

Networks Without Technologies in Industrial Districts of Northeast Italy

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Introduction: an Empirical Study

The fact that new information and communication technologies are revolutionizing the economic system and the way firms organize their business is well known (Kelly 1998; Tapscott, Lowy, Ticoll 1998). What is perhaps less clear are the advantages that can be exploited by SMEs of industrial districts in order to enhance their competitive position.

American literature focusing on the strategic impact of new technologies since the beginning of the technological revolution has followed small enterprises, but SMEs have been generally studied only as influenced by the evolution of big firms: the de-verticalization processes, rise of network – organizations and search for flexibility induced by technological evolution produce a re-organization of the mass production corporation and, as a consequence, increase the strategic role of SMEs and support their proliferation (Malone and Rockart 1991; Brynjolfsson, Malone, Gurbaxani, Kambil 1994; Malone, Laubacher 1997). Italian scientific literature, on the other hand, has studied the problem within more general research on globalization and on tools that can enhance the competitiveness of a traditionally closed economic system, but are now involved in the internationalization of markets out of necessity (Rullani 1995; Corò, Grandinetti 1999).

SMEs, to an even greater extent than big firms and industrial districts, can find advantages in the opportunities offered by new technologies. They help reinforce the business model and the specific organization of economic relations that are at the core of the competitiveness of local production systems. Field studies are needed 1) to clarify the role of small businesses in the new economy, and 2) to understand how SMEs and local systems can increase efficiency and open their boundaries in order to increase the *quantity* and *quality* of resources and competencies to create value and to develop new kinds of competitive advantages that can be applied in a global economic scenario (Chiarvesio 1998).

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The success of industrial districts comes from an organizational and production model based on a network of flexible relationships strictly linked to the local economic and social context. The local context, where work and social life overlap, is the place where the collective identity is produced and reproduced, mutual trust is reinforced, and a flexible and effective network of economic and cognitive relations, that supports the knowledge creation and diffusion processes, is strengthened. These relational features of industrial districts led to a deep division of labour within local boundaries in favour of the specialization and qualification of specific local expertise. At the same time, they allowed enterprises to maintain a high level of flexibility in the market.

The distinctiveness of industrial districts has been undervalued for a long time, perhaps overshadowed by the “best practice” myth. Local systems, however, demonstrated their strategic value as soon as the market conditions that allowed the mass production corporation to grow and dominate, changed. In a condition of consumer evolution and market segmentation, political and economic instability and turbulence, the flexibility and specialization of SMEs systems (working in a context of tight interaction and collaboration with the value chain) was the way to success. The best example is the economic success of the Northeast Italian model, an economic system characterized by a concentration of industrial districts.

Nevertheless, the increasing globalization and growing competitive pressure are issuing new challenges to the districts and to their success. On one hand, they require more efficiency from local systems and individual firms. On the other hand, they disclose the opportunity of augmenting local knowledge and expertise with specialization and know-how coming from the global cognitive system. Therefore, industrial districts need to evolve in order to have a more efficient local network and to open that network to a wider system of knowledge production and exchange.

The transition from local to global (Becattini, Rullani 1993), in our opinion, cannot be separated from a wide and diffused investment in information and communication technologies. On the one hand, network technologies allow for the reduction of costs and the improvement of a firm’s performance. One example is ERP systems that increase effectiveness and quality in the management of data and information; another is the possibility of better and more varied products using shared CAD systems or knowledge management tools. On the other hand, we do not believe that a global network can actually be realized without the support of a technological network. The latter would not only be a solution for challenges that the market is issuing to industrial districts, but also an opportunity to *enhance* the district model, emphasizing local expertise and taking advantage of the best of global economy.

We think that this is a path which should be taken by every firm and local system that aims at maintaining competitiveness; nevertheless, solutions and models of the diffusion of ICTs in local systems are not clear and should be analyzed. For this purpose the Tedis Center launched an annual survey to study in-depth the business and organizational model of industrial districts, its evolution (in terms of outsourcing, globalization, types of relations etc.), and the diffusion of ICTs. The survey has had three main objectives:

- To study the consistency between technological and economic variables of the business model;
- To evaluate the main reasons for the actual model of technological diffusion;
- To analyze the processes that drive the diffusion of technology in local systems.

