

The Industrial District (ID) as a cognitive system¹

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1. Introduction: facts and theories

Localised development is a fact, but is not yet a theory. The empirical evidence of the fact is not sufficient for detecting the causal chain that triggers the growth of a territorial system and determines its pace and direction.

Economic growth has a territorial texture. The idea that development is localised, and organised in territorial *clusters*, is now widely accepted. Empirical observation suggests that territorial *clustering* is not a phenomenon limited to just a few sectors and places, but one of the most widespread manifestations of economic growth (Enright 2000).

Localised development is not restricted to some well known cases - for instance, the Italian industrial districts, the clusters of *flexible specialisation* in Spain and Germany, as discussed by Becattini (2000), Brusco (1989), and Piore and Sabel (1984). The growth of regional clusters is not restricted to mature sectors of the economy, but also occurred in high-tech sectors, for example in information technology and telecommunications like Silicon Valley and Route 128 (Zagnoli 1991, Saxenian 1994). Even multinational companies now carefully select the local implantation of their activities (Vaccà 1995).

On the contrary, we have many different (and questionable) theories or ideas about how to *re-produce* or *re-direct* local development, since the casual mechanism is almost vague and seems deeply rooted in some singular features of each case history. Despite the success of territorial clustering in practice and the popularity of districts, clusters, local production systems, we are still far from achieving a satisfactory theoretical systemisation (cf. Amin 1993, 1988). The situation is embarrassing and, to some extent, dangerous. The danger is that it will encourage *unsuitable* or *dubious* intervention policies, which may prove to be a *waste* of public money, or cause more damage than benefits.

There are many reasons for this uncomfortable epistemic and pragmatic situation.

First of all, localised development is difficult to rationalise because it is the fruit of *on-going learning* processes which remain largely implicit and dispersed among the many elementary units of territorial clustering, without any *master mind* monitoring or directing the process as a whole (Bonomi, 1997). It is often with surprise that researchers “discover” the forms of localised development *after* they have come about.

Secondly, localised development depends on mechanisms with a high level of *complexity*². Complexity is far greater than is generally taken into account by conventional economic theories. For example, it is difficult for economic theory to deal with non *linear*

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² Complexity is a condition produced by great variety (in space), variability (in time) and indeterminacy.

processes, or to take into account non-linear circuits (like feedback or increasing returns mechanisms). In global economy, some local systems may have a fast unexpected growth, while others may rapidly lose their past distinctive advantages, owing to a small change in competitive conditions. The triggering processes of this evolutionary turnaround are not well defined and their premises are under discussion (Becattini 2000, Amin 1998, Storper 1995 and 1997, Rullani 1998).

Another problem is that the natural “borders” of IDs do not correspond to administrative borders. They are often clustered around small towns, or agglomerations of towns which practically run into one another. This creates discrepancies between IDs and the local public administration whose business it is to promote local development (Sforzi 1993). We find similar discrepancies between *national* and *local* policies. Because development has its own territorial logic, and because the competitive factors at work are related to local systems and societies, that very rarely meets the aims of national policies.

Further, the categories that economics has adopted— basically the concepts of *local clustering* and *external economies* – are not always adequate to explain the complexity of the phenomenon.

2. A multiplying force: the role of knowledge

Our thesis is that local development is necessarily linked to a *multiplying cognitive process*, that increases the size and quality of *intellectual and social capital* that is embedded in a particular place. Local development is due to the locally shared knowledge, which cuts the cost of each agent knowledge production and favours its application. The available shared knowledge can be obtained through co-operative attitudes among local actors, or, more often, through involuntary leakages of information and know how, that local actors are not able to hinder. What is really important, in both cases, is that knowledge can be re-used and multiplied in the local circuit.

But the district multiplier is a *necessary* condition, not a *sufficient* one. Many other premises (generally non-cognitive premises) are required for making the cognitive engine work. But nothing can replace the cognitive engine, because of the *multiplying effect due to a special property of knowledge: the possibility of costless re-production and re-creation of ideas, models, formulas, laws etc.*

The knowledge engine produces the amplifying effect: development is not the final result of a gradual cumulative growth, but is the outcome of a non linear, discontinuous, evolutionary path.

For example, the initial know-how needed for development was rarely available locally to IDs, even if traditional connected activities were spread almost everywhere. In the great majority of the cases, the innovation that was required to break the traditional equilibrium came from outside. And, afterwards, it was amplified by circuits of learning and accumulation, which also lead to a specific local specialisation.

So, we had a combination between a *contingent* event, that could happen or not (a seed), and a *required* mechanism of amplification and diffusion (a fertile land, acting as a multiplier). IDs development can be explained by a *sufficient* chain of events, not by a *necessary and sufficient* law of causation. In other words, it is a historical path, not a casual effect.

This aspect is crucial also today if we want to examine the possibility of replicating or extending the district model to other places.

3. Production of goods by means of localised resources

Territory is the place both of the *accidental context* (the singular event and the specific circumstances) and of the *necessary* cognitive engine (the multiplying effect).

There is now a tendency to interpret the territory in this second sense, as an economic resource with its own singular “identity” and “productivity”. After the 1970s, economists began to speak of (national) *capitalisms*, each different in terms of institutions, regulations, culture and productive structure. Instead of an undifferentiated space, economists began to look at the different regions and nations, each characterised by specific labour, services, visible and invisible infrastructures, and unique culture and institutions. Localised production – whether on a large scale (national forms of capitalism) or at the grass roots (local systems) – is distinguished from abstract production.

