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ICT AND INNOVATION PROCESSES IN SMES INSIDE AND OUTSIDE DISTRICTS

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ABSTRACT

Literature on industrial districts described the district model as an integrated local system of SMEs where learning-by-doing characterizes innovation, rooted in local contexts and face-to-face/informal communication is relevant within the value chain. Recently however, internationalization and network technologies transform the scenario, reducing the gap between district SMEs and outside firm model. Not all firms are the same in terms of innovation management and use of ICT, according to different strategies and internationalization dynamics. The paper discusses similarities and differences in innovation approach and ICT adoption of SMEs inside and outside districts, based on a survey of about 800 Italian firms.

INTRODUCTION

Transformation in the drivers of competitiveness of small and medium firms (SMEs) embedded in industrial districts is impacting on the firm's localization strategies and the development of business activities within the local system is becoming more and more a deliberate choice, instead of an emerging process. From this perspective, the nature of the district firm's embeddedness (Uzzi, 1997) changes: the district model of an SME producing and trading within the district boundaries – due to technology advantages and cognitive proximity – described by the established literature has to be updated. Moreover, the competitive scenario pushes local SMEs to catch the benefits of new global supply networks as well as international circuits of innovation, reshaping their traditional business models (Schmitz & Knorringa, 2000).

A first driver of evolution for district firms is related to the opportunities of entering into global value chains. Both from the manufacturing and commercial side SMEs traditionally embedded into local district contests can increase their performance and reinforce their competitiveness within the new forms of global division of labour (Gereffi, Humphrey & Sturgeon, 2005). If on the one hand, "pragmatic" collaboration characterizes coordination among local players based on flexibility and reactivity of proximity, on the other hand, the evolution of products and processes towards modularity standards allows also local suppliers to offer their specializations on a broader scale (turn-key supplier model) (Gereffi et al., 2005; Sabel, 2004). Physical proximity is no longer a prerequisite to manage collaborative supply chains in all the cases where shared technological and operational languages are concerned – even outside the district.

A second driver of change refers to market evolution and the relationships between customers

and manufacturers in innovation processes (von Hippel, 2005). Specifically for district firms oriented to final markets it is crucial to get in touch and deepen links with customers, to understand their dynamics, needs and requirements in order to develop and offer products and experience consistently. In addition, it is properly in the consumption *loci* – where lead users act – that customers' experience emerges more clearly and the firm has to locate to promote profitable connections with them for innovation purposes (Prahalad & Ramaswamy, 2003). In the meantime, literature on creativity stresses the role of talents and creative class to reshape and update innovation activities in local systems such as urban areas and districts (Florida, 2002). The open innovation paradigm (Chesbrough, 2003) highlights the potentials of competitiveness driven by extended knowledge management systems, where codified and tacit knowledge are related to R&D, customers' inputs and business-to-business collaboration. Such scenario is much more complex that the one based on learning-by-doing interaction and incremental innovation within local systems and asks for new services, skills and competencies at the firm and territorial level, not necessarily available in districts and organizations of local SMEs (Camuffo & Grandinetti, 2005).

A third factor in the district firm transformation refers to information and communication technologies (ICT). As globally extended connective infrastructures, digital tools become the gateway for new business, market and innovation relationships in SME's value chains, beyond the limited transactional approach (e-commerce). As many studies shown (i.e. Chiarvesio, Di Maria & Micelli, 2004), district firms are not only interested in efficiency when using ICT. Rather, SMEs are looking for communication support in the customer relationship management (web as an interactive marketing tool) and with upstream partners.

Scholars are debating about the sustainability of the district as an integrated system of firms and a specific model of manufacturing organization, where firm's embeddedness in the district offers competitive advantages rooted in the territorial dimension. On the one hand, not all the districts are the same in terms of characteristics and evolutionary trends (i.e. Biggiero, 2006; Markusen, 1996). On the other hand, districts firms are evolving in multiple directions as regards strategies, manufacturing and marketing processes, supply chain management. Our hypothesis is that the district firm characteristics and firm business models located outside districts are blurring in terms of innovation approach and adoption of network technologies.

The paper proposes a preliminary contribution on similarities and differences in innovation approach and ICT adoption of SMEs inside and outside districts. The paper is organized as follows: the first section analyses the literature on district evolutions from a firm-based perspective and discusses innovation framework for district and not district firms considering the literature on industrial districts and innovation; the second section focuses on a specific innovation domain – the adoption and use of ICT – to explore potentialities and constraints for district firms compared to external SMEs; the third empirical section discusses innovation and ICT strategies of district and not district SMEs based on the results of a survey on about 800 Italian firms specialized in the made in Italy sectors. The final section proposes theoretical and managerial implications on the evolutionary of district firm models and further research paths.

