derived from the differentiation of products to be sold in outside markets, and therefore they are numerous and very small. The advantages of suppliers' specialisation are only lower unit costs, not differentiated final products.
The competitive structure of the local market prevents intermediate manufacturers from realizing a surplus of profits, and competition among final firms operates in a similar way. Therefore, final firms must operate at the highest level of technical-economic efficiency, minimising production unit costs, in order to sell at a perfect competition price.

In consideration of the above mentioned exogenous stress, the search for greater market power by final firms is a possible solution to the problem of their survival. A greater market power requires a no longer infinite elasticity of demand to price, and this can be obtained through product differentiation strategies. Indeed, as long as final firms sell a product that the market is not able to appreciate in its specific attributes, such a strategy is not economically convenient, since it implies an increase in costs without the corresponding increase in the selling price. Therefore, although it could potentially be implemented, it is not. However, when market demand evolves and becomes more sophisticated, the preference for variety grows; hence the conditions for the exploitation of such a strategy are created[5].

[5] The empirical evidence abounds. In the sectors linked to fashion, the emergence of firms is linked to the creation or strengthening of their image by means of trademarks, expansion and *customisation* of the production range, organization of distribution structures.
For instance, in the case of the shoe industry district in the Marche Region, the new firm "... almost always owns its own trademark and a show-room ... Every year it prepares 6 or 7 differentiated collections on the basis of current fashions, the country of destination, ..." (Cappiello, 1992, page 26). The most successful firms in the district are those which form most on marketing, trademark and product. Among the better known cases is that of Della Valle, where " the real wealth of the company is its carnet of trademarks" (Magrini, 1922, page 120), and that of Zeis Excelsa, famous for the Dockstep trademark (*ibid.*, page 129).
A similar example is provided by the hosiery district of Castelgoffredo, located between the provinces of Brescia and Mantova: since the end of the Seventies, major firms have tended to bring back into the company part of the work contracted out and to vertically integrate the production cycle, concentrating on a trademark policy (Golden Lady, SiSi, Filodoro, SanPellegrino, Omsa, Levante) supported by massive advertising campaigns, and at product differentiation by increasing the range from 4-5 types to 20-30 types (Leoni, 1992; Moussanet, 1992).
In the Biella textile district, in the Piedmont Region, traditionally characterized by the medium-high quality of its products, already contributing to a lower exposure to price competition, the broadening of the supply range has followed the concentration of activities into vertically integrated groups of adequate strategical size, with very well known names such as Zegna, Botto, Cerruti, Piacenza, Barbera, Togna, Fila, ... (Bosio, 1992).

Clearly, its actual implementation is limited by the availability of human resources capable of applying themselves to new corporate functions. If such resources exist or anyhow can be locally developed, final firms can start to differentiate their production (through design, trademark, quality certification, safety, compliance with ecological standards, R&D, etc.). This is a substantial differentiation, since firms change their production technique and therefore make an outright technical leap: part of the work must be explicitly carried out within each final firm, in those stages that have now become strategic, to make their product recognisable and different from that of competitors.

As long as the differentiation of production and the creation of market power characterise the strategy of an innovative firm, this advantage derives to the firm, generating extra profits which its members distribute. However, the lack of barriers to innovation or to the adoption of new organizational formulas and the presence of learning through imitative behaviours, induce all the district's final firms to develop differentiation strategies.

On the other hand, differentiation has two drawbacks.
First of all, differentiating has a cost which must be off-set by benefits to the same amount. The development of corporate functions which do not increase product volume causes an increase of unit costs which must be counterbalanced at least by an equal increase in the prices applicable thanks to increased market power. Since not all firms differentiate, it is reasonable to assume that there must be a critical threshold of investment in product strategies below which they are not convenient for firms.

Vertical integration and concentration are also evident in the shoe industry district of Vigevano, where firms with trademarks known all over the world and with a strong and reliable image such as Mareschi, Cerutti, Giardini, Aldrovandi, Pollini (Bernacchi, 1992) have survived and achieve good results.
In the eye-glasses industry district of Cadore in the Veneto Region, the predominance of strong firms is associated with "competition in vertical markets with a strong differentiation or even contiguous diversification" (Pilotti, 1995, page 26) able to organize themselves with tested distribution channels and adequate R&D structures (Bernacchi, 1992).
Finally, in the furniture district of the upper Livenza - Piave area laying between the provinces of Treviso, Pordenone and Venice, the formation of groups has in several cases been associated with a strategy of product differentiation (Guerra, 1992), so that if in the Seventies "... medium-sized companies in the area did not generally produce more than two-three types of bedroom furniture (or sitting-room or kitchen furniture) and, in any case manufactured 100-200 copies of each type a time, without any customisation problem" (Anastasia, 1989, page 48), today this is no longer possible due to the variety and fragmentation of market preferences.