In this view, the territory is a *non-replicable* resource (the goods or services that a territory produces are limited). Besides, the territory is a *unique* resource, which stamps its specific characteristics on the resulting productive process and products, which in turn are marked by the character of the “place” where they are made. The territory can be seen as a depository of culture and habits and accumulates forms of tacit knowledge, and channels of communication. These institutions remain largely *invisible* to the outside observers and even to the local actors themselves, because they are embedded in the anthropological-social system grown up in each place (Brusco 1989, Becattini 1997).

But uniqueness is not an explication. It is, at most, a description.

The idea of clustering, which summarises the advantages of a specific spatial concentration of activities and the positive effects of external economies, tries to overcome this difficulty, because it refers to a general multiplying mechanism: the increasing returns of territorial concentration processes, through physical proximity. But it is an illusory way to escape difficulties. In an abstract world, advantages and disadvantages of concentration are symmetric forces: their convergence can supply only a new version of the equilibrium theory, not a discontinuous evolutionary path. In order to justify evolutionary surprises and multiplying effects, we need a combination of contingency and necessity, of uniqueness and reproducibility. Only cognitive processes contain both these two dimensions and can transform the one into the other, connecting their evolution along time.

The classical models of localisation (Christaller, Losch) have generated a rather geometrical structure of economic space, which does not fit at all with the increasing observed tendencies to the territorialisation of production activities. What needs to be explained is why a place has an economic, cultural and social *quality* different from that which can be observed in other places. And again, why there is not an easy way of imitating or reproducing the capabilities embedded in firms belonging to a specific ID.

To sum up, IDs and clusters are *signs* of the economic value generated by the territorial singularity of a multiplying mechanism which is fed by unique, localised, knowledge. This is what gives differential value to a specific territory, not the mere presence of some “external economies” resulting from concentration.

4. IDs and clusters in a networked economy

Only during the last 20-30 years, were the productive properties of local texture understood and acknowledged. The role of small firms and IDs in economic policy has changed radically compared with the long period of dominant Fordism.

Until a few years ago, we were used to seeing economies of scale and large enterprises as the precondition for acting on the global economy. Small firms were restricted to limited, often local, geographical environments.

Research into foreign direct investment, as a determining variable of the new global economy, tended to confirm this dualism: small firms were mainly exporting, while large enterprises were investing abroad. And this difference was becoming increasingly important in the process of globalisation. At the beginning the “discovery” of IDs further emphasised this division of roles: small firms were increasingly associated with the local sphere, large companies with the global market.

However, this is not the way things really are. The error of judgement, regarding the degree of internationalisation of IDs, was based on a distorted viewpoint, which looks at *individual enterprises* rather than at the *connected system* (the complete value chain) to which they belong. Large companies contain the whole value chain within themselves. Only in a world of vertically integrated firms, their exports (or direct investment abroad) may well give an accurate idea of their degree of internationalisation. For small firms, what really matters, in terms of competition, is the degree of internationalisation of the value chain as a whole (Grandinetti and Rullani 1996).

In addition to that, today the process internationalisation is more favourable to the small firm. This is because the growth of networks, and the ICT paradigm, are lowering the entry barriers for small firms and, at the same time, are enforcing their capacity to operate at long distance. Small firms cease to belong just to a specific local setting, becoming part of a global network that connects the local sphere with the global economy. While globalisation becomes a pervasive phenomenon, small firms, through their access to global networks, enter into the whole economic circuit, assuming its standards and its rules of efficiency.

The network, which connects the local to the global, becomes the true environment in which small firms develop, grow and proliferate in each district or territory. By interacting with the networks which connect them with other local systems or directly with the global economy, IDs do not lose their identity, but they must adapt to these new circumstances. In some cases, competing IDs can offer products or processes at lower costs; in others, they enjoy a strategic competitive advantage. With regard to the global economy, different IDs activate a *reciprocal specialisation*.

Networked economy is not ruled only by territorial heritage but is also a normative and political construction. In a network, standards, rules and entry conditions are shared due to a trust attitude or to some form of visible/invisible hand.

In fact, IDs are cognitive, but also regulatory machines such as trust and confidence are created in order to enforce the efficiency of the system. This contributes to enlarge the division of labour and, in this way, a reliable regime for *sharing* knowledge among the various actors of the system is built-in. The resulting effect is that each agent belonging to the local system

earns improving returns on his investment in knowledge. Seen in this way, IDs are systems where agents take advantage of their physical proximity using their personal and direct interactions to organise an efficient division of labour in the production and use of knowledge.

5. Competing learning systems

IDs are therefore *learning systems* which, in the global market place, compete with *other modes of learning*. Indeed, they are not the *only way* of use knowledge to produce economic value and competitive advantages because there are other forms of learning whereby it is possible to differently organise the circuit of exploration, specialisation, sharing, accumulation, and division of knowledge.

For example, hierarchy competes with localised systems, through very different ways of seeding and multiplying knowledge. All the cognitive cycle of hierarchy is performed under the *power-of-command* of large multinationals, which manage their knowledge needs in the global economy without a significant recourse to personal interaction and to the advantages of physical proximity.

Another competing solution is placed at the other extreme of this ladder, relying on the “invisible hand” of the *market*, which links anonymous producers and anonymous users of knowledge and productive know-how, using contracts and prices as tools for managing the cognitive/productive circuit of exchange.