DISTRICT FIRMS BETWEEN INNOVATION AND INTERNATIONALIZATION

Among the many researchers on the district model, the recent Sabel's contribution (2004) offers an interesting perspective on new characteristics and trend of such studied concept. The

fact that districts are "on the move" can be perceived as a strong opposition to their traditional notion of well-established manufacturing systems rooted in specific local contexts of action (Becattini, 1991). Industrial districts are asked to transform their socio-economic structures because of the international competition and market evolution and update their traditional sources of competitive advantage. In this framework, on the one hand, codification of district products and procedures – modularity –allow district firms entering into global business networks (i.e. Berger, 2005). However, as Sabel stresses, on the other hand, district firms can exploit also their specific mechanism business-to-business relationship management even on a wider level, through the valorization of their ability to cooperate on a flexible way – pragmatic collaboration.

Such discussion of the transformation of districts received great attention in the Italian literature debate even before. From '90s Italian researchers focused on the alternative evolutionary trends of this particular form of economic organization (i.e. Belussi, Gottardi & Rullani, 2003). According to their historical origin, industrial districts can be considered as a first experience of business-to-business network, coupling the social network and firm's embeddedness into a local context. Industrial districts are specialized generally in specific industries (vertical specialization), where the manufacturing process is split across a large number of firms (high fragmentation), which benefit from external economies at the district system level (economies of agglomeration). Spatial proximity had played a critical role in the district dynamic, reducing firms' transaction costs in terms of control, information sharing, and coordination. Information exchanges are linked with the process of knowledge creation and diffusion, which are made possible by strong social and trust-based relationships among firms. A flexible and dynamic labor market, where workers' mobility is very high, and strong entrepreneurial

processes enhance this mechanism. Hence, benefits are in terms of rapid innovation, high quality of products and processes, flexibility, and short time-to-market.

The recent heavy economic crisis has stimulated an internal reorganization of district firms through merges and acquisitions, especially oriented to leveraging high quality internal competencies in order to exploit international opportunities. From a unique organization model Italian industrial districts are evolving and differentiating, according to their internal capacity to face the present dynamic economic scenario (Corò & Grandinetti, 1999) and to become a platform internationally recognized for its potentialities of innovation and specialized competences. Investments of leading international companies such as Adidas or Nike in the districts show the competitive potentiality embedded in the local manufacturing context of Montebelluna, able to develop different evolution paths even if based on the common matrix of ties (Corò, Gurisatti, & Rossi, 1998).

High levels of outsourcing characterized business relationships together with a strong presence of strategic suppliers directly involved by firms in collaborative connections. Until now, the social context has had a crucial importance for the choice of strategic partners and the development of interdependent innovative processes (Camagni, 1993), as most of the district firms' strategic suppliers have been localized within the district. Business-to-business district relationships can be described in terms of vertical connections, which link firms carrying out the manufacturing process, and horizontal relationships related to services and support activities provided by other players. In the original district model both the categories of activities was carried out by local players, improving and leveraging specialized competencies. However, district suppliers and subcontractors are now developing alternative strategies in managing their portfolios of customers and many of them are able to overcome the boundaries of the local

system as main market and exploit their competencies worldwide (Camuffo, Furlan, & Grandinetti, 2006).

Firms beyond local networks

One of the elements that emerged by the analysis of the transformations taking place within industrial districts is the role of single firms operating within the system. While the systemic approach has generally prevailed over the firm level, many scholars highlighted the relevance of firm strategies in affecting district paths. The internal dynamics of the district and the same evolutionary resources are not independent from the district players and have to take into account the variety of district firms located in each district (Varaldo & Ferrucci, 1996).

According to a traditional approach of the district model, firms are part of an integrated local systems and benefits from external economies rooted in physical proximity. However, as stressed by Varaldo and Ferrucci (1996), a more explicit attention to the firm as unit of analysis can help researchers to verify how the efficiency and effectiveness of the district are tightly linked with peculiarities of district firm model. Moreover, the district external economies are valuable ones only if they become sources for district firm's competitive advantage. Especially during the '90s local SMEs emerged as leading firms. Districts are rooted on a dialectic relationship between firm and the socio-economic context, where the changes of the local systems leverage on the entrepreneurial and innovative behavior of firms that identify rapidly and before others new market or technology opportunities, by then activating new paths of research and exploration (Grandinetti & Rullani, 1996; Lazerson & Lorenzoni, 1999). Not all firms have been able to lead the districts and the stereotype of the district firm has been substituted by a variety and

heterogeneity of district firm models, where few innovative firms lead the districts and their transformations (i.e. Chiarvesio, Di Maria & Micelli, 2005).

