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STRATEGIC AND VIRTUAL NETWORKS – A POSSIBLE INTEGRATION*

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Strategic and virtual networks – a possible integration

One of the best known features of the Italian entrepreneurial system is undoubtedly the industrial district, a network of small and medium size enterprises; the object of this survey is to study the integration between the strategic network, identified by the relationship between the companies in a district, and the virtual Internet network.

1. The strategic network: the “industrial districts” model

About twenty years ago Michael Piore and Charles Sabel published “*The Second Industrial Divide: Possibilities for Prosperity*”, their famous research about Italian industrial districts; this book was able to show all over the world the existence of a new and alternative way to organize the industrial production, giving so another big shake to the Fordist Paradigm (Piore and Sabel 1987).

In Italy this phenomenon has old roots, even if there was an improvement of the industrial districts number mainly in last twenty years¹. The industrial district phenomenon can be put in the *external firms network*² class, identifying it like as a strong territorial concentration of firms, which work in the same supply-chain. Within these territorial areas, every firm attends to one phase of the production process and specializes strongly itself to maximize the efficiency of trade relationships with the other firms placed upstream and downstream the supply-chain (Golinelli and Dezi 1997).

So, the industrial district is a production organization model based on small and medium enterprises territorial networks, based on new forms of organizing the supply-chain (now reactive and flexible), based on new forms of specialization and of innovation (thanks to

¹ Even if the definitive success of the industrial district model is quite recent, the concept is about one hundred years old; indeed, Alfred Marshall was in 1890 the first economist to write about industrial districts; a population of independent small and medium enterprises, coincident with the single productive units, constitutes Marshall's industrial district;

² Other expressions of *external firms network* are also the *constellation firms* and the *hollow corporation*; while the first is a whole of firms with common goals, the second one is a firm based on a strong outsourcing, which attends to corporate strategies only (Golinelli e Dezi, 1997; Dezi, 2001);

focused activities and entrepreneurship), based on new forms of knowledge socialization (through the territory).

According to Giacomo Becattini opinion (one of the most important Italian researchers about this topic), the industrial district is the result of the relation between various factors: social and cultural traits of a community, historical and natural features of a geographic area and some technical features of the productive process. At the same time, the industrial district is the outcome of a dynamic integration process among the labour division in the district and the market enlargement of its products (Becattini 1991).

Even if there are a lot of industrial district definitions in the various Italian and foreigner books and papers dedicated to this Post-Fordist example of firms' territorial organization, the following features are widely accepted (Garofoli 1991; Brusco and Paba 1997):

- high firms *specialization* in a certain industry; in example, the historical industry for many Italian industrial districts is the “*Made in Italy*” industry, that is the whole of industries related to fashion system (clothes, glasses, shoes ect...);
- large number of *small and medium enterprises*, which are the prevalent entrepreneurial typology of the entire Italian industrial system;
- *decomposition of the productive processes* in different phases characterized by optimal reduced dimensions; this feature allows every firm present in a determinate district territory, according to its core competencies, to realize a specific supply-chain segment;
- presence of *external economies* for the single firm but internal for the local territory;
- development of *subcontracts* and *cooperative behaviors* between district firms; indeed, this feature often becomes the real propeller for the territorial entrepreneurship;
- development of a productive and organizational *common know-how*, incorporated in the workers competencies, periodically regenerated and renewed by *knowledge-exchange processes*.

The district strategic net is so characterized by the high connection between the territorial firms, which are strongly interrelated for their productive performances, management strategies, knowledge, core competencies and specific know-how.

So, talking about industrial districts, the knowledge topic cannot be overlooked: this asset, thanks to the recent Information and Communication Technologies progresses, becomes the productive factor with the main added value for the businesses and the territories; the knowledge contents improvement in market economic relationships, resulting by the great relevance of the knowledge exchanges in the modern economy, modifies the role of the old productive factors (Perulli 2002). This consideration can be seen and observed in various practical contexts; the industrial district is one of them.

Indeed, this one arises from a social structure without definite borders but with a key-feature: to be a network. So, there is a strong horizontal relationship between the various actors of the same territory, which eases the existence of solidarity and the knowledge exchanges between them (Bettoni and Creti 2001).

According to this point of view, Giancarlo Corò (1997) well identifies “the industrial districts like as *cognitive systems*, like systems able to elaborate complex information, to create new knowledge, to activate conversion processes among practical and contextual know-how and scientific and technologic know-how [...] it is necessary to understand the same capability to give economic value to the scientific and technologic knowledge relies on a set of tacit knowledge, territorial specific factors, exchangeable between people and groups only if they have a common base of experiences and values”.