Between these “classic” rival systems (market, hierarchy, local system) now we have to consider another modality: the *virtual network*, i.e. a cognitive/productive circuit relying on virtual interactions organised throughout ICT technologies, which connect different enterprises located in various parts of the global economy.

IDs and local systems are fully part of the global economy, but they have no exclusive claim on it. Their space may be large or small, they may grow or shrink, depending on the outcome of the competitive confrontation with the other ways of organising resources, within the cognitive/productive circuit of the global economy: multinational enterprises (hierarchies), markets, and virtual networks.

Hence, IDs cannot be analysed per se, but their role stems from the global competitive arena, in which IDs face the alternative forms of cognitive/regulatory circuits of organisation.

Markets, hierarchies and virtual networks are partially competitive and partially complementary to IDs, because IDs can use these forms of organization to acquire knowledge, expertise and goods at low prices. For example, a decisive factor for IDs’ competitiveness is the degree of *global openness and hybridisation* that each ID can achieve. The recourse to external suppliers (or markets) whenever they can offer semi-finished products, know-how or services at advantageous prices must be welcomed. And also the penetration of multinational hierarchies within IDs (or, conversely, the external investment of leading local firms moving abroad) whenever this represents the most effective way to have access to distant markets or to acquire outside technology. The same is true for the use of virtual networks (e-commerce, metropolitan services, etc.). IDs need to utilise virtual services or distant connections, whenever this is proved advantageous.

Let us discuss in depth the four competing forms of network interaction, also as competing alternatives in the strategic function of knowledge creation, absorption and diffusion.

Local learning systems

Local systems make their own special contribution to the production and exploitation of economically useful knowledge, because:

- 1) they create an environment favourable to the experimentation of new ideas;
- 2) they facilitate the rapid, “sponsored” propagation of the most successful solutions, acting as “natural systems” of evolutionary learning;
- 3) they permit the regulated sharing of knowledge because IDs are an environment of shared values, predictable behaviours, unspoken rules and socially controlled procedures;
- 4) thanks to the local regulation, knowledge can be easily shared and exchanged, fuelling a process of specialisation which reduces the costs and risks of investment in knowledge and increases the returns on such investment. Consequently, a continuous flow of micro-investments leads very quickly to a cumulative growth of knowledge.

When considering local networks, it is important to understand how they succeed (or fail) in defending the three fronts on which they face, respectively, markets, hierarchies and virtual networks, regarded as competing alternatives in the division of cognitive labour.

Market learning systems

In the *market*, the production and exchange of knowledge is mediated by transactions: the buyers and sellers remain often unknown to one another, and the only bond between them is the price. In these circumstances, localisation is important only because it implies a certain amount of *costs* (transportation, communication, etc.) for moving goods, persons and information from one place to another. The market links producers and consumers localised in unspecified space: the only thing that matters is that the location must be “efficient” (i.e. not involving excessive costs).

Of course, this happens only if markets are perfect. But in practice, markets are highly imperfect, and buyers and sellers are not anonymous, but *localised*. The space that buyers and sellers share, if they come from the same district, may in fact reduce the imperfections and improve the efficiency of the transactions between them. Market and space, to some extent, co-exist. However, their co-existence is precarious and often only temporary. When the main *medium* of exchange is the market, the territorial space has no precise identity.

Why may the “use” of a specific space show a superior efficiency? This occurs when a territory is able to provide advantageous service, in terms of information, use of knowledge, reduction of uncertainty, transparency of rules and behaviours, etc. In this last case a specific economy is coupled with the corresponding territory (Maturana and Varela, 1985), and a permanent cross-fertilisation is built. However, there are indeed many cases in which the growth of market-mediated relationships gradually destroys the pre-existing territorial local culture, making the places linked by anonymous market transactions.

Hierarchical learning systems

In a hierarchy, the production and exchange of knowledge are organised by the “visible hand” of the proprietary power of the (often large) corporation.

For a “perfect” hierarchy, the territory simply represents a cost (measured by the distance). Typically, the hierarchy superimposes its own logic on the territory where it is settled. The territory is “utilised” if it offers some useful services, but the aim of the company is to reduce its dependence on it.

This gives rise to two possibilities:

- a type of localisation in which the large enterprise “colonises” the territory (let us think of the Fordist company town);

- a multi-localised enterprise, where the possibility of transferring activities from one territory to another is related to the costs and benefits offered by the different locations.

Usually, the hierarchical *medium* and the territorial *medium* are in competition: the former tries to mould the latter to suit its own needs, during time sometimes destroying its territory’s internal logic.

Virtual learning systems

There is then a fourth possibility of dealing with knowledge and information exchange: the use of virtual networks. In the past, most networks were territorially based. They were localised because communicative interactions were favoured by, and sometimes almost demanded, physical proximity. Nowadays this condition is no longer strictly necessary because there are many technologies that can be developed through the access to ICT (Information and Communication Technologies). This makes possible long distant interactions, or/and real time interactions, or/and virtual interactions (Vicari, 2001).

The virtual network stimulates all sorts of interactions between a vast number of places, spread over a potentially planet-wide area. It does not suppress the specificity of the individual place, but integrates it globally within a system of competition and division of labour which is clearly based on a wider-scale.

The virtual network allows the production and exchange of knowledge between enterprises and individuals using communicative interactions and it is more open and balanced than the hierarchical system, which is built around one dominant source of power and interest.