Those firms are characterized by an autonomous strategy, able to develop strategic decisions with strong impacts at the local level (Corò & Grandinetti, 1999). Those behaviors tend to diverge from the traditional district firm model, in terms of operations and organizational structures. Firms are interesting in finding abroad efficiency, but they are also driven by strategies of innovation-seeking (Zucchella, 2006), where the role of global circuit of knowledge may open new opportunities of product innovation and market interaction.

In recent times, not only large corporations (multinationals), but also local systems of SMEs have perceived the importance to enlarge their competitive scenario outside the local contexts. This extension of the local system does not reduce the importance of the manufacturing basis of the district, but it also stresses the opportunity for the system to embrace even actors not embedded locally. In this perspective, district firms as well as firms outside districts can gain from defining and managing international networks of suppliers, sales channels, research partners and customers (DeMartino, McHardy Reid, & Zygliodopoulos, 2006; Doz, Santos, & Williamson, 2001; Gulati & Kletter, 2005; Humphrey & Schmitz, 2002).

Open innovation and SMEs

Local manufacturing networks exploited proximity to develop shared languages and knowledge frameworks, able to support and incentive knowledge creation and transfer across organizational boundaries. Successful innovation based on learning-by-doing processes show

district firms ability to develop knowledge related to manufacturing processes and products, where social systems sustain tacit knowledge circulation.

Specifically, the role of knowledge creation at the local level consider as important players labor forces as well as single firms, which could be interested to reorganize their innovation cycles on a broad scale. According to the literature, the main leading firms' strategies carried out within industrial districts also consider the introduction of complex innovation as an important element of a firm's distinctiveness (Belussi et al. 2003; Lazerson & Lorenzoni, 1999). Such innovations deeply transform the firm's business idea and its organization. The rise of dominant strategic actors characterizes the recent district changes: by also exploiting their global connections, these firms are able to give rise or implement breakthrough innovation. Few district firms have demonstrated capabilities in obtaining and improving external knowledge (from competitors or research centers) and turning it into competitive advantage (Coe & Bunnell 2003). Coordination and relevant knowledge sharing process is also achieved through firms' coalitions, which become part of industrial groups (Guerra, 1992). Even if a high degree of independence among firms still persists within the districts, some firms (or groups) have assumed the role of leaders, stimulating the innovation process with their suppliers especially in terms of quality improvement.

Many studies stress the rise of a new paradigm in innovation from closed (proprietary) innovation to open innovation (Chesbrough, 2003), where inputs for knowledge creation and exploitation may refer to unpredictable areas or domain and involve multiple players within and outside the firm (at the local and international level). Recent studies on innovation describe a paradigm of distributed innovation (von Hippel, 2006), where the role of users is specifically important for product development and knowledge creation. In such contribution, social

dynamics are relevant for knowledge sharing (Brown & Duguid, 1991), consistently with the characteristics of the dynamics of the district model (focus on skills and competencies related to the manufacturing domain). At the same time, scholars stress the benefits for firms – not belonging to districts – to promote networking with business partners, customers as well as with research centers globally to identify new knowledge inputs and innovation opportunities (i.e. Hansen & Birkinshaw, 2007).

In this perspective, competitive advantage is based on value-proposition linked with intangible assets (i.e. brand value, aesthetics), where communication and distribution are key components of the leader's marketing strategy (Schmitt & Simonson, 1997). On the other hand, science-based (codified) knowledge is also becoming more and more important for firms specializing in the so-called low-tech industries as those of districts. Through an upgrading of firms' products and processes based on R&D outputs as well as on new competencies (i.e. design), local firms specializing in the Made in Italy sectors may renovate their competitiveness based on a new innovation approach, also facing international competitors (Bettiol & Micelli, 2005; Gereffi et al. 2005) and transforming their business model beyond the traditional district one.

ELECTRONIC NETWORKS IN DISTRICT AND NOT DISTRICT FIRMS: ANY DIFFERENCE?

In the present competitive and technological scenario, the debate on evolutions of district firm model compared to not district firms should include also the impacts of information and communication technologies on the organizational transformation of firms and on the development of extended networks (Evans & Wurster, 2000; Porter, 2001). Many studies have

stressed firms' opportunities to redesign processes and business organizations through electronic networks on a world-wide scale (e.g. Scott Morton, 1991; Tapscott, 1996). By focusing on the gains in efficiency stemming from the electronic management of business inside as well as between firms, scholars provided evidence that physical proximity and localization have become less important, while there has been a rise in new models of organization and transaction governance such as virtual companies and electronic markets (Kelly 1998; Malone, Benjamin, &Yates, 1989; Malone & Laubacher, 1998).

