Research Paper Economics

The Role of Knowledge in Innovation: the Empirical Results in the Baby Clothing Sector

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ABSTRACT

The aim of this work is to consider how the innovation, generated by knowledge and by social capacity and interactions, induces changes in the competitive dynamics of the garment sector and how knowledge and innovation are the key variables in understanding the recent structural changes in technical and organizational terms, observed in a local production system. The relationship between knowledge and innovation is discussed in the theoretical part of the paper. The empirical aspect remains based upon the original results of surveys conducted on a sample of entrepreneurs specializing in the baby clothing sector in the provinces of Bari and Martina Franca (Taranto), in the Apulia region in southern Italy utilizing a multi-method approach.

Summary

In this work, the knowledge and, in particular, the tacit knowledge represent the decisive factors in the creation of competitive advantage, in the survival of firms in a global market and provide a basis for continuous innovation. The firms, in fact, in our sample represent the organization where knowledge is not produced through a process of the integration of learning and formal research, but represent places of specific competences and capacities that provide a basis for continuous innovation.

Keywords : Knowledge, Innovation, Baby Clothing Sector, Southern Italy

1.Introduction

The peculiarity of local production systems is the cultural background of knowledge and cooperative behaviours that does not lead only each company and each operating subject, but all together, to the achievement of economic benefits, that are the result of external economies after undertaking and within the industry. The success of local production systems can be explained with the high degree of specialisation that in turn generates tacit knowledge that becomes more and more extensive thanks to the experience and the interaction between the different actors. There is no doubt that their competitiveness and the reproducibility come from the knowledge of how integrate the tacit knowledge with that codified, that guarantees the possibility of transmission is both in the same production structure and between the structures

The cognitive approach to production function considers social capabilities and knowledge as key variables for understanding the recent structural changes and economic growth of an local production system. The peculiarities of knowledge include social capabilities or social abilities, since they help enlarge knowledge learning processes and promote network diffusion. The former depends on the degree of cumulativeness, and appropriability, which represents the capacity of new knowledge to generate yet more knowledge and innovation. The higher the degree of appropriability of knowledge, the lower the capacity of diffusion in a local production system and, consequently, its growth. The peculiarity of knowledge and in particular of tacit knowledge form a crucial element in the social capabilities that are associated with enlarging knowledge learning processes and network diffusion.

In this work, we analyze, from a theoretical perspective, the different typologies of knowledge, its creation and diffusion and the innovation role in the section two. In the section three we explain the choice of the case study. The empirical analysis, in the section four, based upon results of producer surveys in the baby clothing sector in Apulia, region of South Italy, show how the innovative capacity, generated by knowledge and by social interactions, causes changes in the competitive dynamics of the sector. The last section concludes the paper.

2.Knowledge and innovation as a productive factor

Based on production factors are earth, work and capital, it cannot be denied that knowledge is a factor in any product realization. It stands to reason a process of knowledge accumulation produces innovation and, then, technical progress has in the economic development a crucial role. According to Schumpeter, the changes that lead to development are: the introduction of a new good or a new production method, not necessarily based on a scientific discovery. For instance, they can be a new form of marketing, access to a new source of raw or semi-finished materials, or a new industrial organization. The distinction between invention and innovation makes it clear that if research contributes to innovation, the value that is derivable from it cannot be ensured without the entrepreneur's initiative. Consequently, if competitors dominate in product/process innovation or marketing, this will not create better value for the consumer or greater competitive advantage for the enterprise. So, given that business is the engine of innovation, it is not feasible to invest in R&D if the technical progress is a public good characterized by non-rivalry and non-exclusiveness.

The neoclassical models of development (Solow, 1957) using constant returns-to-scale production functions, with positive and diminishing marginal productivity, deal with technical progress as an exogenous parameter that prevents zero growth. In this way, any economic system, bearing in mind its institutional specificities, can follow its own path to growth and converge to equilibrium. The attempt to exceed the limits of this theory assumes that technical progress is endogenously produced, but not appropriable (Arrow, 1962);considers that human capital, like any other physical capital, can be accumulated over time to produce "self-sustained" growth (Lucas, 1988; 1993); and identifies an activity involved in technical progress that is directed at developing knowledge, which when incorporated into the physical capital, will produce increasing returns (Romer, 1990).