Communicative interaction can therefore take place effectively at different levels: *locally* (within a district or a town), and they are based prevalently on face-to-face relationships; at the *metropolitan* level (within cities/regions), and they are based on a mixture of *virtual* contacts (e-mail or tele-conferencing) and face-to-face meetings; *globally* (at national or world level), where contacts are normally virtual ones. But, in most cases, we shall see a *hybridisation* of local and virtual interaction. In relation to the issue of knowledge creation and diffusion, only the most complex and indeterminate problem-solving types of activities will privilege the local relationships (where we encounter the most direct, informal, polycentric and face-to-face exchanges).

6. The local knowledge factory

To identify the “engine” which generates economic value at the local level, we need to look at the way in which, in different places, knowledge is produced, exchanged and used to generate value and competitive advantage. In other words, IDs need to be regarded primarily as *cognitive systems*.

Most of the labour performed in a modern economy is *cognitive labour*, i.e. labour spent in the production, exchange and use of knowledge. Human energy effort has been in constant decline since the first Industrial Revolution: Therefore most of the working time spent in a modern economy is devoted to planning, communicating, directing machines and transformation processes, codifying and storing information, programming, inspecting and selling. Even in the so-called “manual” jobs, what really matters is not so much the (increasingly limited) muscular energy put into the process as the intellectual/mental ability to modulate the muscular energy needed for operations that have not yet been mechanised. The most time-consuming operations in these processes are those in which evaluations and decisions have to be made in complex circumstances, or when the phenomena concerned are variable and indeterminate. The kind of capital that is now vital to the generation of economic value and competitive advantage is *intellectual capital*, otherwise known as an invisible resource or *intangible asset*.

This being the case, local development must be defined in terms of the competitive advantages that arise from the production and replication of knowledge when these activities assume a *localised* form. Only by entering into the cognitive “black box” do we understand why the territory has been of increasing importance over the last thirty years, and whether it will continue to be important in the years ahead. And it is by entering into this “cognitive engine” that we can find out how and when specific forms of localised production can be reproduced, modified, and enhanced in power and what types of *policies* need to be introduced.

Within IDs, the productive use of knowledge is based on the economies stemming from knowledge replication and from the division the *innovative labour* needed to produce new knowledge and integrating it for economic purposes (Arora, Gambardella and Rullani 1997). Being a resource that can be reproduced at zero cost (or almost)³, knowledge is not scarce, as imposed by the dominant mainstream economics for all other inputs⁴. Its economic value may in fact be increased by its dissemination, or by extending the number of applications for which it is used. However, diffusion increases its value for the society, i.e. for those who use it. This does not mean that diffusion also increases the value for the producer of the knowledge itself, or for those who have invested in it and taken the associated risk. The important element for the producer is not the social value generated by its diffusion but the value he or she privately extracts from it.

³ The essential point is the gap between the cost of producing (new) knowledge and the cost incurred in reproducing the same knowledge for other, even different applications. The reproduction of knowledge occurs at very low costs if knowledge is perfectly codified. When it takes the form of tacit knowledge or if it must be contextualised before its utilisation, the costs of reproduction are higher but lower than the original production costs.⁴ According to Robbins’s definition (1932), a resource is scarce if it is available

⁴ According to Robbins’s definition (1932), a resource is scarce if it is available in *limited* quantity in relation to a range of *alternative uses*, which compete for it on the basis of price. In this sense, knowledge is scarce in relation to the needs and means available only before it is produced. Once an effective solution to an important problem has been found, there is no longer any scarcity constraint on its possible uses. Knowledge is not consumed when it is used, because it can be reproduced at no or low cost.⁵ For

7. Diffusion and socialization: a race for value

Knowledge-creating enterprises tend to increase the speed of knowledge diffusion, but tend also to slow down the speed of knowledge socialisation (realised by copying, imitation, re-interpretation and development of alternative solutions).

The economic value of “proprietary knowledge” is inversely related to the speed of socialization process. Patents (for inventions), copyright (for software) and licences (for the use of solutions sold on the market) are ways of protecting the intellectual property of a person who has produced, or in some way owns, new pieces of knowledge. For our purposes, market, hierarchy, local networks and virtual networks can also be regarded as (competing) ways of extracting economic value from the process of knowledge diffusion/socialization.

The *market* is a means that favours diffusion, because it puts each producer in contact with a vast audience of potential consumers willing to pay the required price. If the market is vast and well organised, knowledge can be disseminated very rapidly, and it is possible to extract large profits. However, the market has many disadvantages:

- it is not suited for disseminating complex knowledge, which requires prior interaction and ex-post evaluation;
- it does not cover the producer against the opportunistic use of the knowledge by final users, because the intrinsic limitation of formal agreements (licences) and given the possibilities to overcome the various forms of protection (patents, copyright);
- it is not functional to have a select audience of potential users for a market that needs to be organised in advance. But a market which is pre-organised and filtered in this way is effectively a network of virtual interaction.

The *hierarchical system* makes diffusion less easy but, in return, slows down the socialisation of knowledge and makes it possible to extract value from the knowledge one possesses in a controlled way. It enables the owner to maintain secrecy or control over knowledge (even if some pieces are disseminated among selected suppliers and customers). However, the hierarchical exploitation of knowledge requires heavy investment and high risk. But, indeed, knowledge tends nowadays to lose its economic value so quickly (because technology and markets change so rapidly) that it becomes very risky and dangerous to try to “conserve” proprietary knowledge for a long time.