Industrial districts are interpretable according to the systemic point of view too; indeed, on the one hand, the systemic approach allows catching the importance and the meaning of the existent relations between the internal components of the single firm-system and, on the other

hand, between the single firm-system and the other external systemic entities included in its environment (Golinelli 2001)³.

It is indubitable that an industrial districts distinctive factor is the strong interdependence of the local small and medium enterprises that, through subcontracts and externalizations, allows the birth and the increase of a territorial entrepreneurial specialized tissue; it means that when the relational glue between these systemic entities weaken, the whole district, recognizable like a real *over-system*, begins to make worse its performances and its competitive strength, going so inevitably to corrode the position of each single firm-system.

So, thanks to the systemic approach, the importance for the industrial district of two fundamental features of the actual economy can be easily appreciate: the markets Globalization and the New Information and Communication Technologies development. These two context variables must be understood like as necessary factors for the industrial district systemic prosperity, because they allow the right interaction among the district over-system and the external environment, enabling to the feedback mechanisms (necessary to the survival of the local productive system) to work.

2. The virtual network: globalization and technology in the actual competitive context

Both the management of a *large corporation* and the administration of a SME in the third millennium must necessarily to consider two phenomena, interdependent among them; the products and markets Globalization and the fast development of the new Information and Communication Technologies (ICT).

Globalization is mainly an economic fact; it is the economy tendency to take a worldwide dimension, even if many political, social, cultural and environmental implications can

³ About the options for the firm events research, Golinelli argues that there are two possible choices, the systemic approach and the analytic approach; while the lat one consists in the decomposition of the phenomenon in a series of elementary parts to arrive to the knowledge of the whole through a rational process of composition, the systemic approach allows a global vision for the knowledge of the facts, especially when there are relationships and interactive processes between the parts of the whole (Golinelli, 2000);

obviously arise from this increase of the international integration of markets and goods, of services and productive factors.

This phenomenon does not happen today for the first time⁴; but, thanks to the Information and Communication Technologies development (the virtual network), the Globalization topic is discussed in many fields never as today. Indeed, new technologies product pervasive influences on firm infrastructure, on its products, on its markets and consumers, with a strength never seen before. If on the one hand ICT give to the firm many new opportunities (related to new emerging business models), obviously on the other hand the risks and the possible strategic surprises increase in this kind of business environment.

The Globalization process, related to the modern communication forms, organized on worldwide links, facilitates cultural integration mechanisms and if, on the one hand, it looks to uniform consumption models, on the other hand it creates many occasions to characterize more deeply firms' products and services. So, the global competition determinates the continuous benchmarks redefinition and the research of new synergies between the firms. This is the main reason, as noticeable in the international economic context, of the amount of partnerships, fusions and new strategic alliances in a lot of areas and industries (Buzzavo and Stocchetti 2000).

This interdependence, able to tie together various international markets, is strongly related to the technological variable, identifiable like as the main factor for the evolution of economic worldwide system. Indeed, every Globalisation phase comes from some applications of a technological⁵ innovation; if the transports technological developments were the key-factors of the first globalisation phase, the following phases are the results of a

⁴ De Benedictis and Helg (2000) point out three "globalization" phases: the first one started about in the end of XIX century; the second one since 1945 until 1980; the third phase started about in the end of XX century;

⁵ The first globalisation phase was connected to the reduction costs of naval and railway transports, due to technological developments achieved in these areas in the begin of last century; the second globalisation phase was instead favourite by the telegraph (first) and telephone spread (then); finally the third phase is related to personal computer and *world wide web* spread.

different technological revolution: the information transmission and elaboration (De Benedictis and Helg 2002).

Rebus sic stantibus, it was necessary that information economy became one of the main study and research areas for a wide portion of scientific community; it is due to the high strategic relevance taken (always thanks to ICT) by information in the global economic context. Indeed, the technology facilitates the access to information and increases its value. So, the infrastructure, allowing the information to be sold, reproduced, transmitted, assumes a key role in the creation value process.

The international firms are characterized by a strategic use of new Information and Communication Technologies, overworked both like instruments for the standard procedures reengineering and like levers for improving the knowledge internal networks sharing. The firms, thanks to these instruments, are able to create new communication and cooperation environments absolutely innovative (i.e. the communities of practice⁶), which redesign not only the operative management modalities but also, more generally, the rules of the cognitive labour division (Micelli 1999).