Therefore, technical progress is an impure public good be-

cause it is appropriable and exclusive; this means that, according to Schumpeter, the time needed for innovation dissemination, combined with imitation capacity reduces monopoly power, but leads to further innovation. This, therefore, would seem to be why it is believed that higher expenditure in R&D and in the adoption of the new available technologies will remedy the low productivity and poor competitiveness of the Italian economy. The driver of the knowledge-based economy is the technological innovation derived not only from expenditure on R&D, but also related to industrial organization and marketing.

The enterprise's evolution, the choice of more complex legal forms, the separation between ownership and management, and the consequent or existing modification of the market's structure, all favour large enterprises, which, in turn, take control of market shares and raise strong barriers. In this context, innovation is produced by the large enterprises, whose research activity produces innovation which is distributed according to precise industrial policy choices, leaving little room for the individual entrepreneur.

So, is innovation a feature of large enterprises and if so can the low competitiveness and productivity of the Italian economy be attributed to the medium and small size of its enterprises? According to Schumpeter's idea of an entrepreneur as someone able to create an innovation, the small size of a company is more suitable, in a context where the access to the innovation is free.

Small companies can gain access to the market more easily and rapidly, and can compete with companies already operating in the market. In the long run, this form of innovation evolves towards the institutionalized form characteristic of large enterprises, which use strategies to associate R&D expenditure with high scientific content innovations that generate global changes, and with profit maximization, and which have access to markets that are barred to the small innovator-entrepreneur.

In relation to the Italian economy, we cannot assert that there is an irreversible connection between innovation and the enterprise size (Archibugi and Imperatori, 1997), nor can we affirm that in large innovative enterprises, the thrust towards innovation is aimed at consolidating the competitive advantage, deriving from the adoption of new technologies. Rather, it is directed towards achieving new shares of the national market. This is demonstrated by the fact that large Italian enterprises differentiate their activity in sectors that are totally different from their core business. The connection between innovation and enterprise size also cannot be analysed out of context, that is, without taking account of the concentration of enterprises in a given industrial area (Pavitt, 1984). Knowledge develops and can increase productivity according to the extent of the information circulation which connects codified knowledge with that present in each productive system.

The knowledge that resides in production systems is generally tacit and is typical of the knowledge in Italian industrial districts. It is present in every person and system, although individuals may not be aware of this or of how the knowledge is formed. Codified knowledge belongs to those who possess specific competences and can be improved, exchanged and transferred. Tacit knowledge cannot be exchanged. Both types of knowledge are based on the labour and learning division, since they can increase productivity and competitiveness only when they are acquired. The combination of codified and tacit knowledge lads to localized knowledge (Antonelli, 1999, 2008; Metcalfe, 1999; Ibrahim et al. 2009; Casanueva et al. 2013).

According to Helpman (1998), IT are *general purpose technology* or innovations, which possess a remarkable availability to be used both in quantitative and qualitative terms. This results in a new industrial revolution which involves the adoption of new organizational models by enterprises to obtain improvements in efficiency deriving not only from scale economies, but also from other instruments, such as the passage to a modular structure of production (Milgrom and Roberts, 1988), as in the second post-Fordist revolution., or to a structure that integrates enterprises operating in the same field willing to combine cooperation and competitiveness.

The advent of IT, which reduces transaction costs significantly, contrasts with the traditional model of industrial organization which evolves into a network where products do not only depend on factors availability, but also depends on the relationships with other enterprises and institutions. Technological revolutions induced by IT affect labour productivity (Aghion and Howitt, 2002) when high levels of human capital develop in an appropriate institutional context. Therefore, it seems important that for both the transmission of tacit knowledge prevailing at the local and regional levels, and for the transfer of codified knowledge available internationally, the innovative national system plays an important role (Cainelli, Leoncini and Montini, 2003), since, where this is inadequate, the benefits of the innovation on the factor productivity would be insufficient.