The hierarchical system is now losing its efficacy and it gives room to networks, which can ensure a better way of sharing the costs of knowledge creation and that allows for a more rapid and widespread dissemination. Large manufacturers traditionally have relied on the market and the hierarchy to build their system of knowledge production. But the growing demand for variety and flexibility has required a quick adaptation of their knowledge and the introduction of rapid learning curves. As regards this, since the 1970s, local networks have performed quite well in this respect, sometimes exhibiting even a superior efficiency. This is because they are very dynamic learning systems, able to develop small-scale innovations and to increase the search for new solutions.

8. The competitive advantages of local exploratory learning

Local networks have some advantages in exploration and learning when it is required to identify complex but incremental innovations. In this field, local networks perform better than markets and hierarchies in many cases that empirical studies have analysed.

The market is efficient in responding to a simple, well specified demand. But it is unlikely to venture “into the dark” to explore less probable, more difficult pathways. If there are a hundred alternatives, the market will tend to concentrate on those which are most obvious and attractive, neglecting the less visible. Large companies (hierarchies) are also more inefficient in responding to problems of this kind. Having to choose between a hundred possible alternatives, a large company needs to invest time and money in the research process which, after a series of simulations and selections, will reduce the alternatives to just one, and only this sole alternative will be tested and put into production.

The local network, on the contrary, represents a good example of how parallel efficient exploratory searches may be developed when enterprises are unable to “protect and hold ” their knowledge.

In IDs variety is generated by the exploration (acting in all directions) of many possible methods based on the contribution of different agents and on competing ideas. If there are a hundred possible alternatives, all will be explored (even though some will receive more attention than others). The research costs will be divided up among many enterprises. The research process will speed up and at the end it will be clear to everyone which solutions were best appreciated by the market. Firms will convert immediately to the “winning” solutions.

This is the secret of the success of many IDs in traditional sectors, high-fashion goods, special machinery, household products, furnishings and so on. A local system can be very effective in this process of exploratory learning where the propagation mechanisms allow a rapid – and generally involuntary rather than co-operative – dissemination of knowledge among competing enterprises.

The involuntary propagation of knowledge is due to the fact that enterprises are unable to hold the knowledge they possess. Each producer specialises in just one thing, with limited costs and risks, because he is able, if necessary, to use without costs and rapidly the knowledge developed by others. These are the advantages of *involuntary sharing*, which are often confused with those of *co-operation*.

9. Involuntary sharing or co-operation? A common misunderstanding

Involuntary sharing is the phenomenon that enables rival firms, which do not voluntarily co-operate, to benefit from the collective localised process of exploration, which eventually become common knowledge.

Voluntary co-operation, on the other hand, is a phenomenon arising between suppliers and customers, in the chains of value developed within the IDs. In this case, firms deliberately organise themselves to benefit from the replication of the knowledge possessed by each specialist and by the enlarged division of labour existing in the area.

Involuntary sharing and voluntary co-operation are both important. But, to operate, they require different conditions. In the case of involuntary sharing, what matters above all is the *impossibility of closing off the cognitive circuits* at firm supply- chain level. This outcome must be regarded as socially useful, even though the individual firms would prefer to prevent any knowledge spillovers, against which - maybe without much success - they actively devote themselves.

Involuntary sharing stems from the difficulties to keep things secret. Within IDs, members of a single family may work for different firms, creating an “information bridge”. In a small town, where there is a dominant industry, bars, places of recreation, schools, and generally daily life itself are means of knowledge sharing and socialisation. Everyone knows everyone else’s business.

On the contrary, in local systems with a lower level of specialisation which include firms from various sectors, involuntary sharing will be much less significant, as well as within large towns, where people’s personal life is quite separate from the work place.

The deliberate co-operation which generally occurs between suppliers and customers (and exceptionally between competing firms which have a common interest) requires other conditions. What is needed are cultural circumstances and institutions which actively favour co-operation, less antagonistic industrial relations (among workers and entrepreneurs), and trustful and integrated interactions among final firms and their subcontractors.

10. Re-using shared knowledge

The local network is an environment that favours a high speed of knowledge and information diffusion while, at the same time, regulating the process of socialisation by setting rules for the sharing of knowledge. As we have argued above, the value of a piece of knowledge depends on the capability of its owner to profit from it more rapidly than it becomes “socialised”.

In the local context, there are two important factors promoting rapid dissemination:

- 1) direct and informal communication based on a shared language;
- 2) spatial proximity, which facilitates the logistics of transferring goods, persons and information, simply and at low cost, because of the short distances involved.

Here again, it is easy to see why IDs are placed in a stronger position in comparison with other types of local network.

Communication is easy when there is a dominant industrial specialisation and a common professional language able to express all the details involved in the description of the specialised skills possessed by a large part of the local population. This common language is fed by local vocational schools, research centres, laboratories and certification institutes which set common standards. The local labour market itself is a powerful pool of communication, being characterised by a high rate of labour force turnover. This favours the formation of a common professional language and the dissemination of basic skills (blue collar workers move frequently from one firm to another, and many of them leave the established firms to become new entrepreneurs themselves).

Moreover, because the logistics of the whole supply-chain is typically concentrated just in the surrounding area, there are closed circuits supplying semi-finished items and just-in-time

manufacturing processes, within them knowledge and information can simply circulate. This is more complicated for other types of local network, when supply chains are globally localised.