This methodology allows for the comparison of the diffusion of ICTs in connection with the real needs of SMEs and their strategic position in the value chain. The final result will be a system of useful information for the establishment of consistency between demand and supply of technologies and the development of an action policy that supports innovation and evolution of SMEs.

Main Results of the Survey

The first part of the survey focused on the 12 most important industrial districts in Northeast Italy²¹ which belong to the main industries of the Italian economy: home furnishings, mechanical industry, and fashion. The industrial districts analyzed were (Fig. 1):

Home furnishings:

Furniture district of Livenza
Furniture district of Quartier del Piave
Chair-manufacturing district of Manzano
Specialized local system of Murano (artistic glass)

Mechanical industry:

Electromechanical district of Arzignano-Montecchio
Mechanical district of Schio-Thiene
Mechanical district of Conegliano (InoxValley)

²¹ The data discussed in this paper refer Northeast Italy, but the survey also involves other regions of Italy.

manufactured products and components (18.4%), and a small part works on behalf of other firms.

Many of the firms interviewed (46.0%) belong to an industrial group with a greater incidence in the furniture industry. This reflects a tendency towards concentration of local turnover and a “hierarchization” of local systems by firms that buy other local SMEs in search of advantages coming from an intra-group division of labour or an enlargement of product portfolios.

Figure 2. Firms per class of turnover (billions of lire)

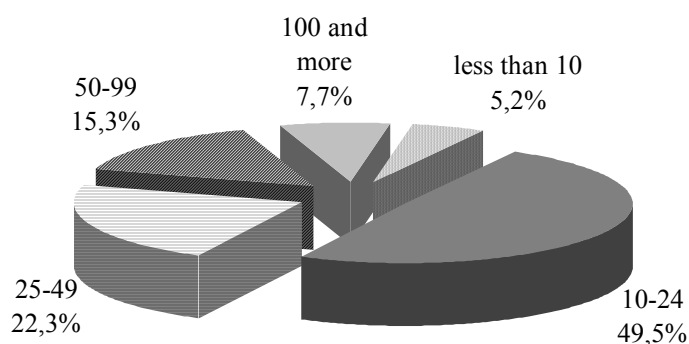
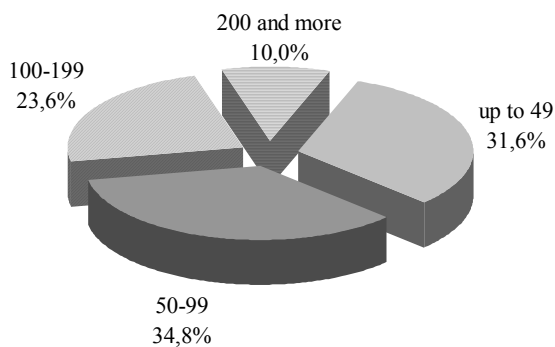


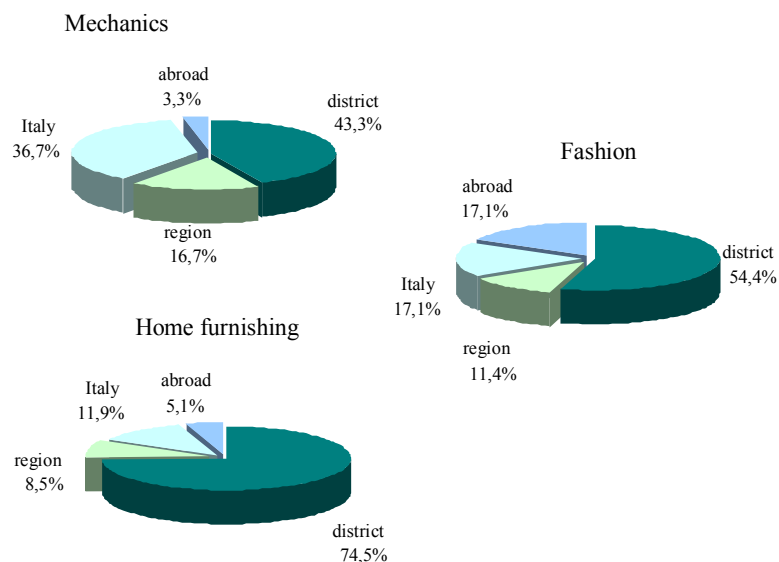
Figure 3. Firms per class of employees



From the organizational point of view, the main results of our survey confirm that the actual business model of industrial districts is based on an exploded value chain co-ordinated by network relations. SMEs reveal a high level of outsourcing of operations, but also of other activities, like design or R&D (almost all firms externalize at least some of the value chain activities). At the moment the local system is still very important as a source of specialization, but the network is opening up to encompass the rest of Italy and other countries.