Secondly, as product strategies spread, the increase in the number of varieties is matched by a decrease in market power for each manufacturer, in that there is increased elasticity of substitution between the differentiated goods belonging to the same consumption category.

A certain amount of resources dedicated to product strategy therefore loses its effectiveness the more the group of competitors adopting such strategies is numerous. Therefore, the labour requirement necessary to maintain or to increase the relative distance separating each variety from the other, i.e. to make a firm's products recognisable and sufficiently distinct from those of it competitors, grows. The joint operation of these two factors entails that the range of differentiation and the number of varieties produced are finite.

The organization of activities in the district must consequently modify. Each final firm focuses on production of a single variety, still realized through the use of intermediate products supplied by district firms, inputs to which a portion of direct in-house labour is now applied by the final firms themselves. However, the role of intermediate suppliers changes: a smaller proportion of the product can be directly assigned to them, both at the level of the individual final firm and at the global level of the district: the number of suppliers and the range of varieties produced by them diminishes[6]. The characteristics of the intermediate market still make the exploitation of environmental economies possible and, as long as such exploitation is convenient, it in turn enables one of the intrinsic features of the district to survive.

By contrast, the workforce directly employed in final productions and its role in guaranteeing the survival of the whole district grows. Thus, the unitary nature of the district is weakened, the district as unit of enquiry, but it will not disappear completely as long as specialisation economies in intermediate supplies can be found and conveniently exploited on a local basis.

This interpretation of the districts' nature, based on the fading of the substantial dichotomy between specialisation economies within the district, but external to firms, and exclusive assets within firms as a source of competitive advantage, render the existence of districts compatible with the phenomena that can actually be noted, regarding hierarchization, the structuring of the intermediate supplies market and the

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[6] We have already documented the tendency towards vertical integration in various industrial districts. This tendency is to be ascribed (a) to the greater need to guarantee control on product quality, (b) to the minor practicability of the decentralised model in the case of production of small-sized highly differentiated batches.

partial vertical re-integration of some stages of the production cycle. Nor does the development of tertiarization in the district threaten their existence, if it is the final firms that increase their tertiary component and not the local system as a whole. However, the increasing openness of the districts' intermediate markets, both to the purchase of inputs from outside by final firms, as well as to the exporting of their own intermediate outputs by intermediate firms, appears to be increasingly less compatible with the preservation of the districts themselves. A further problematic phenomenon is the creation of groups, since this may generate more marked forms of vertical re-integration, which inevitably lead to the extinction of the district, and the increased size of final firms, and the consequent greater weight that their strategical functions can assume without losing the link with the local supply market.

3. THE MODEL

The situation is intuitively understood, but its formalization is more complex. We suggest here a stylised version of the main facts based on the assumption of certain functional forms and on the principle of symmetry. The use of charts, with numerical parameters selected *ad hoc*, allows representation of relations which, notwithstanding the assumptions made, are still difficult to understand in their analytical formulation.

3.1 The representative consumer utility function

The utility function is composed of ***(m + 1)*** arguments. The first ***m*** arguments represent non-district goods; the last argument represents the district goods class. The goods produced by the district are, for the time being, homogeneous goods. This assumption will be abandoned later. We make the simplifying assumption that the ***m*** classes of non-district goods and the district good can be grouped into a CES, defined as follows:

[1] $$U=\left(m\,v^{\frac{\tau-1}{\tau}}+x_D^{\frac{\tau-1}{\tau}}\right)^{\frac{\tau}{\tau-1}} \qquad (\tau>1)$$

The x_D argument is the aggregate of output of N small district firms producing final goods.

In general terms, it is possible to describe this aggregate as follows:

[1b] $$x_D=\left(\Sigma\, x_{iD}^{\frac{\tau_D-1}{\tau_D}}\right)^{\frac{\tau_D}{\tau_D-1}}$$

If the goods are homogeneous, the elasticity of substitution, measured by the τ_D parameter is infinite. Therefore the [lb] is simplified in the following way:

[1c] $x_D = \mathrm{N}\, x_{iD}$ and we return to the formulation of [l].

were the product of each of the N firms not homogeneous and perceived as one variety of goods among others ($\tau = \tau_D < \infty$), we would have:

[1d] $\mathrm{N}^{\frac{\tau}{\tau-1}} x_{iD} = x_D$ (for the symmetry in the use of varieties).