One of the issues not yet explored is how SMEs embedded in local manufacturing systems can exploit information and communication technologies (ICT) to enhance their competitive positions, compared to strategies carried out by SMEs not involved in local networks. Industrial districts have built their competitiveness on largely informal local network relationships and division of labor (Pyke, Becattini, & Sengenberger, 1990). Despite the benefits deriving from agglomeration, SMEs generally find it more difficult to establish business relationships with new non-district players, which require codification of technical languages and procedures or more formalized mechanisms of interaction (i.e. Brousseau, 1994; Storper, 1993).

In recent times, thanks to the evolution of network technologies and the decrease in transaction costs due to ICT, technology providers have developed innovative solutions for SMEs as regards communication and the management of business processes outside the district . The euphoria for the new economy provided new opportunities for small businesses to widen their scope and carry out exchanges worldwide, thanks to lower transaction costs. From this perspective, SMEs could refer to a completely different way of doing their business, where the advantages of the local embeddedness such as informal exchanges could be overcome by the benefits of electronic marketplaces.

In the 1980s, large firms have been the first to benefit from the adoption of ICT in reducing internal costs and gaining efficiency. Network technologies helped large corporations to improve the integration and automation of the internal operations (manufacturing and logistics processes) as well as the management of the communication and information flows within the firm. Large firms became more flexible and cost effective by using ICT for increasing efficiency and business process redesign. Through the investments in ICT the corporations were able to recover their competitive gap and to effectively answer to the challenges of the mass production crisis of the 1970s. Since the beginning of the technological revolution, scholars' interests have mainly been addressed to the effects of ICT on the evolution of big corporations. On the one hand, those firms have been able to achieve efficiency through applications aimed at increasing process integration and automation (i.e. ERP, Enterprise Resource Planning), which are important goals for large companies (Venkatraman, 1994). On the other hand, technology has improved internal co-ordination among scattered employees and teams through electronic infrastructures for communication, document sharing and co-operative work (work flow management) (Sproull & Kiesler, 1991).

While technological products and services have been traditionally focused on large companies, in particular to satisfy big firms' needs in terms of co-ordination and process efficiency, in recent times new solutions built around the Internet network have been made available to small businesses. In particular, researchers and analysts have emphasized the opportunities for firms to manage transactions directly through electronic commerce (Bakos & Brynjolfsson, 2000).

From this point of view, electronic networks have been able to considerably reduce transaction costs and give birth to new more efficient forms of governance, such as electronic markets (Malone et al., 1989). In such market models, market mechanisms can be static (such as

a catalogue) or dynamic (in terms of action or exchanges) and allow buyers and suppliers to define the terms and conditions of transactions (Kaplan & Sawhney, 2000). Consequently, innovative services and solutions for SMEs have focused specifically on supporting on line transactions through new electronic channels and portals. Small businesses could benefit from an electronic hub where suppliers and buyers are able to meet no matter what their location on a potentially global scale. As industrial districts are networks, they seemed to be the ideal context where network technologies could be adopted. Electronic networks could allow SMEs to overcome advantages mainly based on physical proximity and extend their business networks through the search for new customers in the on line markets.

ICT in industrial district firms

Since the middle of ’90 some studies focused on the diffusion of ICT in Italian SMEs and in industrial districts but, in the words of Micelli and De Pietro (1997), industrial districts could be considered “networks without technologies”, where physical proximity, trust and shared language were the tools that guarantee efficient transactions among firms within the district, without the need of network technologies.

In recent years, due to the challenge of globalization and the increasing competition on international markets, even SMEs have invested in ICT; nevertheless, they have followed a different path with respect to the one pointed out by literature, which underlined the potentials of ecommerce and marketplaces (Chiarvesio, Di Maria, & Micelli, 2004). Investments in ICT are more conscious and coherent with business strategies and they are aimed at sustaining mainly some business areas, such as the information management on one hand and the market relations

on the other. Moreover, companies are not investing in ICT to enter into electronic markets. ICTs are tools that the enterprise as a network of relations is using in order to coordinate and manage such relations at an international level.