The use of new technologies allows the redesign both of the internal organizational relationships (more flexibility, new forms of control and remuneration) and of the relationships with the other value system partners (supply chain management, sales force automation, customer relationship management). It implies that, in relation to potential internal single firm changes and to potential corporate business environment external changes, new technologies can influence strongly three critical dimensions of an industrial system:

- The *single organization* dimension, having a great impact on firm supply chain, through the creation of new products/services constituted by information, through the integration

⁶ Community of practice is a group of people that carry out an activity analogous and interact strongly in informal ways. The strong cohesion, the group spirit and a specific culture of its members about certain topics are the constituent elements that maintain connected these social aggregations.

of new products/services gifted with information contents and through the optimization of the productive processes;

- The *supply chain* dimension, thanks to the ICT influences on the entire firm value system;
- The *industry* dimension, related to the impact of new technologies on the industry competitive forces, that raises a potential industry structure change, with the consequent rethinking about the methodologies for its analysis.

Nevertheless, ICT cannot be interpreted as incentives for an old strategies total abandonment; some Authors, indeed, remember the importance to find a mix among traditional development politics and new *web-based* strategies (Shapiro and Varian 1999; Porter 2001), considerable not as alternative but complementary; from this point of view, new technologies are recognizable like as new instruments to improve the off-line corporate strategy performances, which cannot be forgotten and under considered. So, the off-line corporate strategy must just find in new technological tools a further benefit to increase the corporate competitiveness.

Besides these strategic and industrial considerations, it is equally relevant to consider the new technologies influences on the firm communication system, inside and outside the corporate boundaries; in fact, today is possible to contact in *real time* many economic agents geographically far, using languages less structured and formal than past.

In this changed context, the attention on the corporate communicative forms goes toward new solutions, as *knowledge management* and *communities of practice*, that so become the main areas of strategic operations to optimize business communicative flows (Micelli 2000).

The increase of the corporate codified knowledge levels provides an advanced lecture key to understand corporate information systems; the development of new Information and Communication Technologies in the everyday business life pushed the firm toward new and

alternative communication modalities. Indeed, ICT improved both the standards and the skills of the corporate human capital and the optimization of the relationships with various company stakeholders (customers, suppliers, retailers, etc...) present in the business environment, through continuous knowledge and information exchanges, rich and profitable for their meanings.

In the near future this growth capability for the firms know-how will involve a necessary conversion of the management cares toward other new communication ways and forms (now available for the company), more strategic and specific than old ones.

This virtual net improved the strategic and communicative alternatives pursuable by enterprises; obviously, the Italian districts looked with great interest at these environmental evolutions, able to destabilize the old industrial production assets and to regenerate the competitive arenas and management strategies.

3. The convergence between the strategic networks and the technological networks

Having been defined the theoretical picture of reference (paragraph 1 and 2), including the meaning of district and information and communication technology (ICT), we are faced with the important question as to whether there is any advantage in adopting ICT for small enterprise systems.

Many answers seem to come from a recurrent syllogism: ICT assists the development of inter-organisational networks; the districts are qualified as inter-organisational networks; so ICT should assist the districts (Rossi, 2003).

However this reasoning is based on similarity and not on a true syllogism, because the nature of relationships in the districts is not easy to reproduce in electronic networks; the district companies, in fact, require organisational systems and skills which are not over-formalised and are extremely individual processes, developing relations of a personal and

trusting kind within the system that, although on the one hand guarantees an exchange of knowledge (a tacit one) deposited in their history and traditional methods of production, on the other are not easy to duplicate in an electronic context.

The union between the districts and ICT seems therefore to be problematic due to numerous other obstacles:

- autonomy of each single business: the prevailing entrepreneurial model is based on strong competition between the companies of the district that prevents the realisation of agreements and common strategies;
- little inclination to share information: the utilisation of a common technological platform is considered, in some cases, to be a risk that could give an advantage to competitors;
- production specialisation: the fragmentation of activity feeds the tendency to work on one's own, convinced that it is possible to win against the competition within the productive process of the district in a closed perspective and of the product;
- human resources: the demand for '*professionalism*' cannot be compared to the ability acquired in the training system because there is a gap between offer and demand, which is the same in small enterprises (organized in systems or isolated) as in the big ones, although it assumes a larger relevance in the first which is less likely to sustain the necessity of training (it is generally held by them that this cost should be sustained by outside businesses in the entrepreneurial world);
- lack of physical infrastructure: the infrastructure and access to the network is still very inadequate. It is necessary to be able to offer, as is the case in other European countries, a wide band at an accessible cost in order to encourage the construction of vertical portals, implement the ASP services and develop the *e-marketplace*.