The latter formulation will be used later.

It is possible to demonstrate that the elasticity of substitution between the various classes of goods in [l] is equal to τ in absolute value[7].

Furthermore, if we assume that the individual income is ***R*** and that the price of the external goods is equal to 1 for each m-th class (usual simplifications), we obtain the demand curve of the x_D goods:

[2] $x_D = \dfrac{R}{p_D\left[1+m\,p_D^{\tau-1}\right]}$; with very large ***m***, the demand curve becomes[8]:

[2b] $$x_D = \frac{R\,m^{-1}}{p_D^{\tau}}$$

Finally, let us suppose that the size of the economic system, comprising the district, is equal to ***L***, very large. Therefore, the market demand curve for district goods, horizontal sum of individual demands, will be equal to:

[2c] $x_D^{*} = L\,x_D = \dfrac{H}{p_D^{\tau}}$ with $H = L\,R\,m^{-1}$ constant

3.2 Price and expenditure

The "smallness" of the district compared with the overall system entails that the income of the representative consumer does not change when the demand of district goods changes; we therefore assume that the actual income variation caused a change in the district goods price is nil. For simplicity's sake, we further assume that the income of the system population is equal to one unit. The district population, ***LD***, which coincides with the number of employees within it, remains resident in the district if it can earn, therein, an income at least equal to the one available outside. If this is not the case, there will be emigration. The entry of a new external population

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[7] The elasticity of demand to price is equal to: $\varepsilon_D = \tau + \dfrac{\tau-1}{\left[1+m\,p_D^{\tau-1}\right]}$. For a very large ***m***, the second term is negligible. Therefore, the elasticity of demand can be considered equal to τ.

[8] The simplifications made are similar to those proposed by Dixit-Stiglitz (1977) and by subsequent literature. They are substantially tantamount to the assumption that the cross elasticity between two classes of goods is equal to 0.

into the district is not admitted: the population must have been born[9] in a the district. Therefore, given the population of the district, the district is balanced if the expenditure on final goods of the district by the system population is not less than ***LD***. Finally, we define as *critical balance* the situation in which the expenditure on district final goods is exactly the same as ***LD***, that is the situation in which the district size is exactly the maximum possible to prevent emigration (given the outside income equal to 1) and the derivative of the expenditure in district goods compared to the population is lower than 1.

3.3 The production functions

Two types of firms are present in the district: firms producing specialised intermediate inputs (goods and services) and firms which, by assembling those intermediate inputs through labour, produce final goods.

The production function of the former is:

[3] $$l_{Aj} = \alpha_A + \beta_A A_j^P \quad \forall j$$

which represents the labour necessary to produce the output by the generic firm producing specialised inputs, A_j^P; fixed labour costs[10] exist.

These intermediate functions present specialisation economies for which district final firms are willing to pay (preference for specialisation, measured by the reciprocal of the elasticity of substitution between these functions by the firms producing final goods), the selling price of which is a *mark-up* on the marginal cost:

[4] $$p_A = w\frac{\theta}{\theta-1}\beta_A$$

with ***w*** per capita income of the district population (the outside per capita income was, by definition, set equal to 1). Parameter θ (>1) is the inverse of a measure of specialisation efficiency in the specialised functions typical of the district. These can be exploited only "*in loco*". Furthermore, this parameter measures the elasticity of substitution among the various specialised functions and allows definition of the *mark-up* applicable on the marginal cost.

The condition of nil profits (freedom of entry in the production of specialised functions) allows identification of the quantity of every service produced in a situation of balance, A_j^P, and the quantity of labour allocated to each intermediate input, l_A:

[9] The large number of manufacturing firms associated, as we shall see, with constant returns to scale, in any case guarantees perfect competition.

[10] This guarantees that, despite the presence of a preference for specialisation, the ***k*** number of specialised functions produced is finite. Furthermore, the configuration is that of an imperfect competition market, given the large number of inputs produced, and the even greater number of those which can be potentially produced, and freedom of entry.