Looking at the outsourcing processes, we see that 86.3% of firms have subcontractors, even if less than 50% have strategic partnerships with them. The data is interesting concerning the localization of the value chain: we can see a clear tendency towards internationalization, but a large part of the companies in every industry say that their strategic subcontractors are still in the local system (Fig. 4).

Figure 4. Firms per localization of strategic subcontractors



On the other side of the value chain, industrial district SMEs have a strong orientation towards export (only 5.4% of firms do not export and 40.7% of them export more than 50% of their turnover). In order to reach national and international markets, they rely on a wide network of sales agents, commercial infrastructure and partnerships, with increasing attention to types of distribution that allow for a better and more direct control of information and knowledge of final markets.

In summary, SMEs confirm that they have an innovative business model based on extensive outsourcing of activities, and therefore they are *networks*. If we focus on sales, industrial districts are internationalized; but when we look at the geographic distribution of production partners they appear to be still strictly rooted in the *local territory*: the *local system* is still a strategic resource.

The Diffusion of ICTs

The survey on the diffusion of ICTs reveals that *these networks are without technologies* or, in other words, that the co-ordination and communication tools are still traditional. The data collected show that SMEs only partially use new technologies, and that the use is not homogeneous with respect to different partners. In particular, commercial partners and commercial customers are more involved in new forms of communication than subcontractors. But the most interesting evidence is that the communication model of industrial district SMEs is still traditional; in other words, it mostly relies on traditional technologies like telephone, fax and face-to-face meeting, whereas new technologies play only a marginal role.

What about the technological infrastructure of SMEs? The technological potential of an SME depends on two orders of technologies: 1) the tools that allow a better management of information (office automation) and 2) the network infrastructure that connects internal offices, employees and the firm as a whole with external partners. The first kind of technology is well diffused among SMEs: 42.1% of companies have a ratio of PCs/employees higher than 100%; this means that every employee has at least one PC and that personal computers are also diffused outside of the administrative offices. Local Area Networks are common as well: 94.3% of firms have a LAN. This diffusion of office automation is not accompanied by a diffused education on tools and software. In fact, only a few firms have a formal training programme for new technologies and one-third of the sample relies on the self-learning abilities of the employees.

If we focus on network technologies, we observe extremely different patterns of the diffusion of new technologies: some tools are part of the technological infrastructure of the SME, but others seem to be very far from the strategic plans of entrepreneurs. New technologies can be divided into two groups: applications that mainly support structured communications (that is, formal communication) based on clear procedures and standards (ERP – Enterprise Resource Planning, EDI – Electronic Data Interchange, Corporate Banking applications) and other tools that support more flexible dialogue, based on natural language (e-mail, videoconferencing, groupware applications, Web site).

Applications for Structured Communications

ERP systems aim at producing maximum efficiency in internal and external processes through an integrated management of all information (administrative, commercial, productive). They have been adopted by only 8.9% of companies interviewed, with a higher frequency in the mechanical industry (16.2%). 11.9% of firms have plans to adopt such systems in the future.

The *EDI* has been one of the first network technologies used to manage relations in the value chain in order to gain efficiency in sales transactions. Some projects have been developed to introduce *EDI* systems in industrial districts (ex. the textile district of Prato and eyeglass producers of Belluno); nevertheless they are not diffused and their adoption is mainly reserved to networks of subcontractors of big corporations. Our data confirms this statement: only 13.1% of firms use an *EDI* application, with a predominance in the mechanical industry. Communications with banks are usually frequent and standardized. They have produced a rapid diffusion of tools to make transactions more efficient, even in the smallest firms. Corporate Banking applications have been adopted by 77.6% of the SMEs interviewed, without visible differences among industries.