At the same time, the local network has a further advantage: it is able to maximise the dissemination of knowledge, while at the same time regulating its socialisation. A local system is in fact a society which exercises a *regulating function* over the behaviour of its members. There is, for example, a social punishment against opportunistic behaviours, lack of respect for contractual obligations, or lack of diligence and rigour in performing tasks (including the respect of deadlines). The existing informal *rules* make labour and business relations more reliable. They support the *sharing* of knowledge, enabling a manufacturer to keep some control over its application and use, even when it is entrusted to other parties belonging to the local circuit. These other parties will respect the rules of preventing the manufacturer from being damaged.

Local institutions can be of great help in ensuring that this kind of regulation works smoothly by consolidating the rules that govern the productive *filière*. This regards sub-contracting arrangements, minimum quality standards in products and processes, contracts guarantees, prevention of unfair competition, control over the excess mobility of firm-specific, knowledge-bearing and skill-full labour from one company to another.

In these local systems the sharing of knowledge is regulated in a more secure and targeted way, with an acceptable balance between the advantages inherent to a collective sharing of knowledge and its firm-specific and proprietary utilisation. They are able to bring down the cost of knowledge replication, speeding up the propagation of knowledge from producers to users. They greatly reduce the level of investment needed to produce novelties from the stock of existing knowledge. They increase the returns depending on specialised know-how by broadening the range of potential uses. To sum up, in a local network the efficient use of shared knowledge depends on:

- *specialisation* among the various operators (each can focus on a very circumscribed and precisely defined problem);

- *abundance of knowledge sources* deriving from the existence of a large number of potential producers and users (other specialists or systems operators);

- *regulation of the knowledge diffusion process*, with shared rules among suppliers, customers, and sometimes competitors, which achieve a reasonable compromise between competing interests;

- development of *new entrepreneurial talent*, by lowering entry barriers (for entrepreneurs, labour, services, and infrastructures).

- labour transform itself into *self-organising labour*, capable of taking an active part in building up the economic environment in which the work itself is performed (Corò 1995, Rullani 1995). There is no need for formal structures to direct the inputs of labour and intervene to modify programmes, as the employees are themselves capable of intelligent adaptation to circumstances. Workers switch fairly easily to the role of entrepreneur, changing their job or company without too much trouble, and add to their professional skills an autonomous capability of self governing the productive tasks, learning their jobs stage by stage, starting very often from an initial lack of academic education.

In local networks, knowledge is intrinsically a social resource. The conditions which create trust, whether they are “natural” (proximity or shared experience), institutional/cultural (social capital) or contractual (formal and informal), trigger virtuous circles of cumulative learning (Bagnasco 1988 and 1999, Trigilia 1999, Burroni 1999, Messina, Riccamboni and Solari 1999, Florida 1999)..

11. How districts learn

Every local system is unique. The differences between one and another are enormous, because the specific differences associated with a place are augmented by those associated with the evolution of various sectors and firms that developed there.

Nevertheless, in all IDs there is a common “multiplying engine” which explains their *economic vitality* and enables many individual or entrepreneurial localisations to exist as a system which owns a differential *identity*.

As we have said, this “engine” is the *cognitive system* expressed and organised by the territory or, rather, by the local economy and society. Space, economy and society are closely wedded, thanks to the many links, flows, and interdependencies created and required to organise the circuit of knowledge.

Italy is a veritable kaleidoscope of cases which, each with its special emphasis, demonstrate how initial learning processes can be amplified to the point of becoming powerful factors of territorial concentration, able to attract other similar activities (Becattini 1997, Bonomi 2000, Fortis 1998).

What factors have determined this “explosion” of competitive advantages? How did a local network manage this extraordinary take off and improvement of the local living conditions?

These are cases in which some IDs starting with relative simple production processes remained quite weak concerning their capability of learning. Others show a very dynamic mechanism of knowledge creation (Belussi and Pilotti, 2000). Whatever the competitive advantages that determined their success in the past, local networks still must *learn*, change and rebuild their identity on new foundations. The competitive advantages inherited from the past are now exposed to the duress of the incoming globalisation process, this means that the productive circuits need to be renewed, and that knowledge-used must be enriched by new ICT applications. The local actors need to transform their cognitive “engine” that has served them so well up to now.

Though it might seem surprising, many IDs did not arise from pre-existing artisan activities. They have a very definite birthday and “founder”⁵. Others are based on pre-existing widespread artisan activity. Historical events seem determinant like in the case of chair district

⁵ For instance, the first spectacles factory, in the frame district of Belluno-Cadore, employing three people, was established in 1878 at Calalzo di Cadore, by Angelo Frescura (De Lotto 1956). Frescura was a native of Calalzo, but left the Belluno area to work as a travelling salesman. He eventually became involved in the optics business by chance, having opened a shop selling optical equipment and fancy goods in Padua. In the past the skills needed for making lenses had formerly been concentrated in Venice which, during the 12th-17th century, supplied the whole of Europe with glassware. However, after that other countries (France, England, Spain and Germany) had industrialised the process. So the initial knowledge was brought in from outside. It was only “captured” by the local system thanks to the network of contacts created by the flow of migrant workers, who put the Cadore area in contact with the skills and products of the more highly developed European economy. The first factory specialising in the manufacture of components (supplying the whole district) dates from 1947. This provided the decisive impulse for the establishment of other small businesses, lowering the barriers to getting started in the industry and creating a market in components and semi-finished products which could also be acquired by outsiders.

of Manzano, which developed thanks to a decree issued by the Empress Maria-Theresa of Austria in the eighteenth century. This new regulation encouraged the cutting of timber from the woods of the commune of Mariano (Gorizia), giving rise to a flourishing chair-making industry, whose products were exported to Lombardy/Venetia and the Balkans.