[5] $$A_j^P = \frac{(\theta-1)\alpha_A}{\beta_A}$$

[6] $$l_A = \theta\alpha_A$$

Secondly, the production function of a district firm producing final goods is:

[7] $$x_i = q_i^b A_i^{1-b}$$

$\boldsymbol{A_i}$ is an aggregate of the ***j*** different specialised functions (goods and services) produced by intermediate district firms. This is shown as follows:

$$A_i = \left(\sum_{j=1}^{k} a_{ij}^{\frac{\theta-1}{\theta}}\right)^{\frac{\theta}{\theta-1}}$$

$\boldsymbol{a_{ij}}$ = use of the j-th type of intermediate specialised function by the i-th manufacturing firm; every i-th firm producing a final good employs all the different specialised varieties of intermediate functions. Given the symmetry of the production functions of the latter, each specialised function is employed by every firm producing the final good in the same quantity:

[8] $$A_i = k^{\frac{\theta}{\theta-1}} a_{ij} \ \forall i,j \rightarrow A = k^{\frac{\theta}{\theta-1}} a$$

$\boldsymbol{q_i}$ = input of marketing and organizational functions. This represents a transformation of the work directly applied to these functions:

[9] $$q = \frac{l_q}{\beta_q} \quad \forall i$$

Given the existence of N firms producing final goods, we will have: $A_j^P = \sum_{i=1}^{N} a_{ij}$, total output of the j-th district intermediate function.

The various industrial firms producing homogeneous district goods are all equal whit each other and in competition; it is therefore possible to consider their aggregate as a single large firm, setting the condition that profits are nil. This allows us to eliminate the subscripts:

[7b] $$x = q^b A^{1-b} \quad \text{for each firm.}$$

4. THE EVOLUTION OF THE DISTRICT

4.1 First stage - firms' choices in a district producing homogeneous goods

Equation [7] places different production technologies at the disposal of district firms producing final goods. Which technology will be actually chosen (since the only input, apart from the transformations highlighted by [3] and [9], is labour) will depend on how it is possible to maximise, given a certain input of labour, the firm's output.

We start by assuming that there is a first stage in which the output of district firms, since it is perceived as homogeneous by end consumers, is considered as such also by producing firms. There are no specific "trademarks", only the generic one related to the fact that these are products of a certain industrial district.

Therefore, the district can be represented, in its section of firms producing final goods, as an aggregate of small firms competing with each other. However, it could be considered as a single large firm acting under conditions of perfect competition (zero profit) in the production of the only final good of the district. Below, in fact, we present the aggregate balance.

From the optimal combination of the production function factors, we have:

$$q\,p_q = \frac{b}{1-b}\,p(A)A$$

where *p(A)* is the price of aggregate *A* of specialised intermediate functions.

p(A)A is the expenditure on specialised artisan functions, equal to wLD^A under monopolistic competition (LD^A is the population employed in the production of intermediate inputs).

$p_q q$ is the expenditure in tertiary corporate functions equal to, in competition, wl_q. From [9], it follows:

$$p_q = w\beta_q.$$

The population of the district is:

$$LD = l_q + LD^A = \frac{b}{1-b}LD^A + LD^A = \frac{1}{1-b}LD^A$$

Therefore: $LD^A = (1-b)LD$; $l_q = b\,LD$

Furthermore, since:

[10] $$A = \frac{(\theta-1)}{\alpha_A^{\frac{1}{\theta-1}}\theta^{\frac{\theta}{\theta-1}}\beta_A}\,LD^{A^{\frac{\theta}{\theta-1}}} = Z\,LD^{A^{\frac{\theta}{\theta-1}}}$$

[11] $$p(A) = w\,LD^{A^{\frac{-1}{\theta-1}}}\,Z^{-1} = w\,Z^{-1}(1-b)^{\frac{-1}{\theta-1}}\,LD^{\frac{-1}{\theta-1}}$$

Substituting in the production function, we obtain:

[12] $$x = \left[\left(\frac{b}{\beta_q}\right)^b\left(\frac{(\theta-1)(1-b)^{\frac{\theta}{\theta-1}}}{\alpha_A^{\frac{1}{\theta-1}}\theta^{\frac{\theta}{\theta-1}}\beta_A}\right)^{(1-b)}\right]LD^{\frac{\theta-b}{\theta-1}} = \left(\frac{b^b(1-b)^{\frac{\theta(1-b)}{\theta-1}}}{\beta_q^b}\right)Z^{1-b}\,LD^{\frac{\theta-b}{\theta-1}}$$

$$= G\,Z^{1-b}\,LD^{\frac{\theta-b}{\theta-1}}$$

Given competition, the production cost is:

$$C(x) = w\,LD = p_D\,x$$

and, given [12]:

[13] $$p_D = w\,G^{-1}Z^{b-1}\,LD^{\frac{b-1}{\theta-1}}$$

Given [2c], the size of the district can be solved in relation to the ***w*** per capita income:

[14] $$LD = H^{\frac{\theta-1}{\theta-\tau+b(\tau-1)}}\,G^{\frac{(\theta-1)(\tau-1)}{\theta-\tau+b(\tau-1)}}\,Z^{\frac{(1-b)(\theta-1)(\tau-1)}{\theta-\tau+b(\tau-1)}}\,w^{\frac{-\tau(\theta-1)}{\theta-\tau+b(\tau-1)}}$$

For simplicity's sake, since the size of the system - therefore of H - can be established at will and depends on the unit of measurement assumed, let us make the following assumption: $H = Z^{1-\theta}$. In this case[11] :

[14b] $$LD = Z^{1-\theta}\,G^{\frac{(\theta-1)(\tau-1)}{\theta-\tau+b(\tau-1)}}\,w^{\frac{-\tau(\theta-1)}{\theta-\tau+b(\tau-1)}}$$

The trend of the ***LD*** critical size with a change in ***b*** is shown in figure 1. The ***LD*** function is therefore decreasing in ***b*** in the first segment; also the subsequent change to a positive slope does not guarantee that the district firms will achieve a better performance compared with that made possible by technology in which $b = 0$.

From the viewpoint of the district as a whole, therefore, it is more convenient to adopt such technology. The argument can be repeated for a single district firm. Let us assume that, initially, there are ***N*** equal small firms in the district employing technology $\boldsymbol{b} = 0$. The size of each firm, ***d***, is very small compared to the district size, the number of firms, $\boldsymbol{N} = \boldsymbol{LD/d}$, is very large. For simplicity's sake, let us suppose $w = 1$ (the district is in critical size, beyond which emigration is triggered). Calling this critical size $\overline{LD}$, where $w = 1$ and $b = 0$, we have:

[12b] $$x = Z^{1-\theta}$$

[13b] $$p_D = 1 \quad (\boldsymbol{w} = 1)$$

[14c] $$\overline{LD} = Z^{1-\theta}$$

Will it be economically convenient for a firm to change and use a technology of which $\boldsymbol{b} > 0$? Let us call this firm, the j-th, defecting firm[12] . For the balance of production we should have:

$$\frac{b\,A_j}{(1-b)q_j} = \frac{\beta_q}{p(A)};\ \text{and:}\ l_{q_j} = bd\ ;\ k\,l_{A_j} = (1-b)d.$$

[11] This assumption, which cancels the exogenous nature of the system external size, has no effect on the results we want to present here. Simply, it will no longer be possible to ask the question of how balances change with the change in the external size. To answer such questions, it will be necessary to return to the previous and more complex form of relations.

[12] By assumption, the size of the firm in terms of work remains fixed to ***d***, also if it changes to techniques in which b>0. In this case, ***d*** will represent not only the work "purchased" by intermediate firms, but also the direct work used for commercial and organisational purposes.

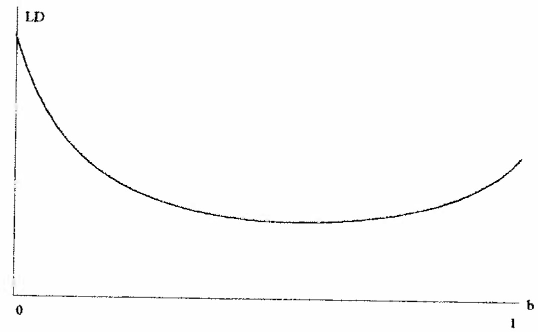

Figure 1 - Critical size of the district when b changes

Substituting in the production function, we obtain:

$$x_j = \frac{b^b(1-b)^{\frac{(1-b)\theta}{\theta-1}}}{\beta_q^b} d \qquad [15]$$

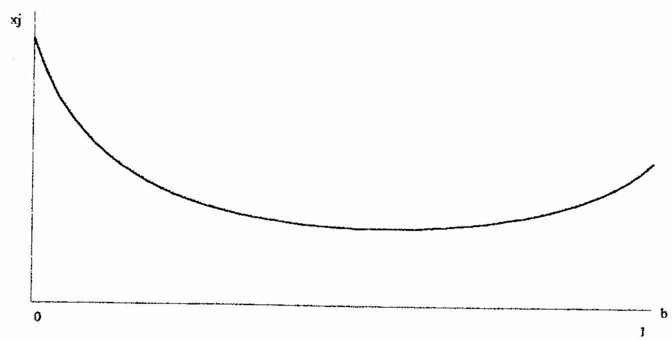

Figure 2 - Trend of the output the defecting firm

The trend of [15] is shown in figure 2. Since the price applied by the defecting firm can only be equal to 1, [15] coincides with its income. As can be seen, also at the firm's level, we have a lock-in at the initial technology level.