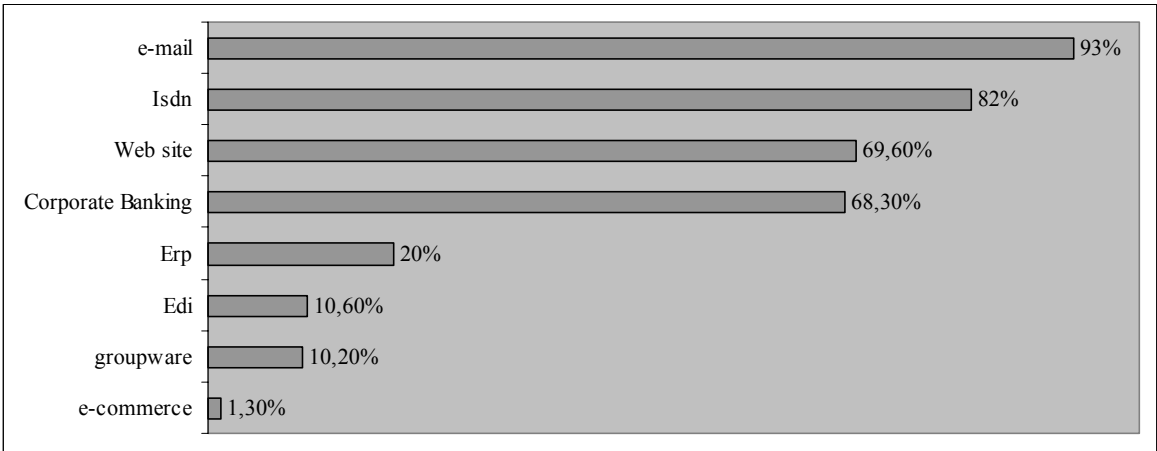
The awareness of these problems create a cautious attitude, even an unwillingness to develop the network systems between companies, which is overcome only when there is an

enterprise *leader* in the territory – that is someone who sets up relationships and hierarchies between companies and imposes relational models – or a strong cooperation between equal companies, used to operating within the logic of full cooperation (Rapporto Federcomin, 2001).

These observations, deduced from a theoretical study of the district reality, are confirmed by the practical investigations carried out over the last few years (TeDIS, Federcomin); in particular, re-examining the TeDIS research data covering 33 industrial districts, it's possible to identify more clearly an effective method of disseminating the new technology within the scope of present managerial solutions (figure 1).

FIGURE 1

The diffusion of new technologies in the districts



Source: TeDIS, 2000

More specifically, there is a difference between innovative technology, that has a larger distribution (superior to 60%), and the other in which the adoption percentages are absolutely immaterial (project technology).

Belonging to the first group are the e-mail, the ISDN connecting services, the web sites and applications for integration with banking systems (commodity technology), for which the

distribution data should not give the wrong impression: companies, although availing themselves to a large degree of e-mail services (93%), do not base their interaction system on the exchange of digital messages; the use of the electronic post between businesses belonging to the various industrial sectors – used for inter-company communications and an exchange of messages, sometimes also informal – is in fact limited. This observation can be linked to the comment on the large numbers of web sites (69.6%): it must be understood that district enterprises consider and use the new information and communication technology as a basic instrument directed at improving their capacity to communicate with the external world (and in fact applications for integration with the banking system present a circulation equal to 68.3%), attributing to them a more limited role in respect to the real capacity of impact on the company systems (Rapporto Federcomin, 2001).

The low penetration index of advanced managerial solutions (ERP 20%, EDI 10.6%, groupware 10.2%, e-commerce 1.3%) confirms this and underlines the strong resistance to the use of new technologies and their difficulties until internal processes are improved and can take advantage of the opportunities offered by the network structure.

The relationships which are established between the companies of a district through the new means of digital communication are therefore not well structured, and so it is possible to qualify the districts as ‘networks without technology’ (Micelli and Di Maria, 2000): ‘networks’ because they know how to maintain a focal point on their own core business by turning to third parties for those activities which are not supported by an individual expertise; ‘without technology’ because they deal with all these relationships and connections through a traditional type of technology.