Then we have to note that IDs grow on the basis of two different processes. Small firms grow as a result of the *dissemination* of the knowledge produced within the district (as a whole), and often by the larger firms. From the larger firms a continuous spin-off is generated leading to the establishment of new small-scale business, either involved in subcontracting or to cover new market segments. The technology used is often fairly simple, and only a minimum of investment is required if a firm restricts itself to serving just one phase of the manufacturing process. At the same time, there is an abundant pool of dependent customers and end-users, which provide new ideas and new knowledge.

The general shortage of production capacity increases the bargaining power of even small-scale suppliers. Despite the increase of the size of the local system, IDs remain with a flexible structure, enabling them to deal with a rapidly changeable demand.

In many cases, larger firms, on the other hand, grow by applying the typical tools of rationalisation. Their production processes are based on internal scale economies, and integration, which, paradoxically sometimes recall the Fordist culture. This is of course a Fordist culture adapted to the requirements of variety and flexibility imposed by the nature of the local systems.

Typically the stock of localised knowledge is a combination of disseminated basic knowledge, coming from the ID as a whole, and firm-specific knowledge created by the larger companies, which control the more advanced technologies. The first type of knowledge can be acquired free of charge, or almost so, from the direct experience. The second is expensive to build, and requires adequate structures to cover risk and to secure intellectual property rights (designer labels, new brands, specific advertising, and direct sales structures). Often in the district pioneering enterprises contribute to the first introduction of radical technological innovations (Belussi, 1999).

With the globalisation of the 1990s this complementary relationship between small and large firms began to break down. Nowadays large companies are less in need of smaller ones for subcontracting. They can strengthen their internal organisation, or subcontract through international supply-chains. Some large companies can make the strategic decision to go for a full integration of the cycle, to have a complete control of quality and delivery deadlines. Larger companies within IDs are actually tackling two key problems: market globalisation and product dematerialisation (designer labels or *griffes*, own brands, building of sales structures or acquisition of outlets chains). Small firms, and this is an indirect effect of the very existence of the district, have become accustomed to achieve high levels of profitability with little or no direct investment in new knowledge acquisition. They also may be in serious difficulties because the growing competition from low-cost countries (Asian manufacturers and East European firms). Smaller producers of finished goods find difficulties in establishing direct and interactive relationships with distant markets. Many district firms lack organisational capabilities and they do not have the financial structures required to build it. In some IDs, the habit of the *involuntary sharing* of knowledge has undermined the incentives to co-operate in a formal way. Despite the growing district rhetoric on co-operation issues, in many cases we see a persistent individualism of the localised agents.

12. A glance to the future: local networks v. virtual networks

Until recently, many local networks, taking advantage of their competitive position examined above, have dominated some segments of the international markets, competing with the other forms of organisation like “pure market” and “hierarchies”.

Small firms and local networks have therefore become essential complementary partners, to a far greater degree. Markets put territories in competition with one another. Hierarchies have difficulties in “blending” their structure into the local environment.

However, in recent years virtual networks making use of opportunities for communicative interactions at long distance (ICT) have extended over many territories, with the result that network supply-chains actually cross local, metropolitan and global levels.

The decisive advantage of the virtual network is that it can dramatically cut the cost of knowledge using, producing, reassembling, and storing. This is because it enlarges the scale of replication of existing knowledge and information. Moreover, it allows a greater division of labour within a system of almost one billion potential producers, users and consumers. It also brings into play at global level national differentials (in the cost of labour, environmental protection, tax pressures, technological competence, etc.).

The virtual network relates together:

1) markets (for example, many business-to-business relationships, previously relatively unorganised, are now with the use of ICT developing into highly organised markets, organised by infomediaries which, in turn, can easily turn to non anonymous relationships);

2) hierarchies (which are trying to speed up the dissemination of knowledge by cutting off proprietary boundaries, standards, blending their organisation with closely involved suppliers and customers into a captive network). In other words, a network which retains a dominant centre but in which knowledge also flows outside the system.

Given the new opportunities offered by the global economy, there is an urgent need for local networks to enter into relationships with other territories, to achieve economies of scale (size of market) and variety (access to favourable national differentials). However, this opening up to distance relationships is perhaps **more** painful for local networks than for the other forms of organisation. This obligates IDs to share multiple territorial identities, and different cultures. The extension of virtual relationships can be managed only through the recourse to radical new technologies (Internet, information systems, ERP, complex logistic systems), and this contrasts with the ways in which knowledge was typically organised in the past in local networks.