Knowledge accumulation within the firm creates innovation strictly connected to acquired or acquirable skills. The well-funded research laboratories of large enterprises make it possible to elaborate innovative projects. In a specific industrial sector, knowledge accumulation depends on the low grade of knowledge appropriability and on the large extent inter-firm diffusion. This is the key for strengthening knowledge cumulability in a local context, where the firms can take advantage of localised externalities and geographic proximity- openness (Boschma and ter Wal 2007). The Key role of user- producers interactions in the empirical analysis (Fransman, 2010) show the importance of external knowledge. In fact, "the generation of new knowledge by each agent can take place only where and when knowledge interactions qualify and complement knowledge transaction and provide effective access to external knowledge" (Antonelli and Scellato, 2011).

3. The Case of Baby Dresses: Results of Survey

The empirical investigation was conducted within the provinces of Bari and Martina Franca (Taranto) in the Apulia region in southern Italy, through the administration of questionnaires to producers in the baby clothing sector and considering sportswear, outerwear, ceremonial clothing and pullovers. The questionnaire was made to businesses using e-mail, through direct contacts preceded by telephone appointments or administered during a specific sector event (*Pitti Immagine Bimbo,* Florence, January 2012), the most important international fair organized in Italy, reserved for buyers in the sector and considered a platform to showcase new trends in baby "lifestyle". The choice of the sector resulted from its having taken over the leading position in the textile and clothing industry in the Apulia region, with the presence of *c.* 7,000 businesses and 38,000 active employees (*Osservatorio dei distretti industriali,* 2011) and 123 in the baby clothing category with Infoimprese data. In particular, the province of Bari and Taranto, have a presence, respectively, of 85 and 38 firms, producing and/or repackaging their own clothes and for third parties. The results of the survey are based on a sample of 42 companies that package and sell children's formal wear, pullovers (hosiery), sportswear and outerwear (coats and jackets) for the 0 - 14 age range. Almost all companies surveyed have headquarters in the Province of Bari (90%) of which 38.1% are in Putignano (Bari), an area specializing in the production of wedding dresses and ceremonial clothing and 9.5% in Martina Franca (Taranto).

The survey shows that 23.8% of the enterprises in question were started in the 1980s and 1990s, 19.1% after 2000 and 9.5% prior to 1960, the latter therefore being third generation businesses, boasting know-how consol-

idated over time using innovative techniques and invest more than 100-200 thousand euros in R&D, but not in learning and skills. These are businesses that are found in the higher size class of the sample, that is to say with between 100 and 150 employees. These initial results confirm the Schumpeterian thesis according to which larger firms invest more in innovation, design, fashion, precisely because they are able to maintain their competitive advantages over the long term. The main legal form of the businesses in question is that of the limited liability company (78.6%). An examination of the size class shows that, given the sector, 42% of the firms are small-to-medium scale enterprises with an average number of 28.8 employees, 24% are medium-to-large scale firms with an average number of 86 employees with 22% being small-scale businesses with an average number of 11.44 employees. Only 12% are micro-enterprises with an average number of 5.8 employees. An analysis of the questionnaires also revealed that the number of employees was reduced considerably over the period 2001-2011, particularly following the crisis of 2008. The average number of full-time employees in R&D and Design, equal to about 16.4, is significant considering the size class of reference. In this case a direct connection exists between the number of employees in R&D and Design and enterprise size that has grown stronger over time. This is most probably, and as argued by Demsetz (1974), as a result of the success and profits achieved, the firms have continued to innovate. But this connection cannot be analysed out of context, that is, without taking account of the concentration of enterprises in a given industrial area (Pavitt, 1984).

The number of customers is more than 50 for 90% of companies, and among these, some, the largest, have a thousand clients in Italy and abroad. Only 10% have less than 50 customers but these are contract manufacturing companies which therefore select their clients. In any case, as many as 22% of the sample firms produce under their own label and are contract manufacturers. Others are contract manufacturers working as tailors, others still produce their own brands, owning licenses. 50% of the companies making up the sample have between 11 and 50 suppliers. In this case, the companies are very dynamic as they relate to a wide range of local and national customers and suppliers located in Northern Italy in order to provide fabrics and, in particular, the suppliers for polyester being located in Veneto, Lombardy and Tuscany for cottons together with Prato and Biella for linings and wools. There are also foreign suppliers such as those in China and Turkey for the purchase of accessories and semi-finished products.