Despite the success of the transaction cost theory to study the impact of technology on small business, Italian scientific literature has adopted a completely different perspective. By referring to SMEs as the primary form of economic organization in Italy, scholars emphasize the role of ICT on the competitiveness of small businesses and local manufacturing systems from a knowledge management standpoint (i.e. Rullani & Zanfei, 1998). Specifically, technology solutions have been considered as being a powerful tool to enhance innovation processes towards global networks. Electronic networks can increase the value of a firms' capacity to maintain and to nurture a high level of local expertise and specialized knowledge by enlarging its domains of exploitation onto a world-wide scale, on the basis of codification processes (Ahuja, 2000).

From this perspective, important consequences for district evolution may develop from the advent of network technologies. Empirical studies referring to a variety of local manufacturing systems (e.g. Corò & Rullani, 1998) provided evidence that SMEs have difficulty in managing codified relations efficiently inside and outside the firm and in determining formal processes through which their cognitive assets can be enriched. In this way, network technologies can develop the local systems by enlarging their boundaries, so that they can manage relations with their suppliers and with the final market more independently and share specific knowledge that is useful to the whole value chain system. The focus on the impact of ICT on local networks of small businesses does not specifically refer to transaction cost issues, but more broadly concerns

how innovation and knowledge management processes are developing after the introduction of electronic networks.

Contrary to large companies, SMEs have only recently discovered the opportunities offered by new technologies (Bramanti & Ordanini, 2004; Micelli & Di Maria, 2000). Nevertheless, small district firms are still having trouble in understanding ICT potential not only in reducing internal inefficiencies but also in creating competitive advantages through the management of network relationships. As regards the whole district system, firms with different competitive positions within the district value chain may influence the evolutionary paths of the local manufacturing system not only through their business strategies but also through their adoption of ICT solutions related to those strategies.

As concerns the uncertain situation Italian industrial districts have to face, a comprehensive analysis of the actual diffusion of information and communication technologies within local networks of SMEs and firms not embedded into districts and their paths of diffusion can offer a more detailed insight into the impact of ICT on the district systems and the sustainability of district firm's strategies in the competitive scenario.

Recent studies show district SMEs are specifically oriented towards Web-based applications and other related easy-to-use solutions that support interactive communication, while they do not generally invest in more complex technologies for internal process management (i.e. Chiarvesio et al. 2004). In addition, while at the end of '90s district firms were scarcely affected by network technologies, such firms are now showing a growing interest in tools that can renovate the well-established co-ordination and communication model based on physical proximity. However, district firms able to outperform are those that invest on ICT as an explicit strategy, where network technologies and an appropriate innovation strategy may significantly affect

performances of winners and losers (Guelpa & Micelli, 2007).

The mentioned results stress a potentially twofold process of ICT adoption for district firms and firms not embedded in local economic systems, where technological tools fit with different business needs of process management, coordination, and communication. However, as stated in the paper, many district firms are now evolving towards new business models that do not put the local system at the core of their strategies necessarily. At the same time, many firms operating independently from district may benefit from ICT to build and manage extended networks of manufacturing and commercial relationships, as well as innovation processes.

COMPARING INNOVATION STRATEGIES IN ITALIAN FIRMS

In order to describe the Italian district model and its evolutionary trends facing innovation processes, the TeDIS center[1] has launched an annual survey within a well-established research program of district analysis. The TeDIS methodology is based on quantitative research supported by qualitative in depth analysis. More specifically, the core of the research is the survey, carried out through phone interviews with different managers of SMEs (in relation of different topics covered by the interview – supply chain management, ICT, product innovation), which provides quantitative data. Additionally, to test research hypotheses and to obtain a more reliable interpretation of data collected through the survey, a set of qualitative analyses based on face-to-face interviews and focus groups is carried out.

[1] TeDIS is the Center for Studies on Technologies in Distributed Intelligence Systems of the Venice International University. For more information please visit the website: http://www.univiu.org/research/tedis/.

Since 1999 the TeDIS survey has been focused on industrial districts SMEs, covering more than 40 Italian industrial districts in the so-called made in Italy industries (fashion, home-furnishing, mechanics, food). In 2006 an additional and parallel survey was focused on a sample of manufacturing SMEs localized outside industrial districts in order to analyze innovation processes of companies that not necessarily have the same relation with the local context that industrial districts SMEs have. The objectives of the survey was also to compare innovation strategies of the two sample of companies in order to highlight similarities and differences in management and organization processes and to identify specificities (or not) still characterizing the industrial district model. For comparison purposes, we used the same questionnaire and the same interview methodology for both district (from now on ID) and not district firms.