In this process of transformation, a *path dependent behaviour* tends to dominate against the needs of an innovative adaptation to the economic conditions (Amin 1978, Grabher 1993). Local networks, left to themselves, could be paralysed by political vetoes and evolutionary inertia. To escape from *path dependence* it is necessary to have a good understanding of the possible alternatives, and follow the general interest and change the external relationships (with the market, hierarchies and virtual networks). When local networks open up to the virtual world there is no possibility of fusion, but only of hybridisation. The recourse in favour of international outsourcing is in this context a natural passage, but this will break up some segments of the local supply-chains. The following of the logic of market

advantage will tend to disrupt the pre-existing local bounds based primarily on trust. In many cases, then, the local network will be pushed towards its association with the *hierarchical* forms of organisation. It will develop large local companies that follow more directly the process of globalisation, or it will open up to external multinationals investing into the local system to gain access to its specific resources.

The access to virtual networks will imply an effort towards a partial codification of knowledge which will be introduced within the international circuits. Only the more complex activities, related to the local mechanism of knowledge production will remain anchored to the territory. The transformation of local networks will be neither simple nor easy. It will encounter not only political resistance from interests that could be damaged, but it will also face the necessity to experiment new technological solutions and risky investment.

To keep the ship off the rocks, it may be necessary to navigate “by sight”, but always steering straight for the intended landfall.

13. Three lines for local learning policies

Within the new forms of division of cognitive labour, the competitive repositioning of IDs depends on the evolution of local networks performing in their functional relation with market, hierarchy, and virtual networks. Territorial policy has to interact with the dynamic active forces underlined by this development. Consequently, any policy that is set to achieve some objectives or to make corrections must take into account the spontaneous forces at work and the existing evolutionary tendencies. Otherwise it is likely to be proven as ineffective. It is not a question of *laissez faire, laissez passer*, but one must avoid the error of believing that it is possible to direct the development of the territory by decree.

There are three possible kinds of territorial policy which could perform a positive role:

- 1) *selective policies of investment* in the territory which aim to maintain a distinctive difference and a specific competitive advantage;
- 2) *access and outsourcing policies* which provide local networks with the lower costs and greater variety available in global markets, multinational hierarchies and virtual networks;
- 3) *identity policies* which give a territory a sense of cohesion, maintaining its historical continuity.

Let us take a closer look at these three possibilities.

The aim of *selective investment policies* in a local system is to augment the level of *local intelligence* and, at the same time, support the development of local networks towards highly complex activities. Only activities of this kind can compensate for the *greater cost/risk* associated with face-to-face relationships, the scale and variety of which are considerably smaller than those available in global markets, multinational hierarchies and virtual networks. In fact, local income growth in a given territory presupposes a selection of activities, and a concentration of resources on those that are most innovative and offer the greatest added value. The only way of “keeping all going on” is to rely massively on low-paid labour or immigration. In areas of full employment (two thirds of Italy), it is not possible to have policies giving undifferentiated support to all existing activities. Policy-makers need to decide what activities are compatible with the typical higher costs of the local networks, and concentrate public support and promotion on those activities.

To facilitate a change of this kind, it is necessary, on the one hand, to encourage the delocalisation of the “less favoured” activities. On the other hand, to encourage a corresponding investment in the production of new knowledge that will enhance the quality and productivity of the remaining activities.

How can this be done? There are three broad areas for initiative. The first is done by putting more public investment into knowledge-building activities (research, education, training, entrepreneurial experimentation) and into tangible and intangible infrastructure. The second by giving incentives to individual investment in professional activities, up-grading skills, competencies and capabilities. The third is by introducing forms of *capital venturing* for small enterprises to support the implementation of good ideas.

For all those activities that are external to the *core business* of a given territory (when the comparative advantages are unfavourable), the most appropriate strategy is *outsourcing* from foreign sources (i.e. purchasing machinery, goods, services and manufacturing processes from international suppliers). By opening up to the international production, local systems can escape the risk of localism (Perulli 1998).

The policy of *outsourcing* provides *access* to the best resources and enforces *competition*. A policy of access is therefore a policy of specialisation and differentiation. The aim is to set up global logistics systems, and develop standards, languages and new forms of guarantees that will enable local users to make use of knowledge, skills and resources externally produced. Hence, local networks must not only defend themselves against the global market, multinational hierarchies and virtual networks; they must also *make use of them*.

Finally, a local system needs to maintain its *identity* over time, in spite of the changes induced by the globalisation process. Identity is promoted by local institutions and with the daily life and experience of the people who live within the system.

If a territory lacks the appropriated institutions the task of regulating conflicts of interest and choosing among the various possibilities will be left to spontaneous development, menacing the established identities.

In Italy IDs, for example, still lack institutions to represent their interests. There may be many administrative bodies involved in a district, but often they are in conflict with one another. In Italy, regionalism and “districtualism” have been two independent, often conflicting, phenomena, without an effective point of synthesis (Trigilia 1989).

A policy designed to rebuild identity must be able to mend a social fabric that is constantly torn by the selection of new local activities, where some are expelled in favour of others. In addition, there is a growing recourse to outsourcing, as the process of specialisation needs to consolidate some kind of territorial “vocation”. IDs infiltrated by the global market, multinational hierarchies and virtual networks, tend to fall apart, becoming a confused mess of conflicting interests. Recreating a territorial identity means actively contrasting the entropic nature of the spontaneous development.

Local networks can increase their capacity for competitive survival if they are able to undertake *self-selection processes*, to develop strategies of *outsourcing* via the market or hierarchies, and to use virtual networks. They must also be able to regenerate their own *identity*, absorbing changes without excessive traumas and damage. In this respect, cultural and political influences have a very important part to play. The reasons for staying together can only be reconsidered and redefined if there is a strong social capacity for reciprocal awareness and communicative understanding.

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