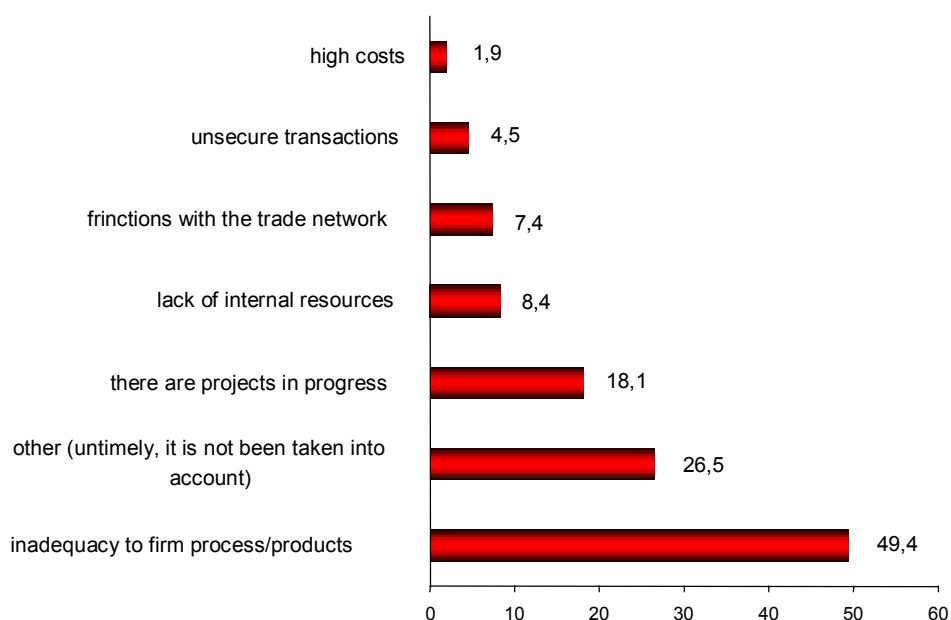
Applications for Unstructured Communications

Electronic mail is part of the communication infrastructure of industrial districts SMEs: 82.5% of firms report that they have it. This does not mean that it is available in every office or that it is used to communicate: in many firms only some offices have it while in a few cases it has almost completely replaced traditional communication tools. Only 11.1% of SMEs have a *videoconferencing* system, with a predominance in the fashion industry (17.6%). *Groupware* applications do not attract investors in SMEs either: 13.7% of them have a discussion database or a workflow application, with a clear predominance of the latter type of tools. In contrast, almost every firm has a *Website*, at least in the form of a static page. Two years ago 24.0% of SMEs in Northeast Italy had a Website; now the percentage has tripled and 72.1% of medium-sized corporations have an Internet presence. Usually the site has a marketing function, but the number of firms that take advantage of this new communication channel to interact with customers is rapidly increasing.

Electronic commerce is almost totally ignored: only one out of all of the SMEs contacted sells its products through the Web. SMEs of industrial districts have always revealed a weakness in their ability to control final markets; this weakness led to the creation of long distribution channels that separated the firm from its markets and customers, reducing the possibility of collecting information and rapidly reacting to changing demand. E-commerce could be a way to at least partially avoid this problem. But SMEs do not think that the Web

is suitable for the specificity of their business. In fact, the reasons that explain why they refrain from investing in e-commerce solutions are not costs or security problems, but the fact that e-commerce solutions are not adequate to the firm product/process characteristics (Fig. 5). On the one hand, this data shows that SMEs, usually highly innovative in the production area, reveal a low interest for experimentation in this field. On the other hand, the reasons for lack of investment indicate a lack of supply variety: the “Amazon model” of e-commerce, that is a model based on standard products sold through a catalogue, is not adequate. The success of these industrial districts is related to SMEs flexibility and personalization of products in close communication and collaboration with the customer. A standard e-commerce model for standard products, created for the big corporation, would imply the loss of this characteristic and the source of success and competitive advantage as well.