More specifically, concerning the survey on industrial districts, in 2006 the annual survey was focused on 45 relevant industrial districts in Italy, out of 199 districts identified by ISTAT (the Italian National Institute of Statistics). The survey addressed four main macro-industries: a) home furnishings (furniture, glass, ceramics); b) engineering; c) fashion (textiles, eyewear, shoes, and sportswear); d) food . We analyzed only bigger firms within districts, with a more structured organization; in the selection of the sample, micro-firms with a turnover lower than 2.5 millions Euros were excluded. 433 companies were interviewed out of 1,875.

Regarding the survey on SMEs outside industrial districts, we selected a layered (by industry and region) sample of 700 companies out of the population of the companies with a turnover higher than 5 ml Euros in 2004 (more recent data available) operating in all manufacturing sectors and in North Italy (13,900). 384 companies were interviewed at the end of the research. Tables 1, 2 and 3 show the distribution of companies interviewed by industry, geographical area and turnover. As not ID companies are bigger than ID companies, we decided to analyze all the

data by dimension, considering 3 ranges of turnover: 5-10 Million Euro, 10.1-50 Ml Euro, more than 50 ml Euro (those ranges identify small, medium an large enterprise according to UE definitions).

Insert table 1 about here

Insert table 2 about here

Insert table 3 about here

Table 4 shows the profile of ID and not ID companies. ID companies are characterized by an higher internationalization rate: on one hand, they have an higher export rate in all turnover ranges compared to not ID firms; on the other hand, more companies decided to organize their supply chain at a global level (the percentage measures the number of companies on the total interviewed that have at least one supplier and/or one FDI abroad). Not ID companies belong to a group more often than ID companies and perceive to be in a leadership position more than not ID. Differences are less relevant if we sum leadership and relevant competitive position.

Insert table 4 about here

Table 5 analyzes the source of competitive advantage that companies interviewed consider as relevant to compete in their sectors. We can see that, except for some minor differences, the competitive model is based almost on the same drivers: quality of products, product innovation, efficiency (reduction of production costs), while flexibility is still relevant mostly for small ID companies.

Insert table 5 about here

Product innovation is a strategic source of competitive advantage and this is witnessed by the fact that most of the companies, either from ID and not ID, did innovate their product mix in the last three years (percentages higher than 70% on average). Innovation is mainly focused on design and new materials - especially in fashion industry (more 60% of companies) – and than on product technology (more than 50%). Few companies (20%) focused on services as part of their product innovation strategy. Even if there are some differences, ID companies appear to be as innovative as not ID companies: in other words, differences that we can observe for some turnover range/industry do not allow to depict an approach to innovation completely different in ID and not ID companies.

Innovation is mainly market-driven, for both ID and not ID companies: suggestions and ideas come from market analysis and customers, while internal R&D, patents, final customers or other partners (like suppliers or designers) still have a marginal role. As far as internal organization is concerned innovation is managed differently. Table 6 shows the percentage of companies that has organized a specific internal function for design and R&D. We can see that ID companies are

more oriented to develop design dedicated structures (even if we consider different industry specialization) whereas not ID companies are more oriented to R&D.

Insert table 6 about here

It is not surprising to observe that ID companies have developed more relations with external designers (for instance in medium size firms about 40% of ID firms has relations with external designers, compared to about 30% of not ID firms; in large companies percentages are 55% in ID firms vs. 25%), while not ID companies have invested in networking with research centers (table 7). According to the literature on innovation in fact, the organization of an internal structure allows creating and managing internal knowledge and competencies, which enhance the interaction with external resources and players (absorbtive capacity) (Cohen & Levinthal, 1990).

Insert table 7 about here

Another area of innovation we focused on concerns investments in ICT. On the basis of the specific model of adoption of new technologies by district firms, it is possible to identify two different typologies of ICT: commodity technologies and project-based technologies. The former is standard and cheap and has an important diffusion among companies. We can call it package (or off-the-shelf) technologies. Through email and the Web it is possible to share semi-structured information (technical and non technical drawings, impressions, sensations, etc.) that plays a critical role for product customization and for the competitive advantage of the firm. From this perspective the firms found easier to use standard communication technologies to cut costs, to

improve the quality of the interaction among firms and to qualify their usual links and to enlarge their market. Instead, project-based technologies, customized and more expensive, are relatively rare. In particular, ERP and groupware are one of the area were SMEs have traditionally less invested. As shown in table 8, in 2006 almost all the companies of any size use e-mail and a website. ERP is widely diffused among large firms (more than 70%), but only one third of small companies invested in such a solution. Groupware (workflow and/or discussion database) is even less diffused.