4.2 Second stage - the emerging of trademarks

Starting therefore from the situation described, where there are *N* firms of small ***d*** size in terms of labour, producing in aggregate the typical $\overline{LD} = \overline{X}$ and applying a price

equal to 1 using a technology in which $b = 0$, we now make the assumption that the defecting firm can, by changing technology, differentiate its product; the latter is no longer perceived as homogeneous with the rest of production in the district. Will it be economically convenient for the firm to do this?

We assume that the elasticity of substitution between the new variety and previous output of the district is τ_j and depends on the investment made in functions connected with the trademark (advertising, marketing, commercialisation), according to the relation : $\tau_j = \tau/b$; the increase in demand due to variety can be completely exploited by the defecting firm. Therefore, the latter will, at first, appropriate the market expansion made possible by the entry of the new variety; there is no possibility, due to the small size of the defecting firm, of repercussions on total demand for district goods due to the entry of the new variety.

Due to the elasticity, we have:

$$\frac{x_j}{X_D - x_j} = \left(\frac{p_D}{p_j}\right)^{\tau}, \qquad [16]$$

where x_j is output by the defecting firm and is defined by [15]. [16] allows us to define the applicable price. Knowing this, it is possible to obtain the income obtainable from the labour employed by the defecting firm; the per capita income to be distributed to the workforce will be:

$$w_j = \frac{p_j x_j}{d} = \frac{(X_D - x_j)^{\frac{1}{\tau_j}} x_j^{\frac{\tau_j - 1}{\tau_j}}}{d}, \qquad [17]$$

with the trend shown in figure 3.

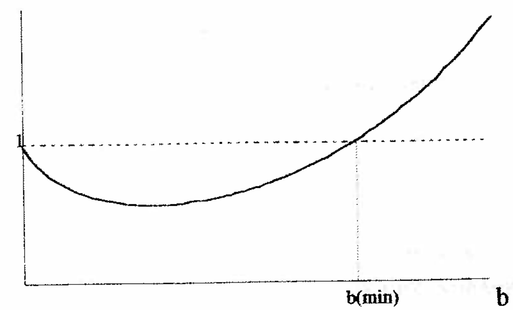

Figure 3 - Income of the employees of the firm which defects by differentiating (τ=2)

To enjoy the benefits deriving from differentiation (obtaining a $w > 1$), the defecting firm must achieve a technological "break-through", to a position where the functions dedicated to differentiation are important ($b > b_{(min)}$). Clearly, the possibility of profits as a consequence of the reduction of the elasticity of substitution will continue until $\tau_j = \tau$; that is, when the new variety is fully recognized as such by consumers. It will therefore be convenient for the firm to continue to define its own market niche up to that level.

The whole district may then react to the initiative of defecting firms (which progressively reduce the district's specialisation) by similarly differentiating products through the adoption of a trademark strategy.
As a consequence, the district product is no longer perceived as homogeneous by consumers, and becomes an "aggregate" of N trademarks.
The utility function, for the equation [1d], becomes:

[1b] $$U = \left[m v^{\frac{\tau-1}{\tau}} + N X_{D}^{\frac{\tau-1}{\tau}} \right]^{\frac{\tau}{\tau-1}} \qquad (\tau>1)$$

The demand function, given the simplifications already introduced, becomes:

[2c] $$x_D^* = \frac{H}{p_D^{\tau}}, \quad \text{for each variety}$$

Equation [18] represents the production function of each individual district firm producing diversified final goods:

[18] $$x = q^{b} \left(\frac{A}{N} \right)^{1-b}$$

with A as the aggregate of all the specialised intermediate functions employed by the district firms as a whole.
Optimality implies, as usual:

$$q = \frac{l_q}{\beta_q} \quad \text{and, in the aggregate:} \quad Q = Nq = \frac{b\,LD}{\beta_q}$$

By replacing the definitions of the aggregate production function, $X = Q^{b} A^{1-b}$, we again obtain equation [12]:

$$X = G Z^{1-b} L D^{\frac{\theta-b}{\theta-1}}$$

By replacing the price defined as a *mark-up* on the marginal cost in the demand curve [2c], we obtain the solution for ***LD***:

[19] $$LD = H^{\frac{\theta-1}{\theta-\tau+b(\tau-1)}} G^{\frac{(\theta-1)(\tau-1)}{\theta-\tau+b(\tau-1)}} Z^{\frac{(1-b)(\theta-1)(\tau-1)}{\theta-\tau+b(\tau-1)}} w^{\frac{-\tau(\theta-1)}{\theta-\tau+b(\tau-1)}} N^{\frac{(\theta-1)}{\theta-\tau+b(\tau-1)}}$$

$$= Z^{1-\theta} G^{\frac{(\theta-1)(\tau-1)}{\theta-\tau+b(\tau-1)}} w^{\frac{-\tau(\theta-1)}{\theta-\tau+b(\tau-1)}} N^{\frac{(\theta-1)}{\theta-\tau+b(\tau-1)}}$$

From [14c] we deduce the starting size which the district does not want to abandon. Comparing this level - $\overline{LD}$ - with [19], we identify the N number of trademarks or

leading firms necessary to mantain the balance of the district with the change in ***b***, on the assumption that ***w*** is equal to 1 (critical size). First, we assume that it is not expensive for the district "to replicate trademarks". In this case, the number of trademarks necessary to keep the district at its critical size is defined by [20] and is shown in figure 4, continuous line:

[20] $N = G^{(1-\tau)}$

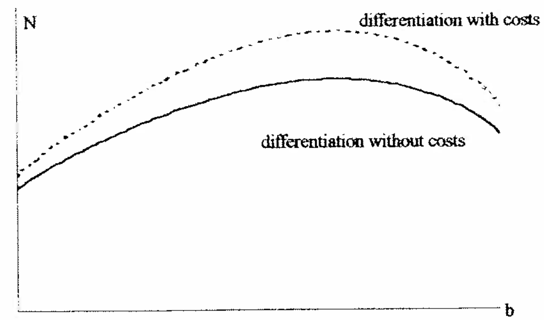

Figure 4 - Number of specializations necessary to keep the initial size at the changing of b

More realistically, we may make the assumption that increasing the number of trademarks is expensive. In this case (which will be modelled later, see equations [21] and [22]), the number of varieties necessary for the balance increases - as the dotted line in figure 4 shows - but the "shape" of the function does not change.

At this point, we can envisage the different paths that the district can take. The first and the most obvious one is that the district will continue to diversify its product beyond the number of trademarks necessary for balance (shift in the region above the curve described in figure 4) guaranteeing in this way greater per capita income for its population.

If differentiation has only the cost of a shift to technologies with greater expenditure on tertiary functions, it will be more convenient for district final firms to continue with differentiation. This is what is described in figure 5. The figure shows (dotted line) the necessary number of trademarks to guarantee the balance, compared with the possible number of trademarks which, according to the assumption made, is increasing in ***b***: if there is no limitation on the "subdivision of trademarks": the net profit, beyond a critical ***b*** (b_C), will always be positive and increasing.

However, if further differentiation becomes expensive, one can define the optimal diversification, which maximises the per capita income obtainable by the district population.

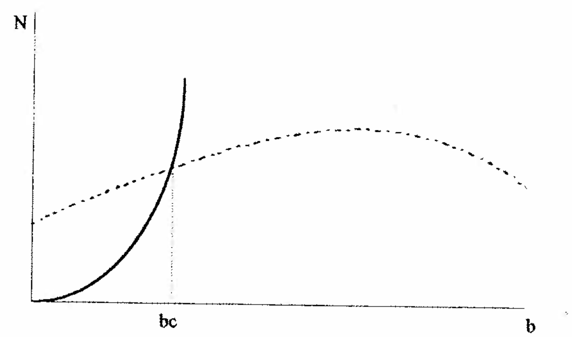

Figure 5 - Necessary number and possible number of varieties at the changing of b

The differentiation cost is modelled as follows:

i) on the one hand we assume that, to increase the degree of differentiation (*N*), the expenditure allocated to marketing, advertising and differentiation must increase. In other words : ***N = N(b)***; this ratio, which replaces the one that made elasticity depend on the technology chosen, is not in itself necessary to establish the optimal diversification; it serves, as before, to connect the technological choice of firms to diversification. In this way, there is only one problem of optimal choice for the firm.

ii) On the other hand, we assume that, with an increasing in differentiation the β_q parameter increases, due to the fact that the ***q*** input must be better trained - therefore the quantity of labour contained per input unit increases[13].

We have:

[21] $N = e^{hb}$

[22] $\beta_q(N) = \beta_q e^{\mu N}$

[13] On this assumption, each new differentiating firm brings benefits and costs to the district at the same time: benefits are linked to the increase of demand for district goods, from which everyone benefits; costs are linked to increase in the marginal cost for the ***q*** input and to change in technologies necessary to tackle growing trademark competition.