However, the integration between these two types of networks is not only necessary but also possible; necessary because it will only be thanks to the new technologies – that promote product innovation, that permit the making of quality goods that are superior to those of their

competitors, and the process innovation, that allows productivity to increase, prices to be reduced and the costs of production to be trimmed down –that the district enterprises will be able to strengthen their own distinctive characters and their own competitiveness. Added to the above is that the same technologies offer the means for enhancing relationships within the territory and to bring suppliers, clients and partners closer together (Rapporto Assinform, 2002). Thanks to the possibility of realising synergies in a number of ways, the companies can extend their own range of action and overcome the limited geographic dimension that up to now has characterized district experience, opening it up to global competition.

The integration between strategic networks (the districts) and technological networks is also possible through the offer of infrastructure and telematic packets suitable for the local development model, able to support its success and increase it, without undercutting the basis of competition. On the one hand the small enterprises do not wish to lose their identity and therefore look for personal solutions and offered applications; on the other the offer must guarantee solutions of connectivity and software adaptable to their specific needs in the various contexts of their use.

The final goal is to transform the districts from physical to virtual, that is communities of different and autonomous individuals that, being by connected on line, can enjoy specific advantages:

- contacts in real time between companies;
- greater competitiveness at the global level;
- a greater possibility to exchange information;
- greater visibility.

In conclusion, on the one hand the districts seem to have overcome the first barrier of diffidence towards the new technology (figure 1), and on the other a more intense development is necessary to guarantee the Italian district system the capacity to face up to a

greater internationalization of the economy. A strong element could be the traditional aggregated function of the territory.

4. Practical analyses

The results that are given in this paragraph are from investigations which have been conducted by Federcomin and RUR-Censis (2001) on the distribution of the new technologies in 51 districts, divided between consolidated and emerging. Our attention will be concentrated exclusively on the shoe-making sector and in particular on the districts of Riviera del Brenta (VE), Fermo (AP) and Barletta and Trani (BA), which have been specifically selected to cover the geographic sub-divisions of Italy (figure 2).

FIGURE 2

The position of the three selected shoe-making districts



The choice of the shoe-making sector has been determined by the consideration that it represents a typical Italian entrepreneur model⁷; it has, infact, all those characteristics that have allowed the Italian small and medium enterprises to acquire competitive advantages over foreign competitors: flexibility, vitality, openings in foreign markets, small dimension, excessive use of banking credit, entrepreneurial culture still following the ‘craftsman’ idea and used to working in markets often protected from global competition.

It also deals with a sector ‘in crisis’, where a continual and noticeable increase in the imports is registered against a reduction of the exports. The struggle with competitive countries (China, Romania, Hong Kong, Indonesia) has infact become more aggressive over the years, as has also the knowledge of the impossibility of facing new challenges with traditional productive strategies. The new technologies, through innovations that they are able to set up, can become instruments that will be extremely useful where the innovation of the product constitutes a strategic aspect able to maintain and improve the market quota: innovative soles, heels made with anti-shock, sensors to regulate the temperature, systems to allow the feet to breathe, synthetic and composite materials, are some of the examples of how the new technology enables the introduction of innovations to the product which could open new space on the market. Other innovative factors that may have important effects on the relaunching of the sector is the application of high tech and use of the Internet: the possibility of production measured through the web is becoming a real possibility for the existence of advanced projects that provide chains of shops where it will be possible to register personal requirements, transmitting them to the production centres that can, in a short time, deliver ‘craftsman shoes’. This is one example of the innovation and commercialisation process that can be added to the other tendencies which are very much more important in terms of concrete applications and dissemination: information applied to the functional production

⁷ In Italy there are seven ‘shoe-making’ regions: Marche, Toscana, Veneto, Lombardia, Puglia, Campania and Emilia Romagna, that cover 23 provinces; the organisation structure of the sector under analyses is characterized by the presence of 7,800 small and medium enterprises, of which 5,400 are exporters.

system; it allows to shorten the delivery time and satisfies the expiry date which is ever nearer for collections and updating.

In the environment of the shoe-making sector, our analyses are focused on the three districts already mentioned:

1. the Riviera del Brenta district: there are 993 companies with 14,260 workers. The turnover is over 1,686.16 million euro (Acrib, 2001).
2. The Fermo district: there are 3,100 companies, with a turnover of 3 million euro of which 65% is from exports (2002 data).
3. The Barletta and Trani district: is made up of 672 companies with over 7,600 workers (2002 data).

Table 1 shows a comparison in the level of dissemination of the new technologies in the three selected districts.