Insert table 8 about here

In the supply chains, relationships are managed informally and interactively: most of the firms do not have standard products. They have specific production competences that they put in place on the basis of the requests of the market. Hence, flexibility and quickness of response are crucial for the competitive advantage of SMEs that is mainly based on product customization. As a result, only a minority of SMEs adopted solutions like EDI (Electronic Data Interchange) and supply chain management to support information exchange and transactions, with higher percentages in larger firms.

Comparing ID and not ID firms, it emerges that companies operating outside industrial districts are more technology oriented, even if there are also similarities in the ICT adoption approach. The basic model of diffusion is the same (commodity vs. project technologies), but the percentages of adoption of not ID firms are usually higher, showing that those companies are using a wider range of ICT tools in order to co-ordinate and manage their activities within their value systems. However, e-mail, websites as well as more advanced technologies such as ERP

have are quite equally adopted in ID and not ID firms, while main differences are emerging for more specific and less established solutions like customer relationship management (CRM), supply chain management (SCM), sales force automation (SFA), overall in medium companies.

On one hand, those results confirm the relevance of the district systems for ID firms. Even if ID firms are globalizing by opening their value chains abroad, they still have a solid network of relations within the local system that do not required more advanced ICT solutions for business-to-business management. However, on the other hand, the local culture and the language shared by the firms of the district granted the effectiveness of communication and acted as a common ground among firms locally, but may represent a considerable sunk cost difficult to overcome at the international level. Hence, ID firms do not invest in those solutions and rely on more established ones such as email and the web.

CONCLUSIONS AND FUTURE RESEARCH

The paper offers a contribution on the debate concerning similarities and differences among Italian firms belonging to local systems and not district firms, by focusing on innovation strategies. Our analysis shows that the traditional district firm model described in the literature is transforming toward a more opened business model, where internationalization is becoming a dominant strategy for many district firms. Moreover, ID firms invest in exploiting the networks of creativity (designers) to support product innovation, even if R&D is not only limited to not ID firms. Nevertheless, science-driven innovation still seems to be predominant for firms not embedded in districts. Those firms are able to exploit national and international connections with established networks of research to enhance their competitiveness.

As far as the ICT adoption is concerned, one of the main original contributions of our paper is that of comparing strategies of Italian ID and not ID firms in the same industry specialization. Results show that there are not two opposite models between the two groups of firms, even if few differences exist. On the one hand, more advanced IT tools such as ERP – traditionally considered not tailored on the needs and organization of SMEs – are adopted with the same rates among district and not district firms. Despite the correlation between ICT (ERP) adoption and the size of the company, our analysis highlights similarities in approaching ICT in both firms embedded in local systems and the other firms. On the other hand, however, the local dimension of social ties and business connections due to proximity are still having a role in the choices of investment for district SMEs in terms of electronic networks.

Even if it is still preliminary in its terms, the paper offers a set of managerial implications for firms embedded in industrial districts. A first insight refers to the increasing level of competition a firm has to face even within the local context, where leading firms are not necessarily oriented to sustain local networks of suppliers through knowledge sharing and collaboration. Even small firms has to increase the level of their internal competences and specialization, being able to offer such distinctive potential to wider markets. Second, managing information and communication technologies is becoming crucial even at the local level for SMEs to catch the opportunities of global value chains. In this perspective, district firms that are not able to exploit ICT potentialities may suffer from the gap with local competitors as well as partners.

The main limit of our study is that it is still preliminary as far as the data elaboration is concerned. Further research should focus on a more detailed analysis on the correlation between industry specialization, innovation strategy (patents, brand and communication, design networks) and size to provide a more comprehensive framework of the firm models considered. Moreover,

differences among firm behavior may be influenced by localization in alternative regions within Italy and a more focused comparison between ID and not ID firms operating the same regions should be further explored. Another area of research investment should refer to the analysis of performances of the two groups of firms interviewed aiming at understanding similarities and differences in the economic impacts of the firm strategies.

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Table 1 – The sample by industry

	ID		Not ID	
	a.v.	%	a.v.	%
Fashion	174	40.2	40	10.4
Home-furnishing	120	27.7	45	11.7
Mechanics	131	30.3	188	49.0
Food	8	1.8	30	7.8
Other industries*	0	0.0	81	21.1
Total	433	100.0	384	100.0

Source: TeDIS, 2006

*Plastics, Chemical, Biomedical products

Table 2 – The sample by geographical area*

	ID		Not ID	
	a.v.	%	a.v.	%
North East	194	44.8	191	49.7
North West	124	28.6	193	50.3
Central Italy	94	21.7	0	0.0
South	21	4.8	0	0.0
Total	433	100.0	384	100.0