The attention paid to national and international market penetration is very important for the companies analysed. Some 52% of the firms distribute their product by relying on sales agents and distributors, operating both in Italy and abroad. The internationalization, however, is not purely commercial in nature, thus affecting only the sales and distribution chain, given that some firms have relocated the production process abroad (Albania, Thailand, China and Turkey), or have entered into sub-contracts and licenses (4.7%). Some companies (7%) have showrooms throughout Italy. Internationalization is most prevalent in this sector, including through subcontracting agreements, as consumers are often not willing to buy clothes that are too expensive. The garment, in fact, has a rather short life due to the rapid growth of the child, for the specific event of which customers are willing to spend rather a lot. By internationalising some phases of the production process with higher labour intensity, companies are able to reduce production costs and satisfy the consumer. The steps that create higher added value such as the creation of the dress, fashion, design and innovation together with those below, such as product quality control, packing, distribution and sale are, however, controlled directly by the parent company in Italy. In this sector, since competition is very high, an important source of differentiation is the geographical location as consumers, preferring nearby and easily reached stores, take the sale price of the goods and transport costs for their purchase into account. This explains why the companies in the sectoring question make use of many commercial agents in Italy, Spain, Russia, USA and the UK and have outlets throughout Italy and abroad. All of this depends on the degree of customer loyalty, the vertical differentiation linked above all to the good quality of the goods certified as “Made in Italy” and produced using environmentally-friendly materials and dyes that are certified and non-allergenic. In fact, the *Eco Safe* brand is increasingly popular.

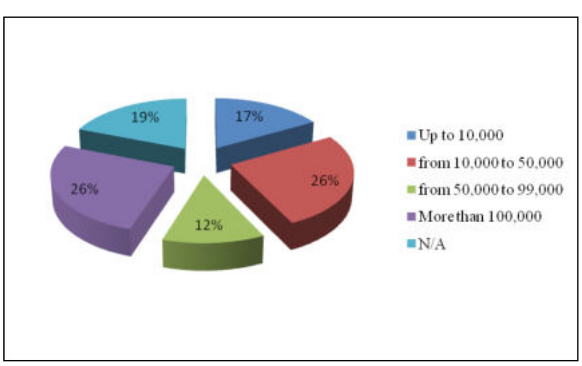
The spread of online sales or the viewing of the catalogue online, which is widespread among the firms in our sample, makes them more competitive, because they get closer to the consumer, eliminating the geographical distance. Online sales in the baby clothing sector is in fact very popular.

3.1. The role of Knowledge and innovation

Research & development and design represent a particularly significant factor in this sector, that, for 90% of cases are conducted in-house with the company relying on a research team, which, in 10% of cases includes cooperation with external companies. Firms in the sample seek to strengthen their presence in domestic and international markets through the creation of innovative samples, investing in quality products - many companies are certified as 100% “Made in Italy” - conducting careful marketing policies, for which they spend an average of €54,000 a year and more than €100,000 euros for 9.5% of the firms in the sample. The websites, deemed very important by 66% of the companies, make market access easier, facilitating contact with consumers to which can be added, as noted above, the online sales.

The great attention paid to innovation, is borne out by the spending on R&D and Design, the survey showing (Fig. 1 about here) that 26% of the companies, spent more than €100,000 in 2011, 12% from €50,000 to €99,000 euros, 26% €10.000 to €50.000 and only 17% up to €10,000. It is important to highlight that the high spending on R&D and design is carried out not only by the largest-sized firms, but also by smaller sized companies, although the figures are more modest. This is a very important result because the firms in the sample, despite the economic downturn, continue to invest although rather less than in previous years. This sector as well, however, companies spend little in Learning and Skills.