TABLE 1

Dissemination of the new technologies in the districts of Riviera del Brenta, Fermo and Barletta and Trani

	Riviera del Brenta	Fermo	Barletta e Trani
Attitudes towards ICT	active	active	passive
Investment/invoice ratio in technologies (1999)	5%	20%	5%
Business to business (B2B) and business to consumer (B2C) activities	B2B: more than 30% B2C: between 10% and 30%	B2B: more than 10% B2C: less than 10%	B2B: less than 10% B2C: less than 10%

Source: Rapporto Federcomin, 2001

It is important to stress that the data given are relative to interviews carried out in 2000; from the most recent investigations (2002), which are still being processed, it would seem that

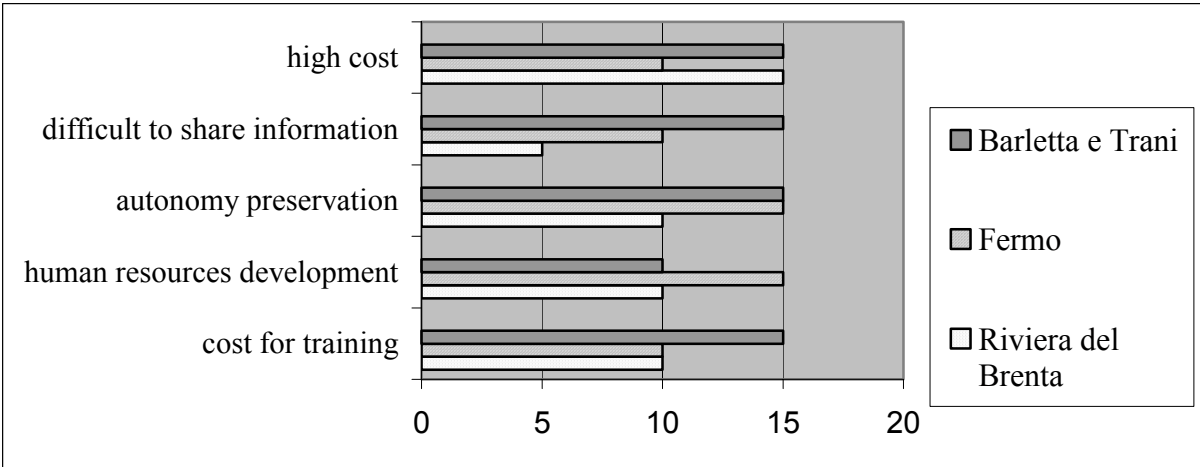
the Riviera del Brenta district has understood the importance of investing in the new technologies, passing from a investment/invoice ratio equal to 7% in 2001 to 20% in 2002.

On the whole we can see that in the shoe-making sector there is a behavioural difference regarding digital innovation: on the one hand it is active, solid and serious –and has brought about the development of a wide-range of initiatives (above all business to business activities) particularly in the north – on the other it is passive, observing ICT only as a trend phenomenon.

Finally, in line with the scheme proposed in paragraph 3, it is possible to define the obstacles to activity, based on the innovations put into use by the three districts (figure 3).

FIGURE 3

Obstacles to the diffusion of the new technologies



Source: Rapporto Federcomin, 2001

Legend: 0= no important; 5= little important; 10= important; 15= enough important; 20= very important

From the data shown it is obvious that the greatest difficulties to the development of activity based on new technologies are to be found in the Barletta and Trani district: in fact the costs of implementing the new technologies, the training costs and the difficulty in sharing the information are fairly significant. Another obstacle is the firm’s need to preserve their

own autonomy of management. This problem is fairly important in the district of Fermo as well, while Riviera del Brenta shows the best performances.

And finally there is the question of infrastructure and cables; the communication network is incomplete in all three districts and only in Fermo has some work been started (in the other two districts some projects exist but no work has been started). The fibre obviously represents a pre-condition to the development of new technologies but the fact that there is not a sufficiency is certainly restricting.

Conclusion

Which will it be the role of the new technologies and their contribution to the development of the districts? The answer is not easy. Sure, ICT can improve the efficiency and the competitiveness of the district enterprises, but only if the district firms learn how to use the new technologies; we have pointed out that nowadays districts enterprises use ICT as an instrument to communicate with the external world and not as an instrument to improve the connection in the network. The situation has to change and, little by little, above all in the North of Italy is changing; only recognizing the role of ICT, it will be possible to exceed (but not to forget) the localism opening to a global competition.

In order to make it possible, firms have to develop a new system of competences and specializations; they also have to learn to work together, sharing informations and platforms. Certainly the State, as over-system, can play an important role overcoming the physical obstacles.

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