Source: TeDIS, 2006

*North East: Friuli Venezia Giulia, Veneto, Emilia Romagna, Trentino Alto Adige
North West: Lombardia, Piemonte, Liguria
Central Italy: Toscana, Marche, Lazio
South: Campania, Puglia, Abruzzo

Table 3 – The sample by turnover

	ID		Not ID	
	a.v.	%	a.v.	%
Up to 5 ml euro	82	20.2	10	2.6
5,1-10 ml euro	129	31.8	83	21.7
10,1-25 ml euro	128	31.5	111	29.0
25,1-50 ml euro	38	9.4	93	24.3
More than 50 ml euro	29	7.1	86	22.5
Total	406	100.0	383	100.0

Source: TeDIS, 2006

Table 4 – The profile of the sample by turnover

	ID			Not ID		
	5-10 ml Euro	10-50 ml Euro	More than 50 ml Euro	5-10 ml Euro	10-50 ml Euro	More than 50 ml Euro
Prevailing finished products for the market (% on total companies)	39.5	47.5	34.6	48.5	45.9	42.3
Average employees	39.8	90.8	402.9	41.9	120.9	306.4
Average Export (% on turnover)	38.9	44.7	55.2	28.3	38.7	40.4
Internationalization of production*	20.9	27.1	65.5	16.9	18.1	27.9
Group (% on total companies)	17.7	36.1	68.0	33.3	46.0	78.0
Competitive position of leadership (% on total companies)	12.9	22.1	52.0	22.4	42.2	56.3
Relevant competitive position (% on total companies)	62.9	57.1	20.8	60.3	46.9	37.5

Source: TeDIS, 2006

* % measures the number of companies on the total interviewed that have at least one foreign supplier and/or one FDI

Tab 5 - The first source of competitive advantage (%)

		Quality of products	Production costs reduction	Product innovation	Flexibility	Design	Service	Communication and brand	Distribution abroad	Delocalization of production
5-10 ml euro	ID	28.1	23.1	20.7	17.4	4.1	5.0	0.8	0.0	0.8
	Not ID	25.0	21.7	30.0	6.7	3.3	10.0	3.3	0.0	0.0
10,1-50 ml euro	ID	29.4	21.6	24.2	10.5	5.9	5.2	1.3	0.7	1.3
	Not ID	22.4	24.0	28.0	13.6	3.2	4.8	2.4	0.8	0.8
> 50 ml euro	ID	25.0	25.0	29.2	8.3	4.2	8.3	0.0	0.0	0.0
	Not ID	23.9	26.1	32.6	6.5	0.0	8.7	2.2	0.0	0.0

Source: TeDIS, 2006

Tab 6 - Design and R&D functions

		Design	R&D
5-10 ml euro	ID	31.1	33.6
	Not ID	25.0	46.4
10,1-50 ml euro	ID	41.0	53.6
	Not ID	20.9	58.2
> 50 ml euro	ID	58.3	79.2
	Not ID	22.9	66.7

Source: TeDIS, 2006

Tab 7 – Innovation networks: relations with research centers (%)

		Italian universities	Universities abroad	Scientific parks	Italian research centers
5-10 ml euro	ID	12.6	1.7	3.4	7.6
	Not ID	19.6	1.8	1.8	5.4
10,1-50 ml euro	ID	24.3	4.3	0.7	7.1
	Not ID	39.8	6.5	4.6	15.7
> 50 ml euro	ID	45.8	8.3	4.2	16.7
	Not ID	55.6	11.1	16.7	22.2

Source: TeDIS, 2006

Table 8 – ICT adoption (%)

	5-10 ml euro		10,1-50 ml euro		> 50 ml euro	
	ID	Not ID	ID	Not ID	ID	Not ID
e-mail	100.0	98.8	100.0	98.5	100.0	100.0
Web site	86.0	91.6	89.8	93.6	93.1	93.0
Corporate Banking	75.8	71.1	69.3	77.3	82.8	69.8
Broadband	53.9	68.7	68.7	79.8	89.7	83.7
ERP	30.5	33.7	53.0	57.6	72.4	72.1
groupware	16.4	26.5	32.5	40.4	34.5	44.2
EDI	13.3	13.3	15.7	20.8	27.6	37.2
videoconferencing	10.2	10.8	11.4	30.4	41.4	53.5
e-commerce	3.9	0.0	0.6	2.9	3.4	3.5
CRM	7.0	7.2	9.6	20.7	17.2	29.1
SFA	5.5	2.4	7.3	12.3	20.7	18.6
SCM	5.5	4.8	12.7	22.2	24.1	18.6

Source: TeDIS, 2006