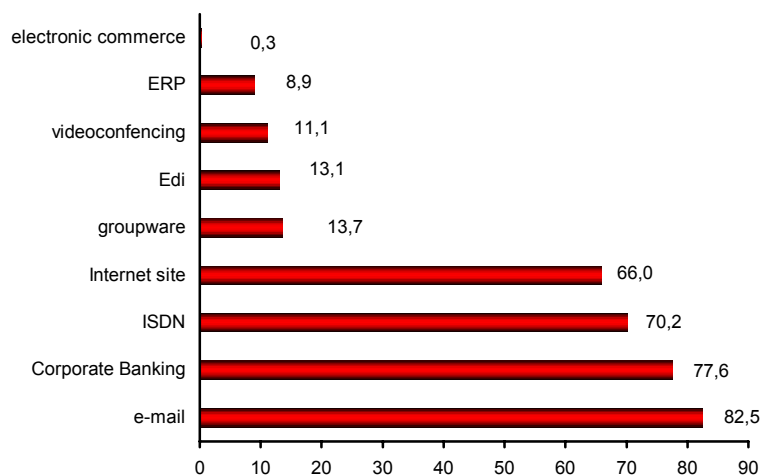
Figure 5. Why firms do not invest in electronic commerce



Main Evidence and Suggestions for Policy Action

The survey on the diffusion of new technologies in the main industrial districts of Northeast of Italy and the comparison with the business model of SMEs suggest that some policy actions should be undertaken in order to create a convergence between SMEs and technology evolution.

Figure 6. Diffusion of network technologies among main firms of industrial districts of North East Italy



The main results of the survey can be summarized in the following points: Previous analysis and Fig. 6 clearly show that new technologies can be divided into two groups: one is characterized by a percentage of diffusion higher than 60% (e-mail, Website, Corporate banking); the other by a very low percentage of adoption (groupware, ERP, EDI, videoconferencing), especially when compared with big corporations.

The most diffused technologies, adopted by three-quarters (and in some cases more) of the main firms of industrial districts, are what we call *commodity technologies*: simple, cheap, easy-to-use without too much training, flexible, and sold in standard packages. For example, e-mail and Internet sites (at least in the simplest versions), are the most known and used technologies among the firms.

SMEs show a low interest for more innovative and complex technologies that require experimentation and project applications, as in the case of ERP, groupware, EDI.

New technologies, when they are employed, have not replaced traditional technologies (meetings, telephone, fax): they are still used marginally, particularly in communication with suppliers.

We observe a rather striking contradiction: SMEs say that ICTs are not useful at the moment, that they do not invest or budget for EDP from the total income of the firm (71% of firms have an EDP budget lower than 1% of the turnover); but they think that new technologies will have a central role in the future competitiveness of the firm.

These results have many possible explanations. First of all there is a problem of culture and focus of firms: Italian industrial districts know production technologies very well and are great innovators in production processes, but this does not seem to apply to the communication area. Thus, although e-mail and Internet sites are well known because of media publicity, the same is not true of other applications. This lack of knowledge is partially attributable to the technology on offer (softwarehouses, service providers,...).

As suggested previously, the technology provider has another responsibility: for many years (and very often still today) the same applications and solutions developed for big corporations have been offered to the small business. But SMEs have a different investment capacity and, overall, a different organization and production model. The idea of creating a standard application to be used in different contexts does not fit well with the distinctiveness of the small business, and overall the industrial districts' SMEs.

Another reason for the low investment in new technologies is the success that traditional technologies still enjoy. Meetings and telephones are flexible and informal tools that allow for direct contact with business partners and reinforce mutual trust; *face-to-face* communication sustains collaborative relations and contribute to the reliability of the system without formal agreements. For a long time this has been the communication model typical of these districts and their source of flexibility. Not least for this reason firms are not totally convinced about the effectiveness of more formalized communications mediated by network tools; as a consequence these technologies are sometimes seen as dangerous tools that can stiffen extremely flexible relations.

This could be understandable at present, when the local network is still important, but as the districts evolve and the globalizing processes go on (Corò, Grandinetti 1999), it would seem to be impossible to maintain efficiency and high performance without innovation from the communication infrastructure. The current scepticism towards new technologies could become a weakness of

local systems and menace their future. In such a case it is important to understand what policy action could create a context favourable to innovation and a pattern for the diffusion and development of technology consistent with needs and specific features of SMEs in terms of business and social relations and knowledge creation processes. Before these industrial districts lose the competitive advantage they have acquired in recent years, an analysis should be done on the role that leading firms and local actors (associations, technology offerers, service providers) should play in local systems in order to promote innovative ICTs. It also seems fundamental to develop projects aimed at promoting culture about technologies and opportunities that enhance investments: for example, the education of specialized human resources capable of understanding and taking advantage of the potential of new technologies within a small firm, services consistent with specificity of SMEs, and financial resources.

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