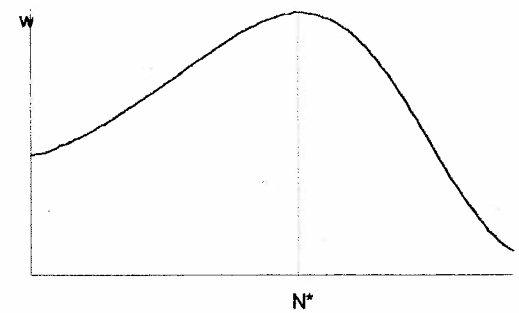

Figure 6 -Optimal level of district diversification

If the aim of the district is to keep its critical size, [19] becomes:

[23] $w = N^{\frac{1}{\tau}} G^{\frac{(\tau-1)}{\tau}} e^{\frac{-\mu N(\tau-1)}{\tau}} = e^{\frac{hb}{\tau}} G^{\frac{(\tau-1)}{\tau}} e^{\frac{-\mu e^{hb}(\tau-1)}{\tau}}$

the trend of which is shown in figure 6. The maximum point of [23], N* in figure 6, defines the optimal diversification from the district perspective.

5. CONCLUSIONS

In this paper, the traditional advantages of districts are identified in specialisation economies allowing local firms to produce with greater relative efficiency. Any problems of coordination, also of dynamic type, are adequately solved within the district by the flexibility made possible by the vertical disintegration of production processes and by the specialisation of stages. Whenever final demand increases, the increasing efficiencies of specialisation enable the district to develop through the establishment of new small firms and the further specialisation of each of the businesses present.

However, when final demand evolves into qualitatively more sophisticated forms - that is, when there emerges a preference for variety and differentiation in consumption - opportunities for the district's development change. In fact, it becomes economically convenient for firms to develop product strategies, symbolised in this paper by the terms "trademark" and "differentiation". This is not only a matter of cosmetics: differentiation here has a substantial meaning in that it implies a change in the technology of production through the introduction of new functions into the production process.

We have also shown that this change can imply discontinuity for firms. In fact, although it is convenient to differentiate, the existence of a technological break-through excludes any marginal adjustments and initially requires a strategic decision by firms which will significantly alter the structure of their production process. Obviously, this raises a problem, especially in the case of small firms, to the extent that they are not able to achieve such a break-through because they lack the necessary means.

We have also shown the existence of an optimal level of differentiation from the point of view of the district as a whole where the district can benefit from the development of such strategies without losing one of its features. However, we have not explored the likely existence of market equilibria different from the *first best* solution.

The existence of the optimal solution for the district, i.e. of a differentiation level lower than the maximum one that can be found in the market, therefore, comes to depend on the increasing cost/opportunity ratio of such a strategy. However, we cannot exclude that phenomena of *learning by doing* and of *reputation* may act in the course of time in the opposite sense, making the cost of differentiation decrease. If the latter exceeded the cost, then the curve in figure 8 would no longer present a top point, but would grow until each firm has taken its degree of differentiation to the extreme, that is, when each firm in the district adopts production technologies similar to those of non-district firms (b=1). The district would then lose what we know to be its reason to exist.

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Transformationsbedingte Anforderungen an die regionale Wirtschaftspolitik in Ostdeutschland

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Kurzfassung
Der Prozeß der ökonomischen Transformation der ostdeutschen Wirtschaft ist mit einer Reihe von Problemen und Fehlentwicklungen behaftet. Wie weitere Bereiche der Wirtschaftspolitik muß auch die regionale Wirtschaftspolitik einen Beitrag zur Überwindung dieser Situation leisten. Die hohe Abhängigkeit von öffentlichen Transferzahlungen aus Westdeutschland und der Europäischen Union kann nur durch ein rasches ökonomisches Wachstum und die Erzielung eines selbstragenden Wirtschaftsaufschwungs in Ostdeutschland überwunden werden. Im Spannungsfeld der Ziele der regionalen Wirtschaftspolitik kommt dem Wachstumsziel eine übergreifende Bedeutung zu. Die Wettbewerbsfähigkeit der ostdeutschen Regionen im internationalen Standortwettbewerb muß zielstrebig verbessert werden. Voraussetzung dafür ist die Erarbeitung von realitätsnahen Entwicklungskonzepten unter Berücksichtigung der ökonomisch günstig gelegenen Wachstumspole. Auf dieser Basis müssen der weitere Ausbau der Infrastruktur, die Bestandspflege und die Neugründung von kleinen und mittleren Unternehmen, die Technologieförderung und die Unterstützung aller Bemühungen zur Erschließung überregionaler Absatzmärkte besonders unterstützt werden.

Gliederung