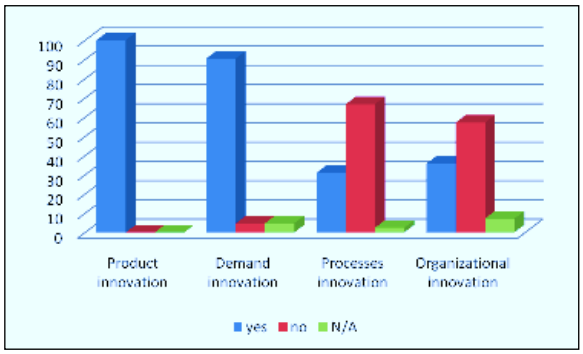
Figure 1- Expenditure in R&D and Design (2011, Euros)



Source: *our analysis of the survey data*

100% of the companies surveyed pay particular attention to product innovation (Fig. 2 about here) and in most cases (90.5%) innovative activity is a result of demand.

Figure 2 – Levels of innovative activity in enterprises



Source: *our analysis of the survey data*

In fact, the research channels and creation of baby and child fashion, although originating from those of women's fashion, (given that, in most cases, it is a woman purchasing for the child and therefore her choice that prevails), require and develop, however, with different colours, cuts and materials that have to take into account the needs, the psychology and the preferences of the child, which varies according to age. They differ, therefore, in their specific lines, sense of style, colours and age range.

It should also be noted that many famous brands for men and women in Northern Italy, have broadened and diversified production, exploiting the economies of scope, putting a line of children's clothing next to those for men and women and allowed the licensing of their brand for use by the children swear companies that fall within the sample, relying on the expertise of the latter, which have adopted business strategies with the recourse to "Buy" rather than to "Make". The firm of our sample, therefore, in addition to producing their own brand/s, have production licenses. It follows that the intensity of formal and informal relationships with businesses outside the industrial district is very important and relevant. The analysis conducted shows that the sample firms have woven important relational ties with other local businesses both formal and informal. These are part of the industrial district approved in 2010 - one is the leading company - and the number of businesses with which some companies in the district may interact has reached, for some of them, as many as 50 or even 150 businesses. What is more, in addition to being their own producers, they are also the contract manufacturers in the district and 31% of the respondents are members of the Consortium Baby Italy, founded in 1999 with its headquarters in Putignano. In particular, the Consortium plays the role of assisting the member companies in organizing major shows and organizes national and international missions to foreign countries, including Japan, Russia and China.

The exchange of knowledge between companies that are direct competitors producing goods that are close substitutes but differentiated in terms of quality and design in order to meet the needs of consumers, is important. The businesses in the industrial district, in fact, relate and exchange knowledge within the consortium of which they are members as well as during shows. Many companies, as we have noted, not only produce their own goods, but are also contract manufacturers for other companies in the district, with whom they relate continuously and informally, in a similar fashion to that which takes place with local, regional and national businesses. With companies with whom they enter into licensing agreements, however, important relations of a formal nature prevail, but the exchange of knowledge is equally important.

In most of the enterprises that make up the system, meetings between the workers and owners, manager and workers, and intra managerial, are, by and large, very informal, the larger firms organizing formal and informal meetings with designers and stylists from outside the company, usually to define a collection of clothes.

One can identify a transmission of knowledge in dealing with suppliers, especially those that are local and regional.

The suppliers as well, both local firms in the sample and national ones, maintain important relationships and exchange knowledge on new materials and fashion trends. However, these relationships are distinguished by being more formal with foreign suppliers, with those outside the district and/or those with their headquarters in central and northern Italy including those in Tuscany, Lombardy and the Veneto for fabrics, polyesters, linings, cotton and wool, and more informal relationships with local suppliers. Relations with most of the external buyers are established in the course of events reserved exclusively for industry professionals. Participation in local and national events, including *Pitti Immagine Bimbo*, reaches 67%, with just under 28% of companies also participating in fairs and shows taking place in France, the United Kingdom, Spain, Japan, Russia and the U.S.A.

The companies that perform processing innovation (31%) also equip themselves with the latest hardware and software of an operational nature. They produce clothes that not only require the use of a traditional production process, but also technical sportswear and outerwear, including jackets, coats and padded jackets, which require the use of new machinery, teletechniques and products certified as environmentally friendly or non-allergic. These companies coincide with those that spend more on R&D and marketing. It should be added that the innovation process culminates in the use of CAD (Computer Aided Design) or CAM (Computer Aided Manufacturing), in order to improve production efficiency. In 85.7% of cases the prototypes are processed and manufactured using CAD or CAM, and in other cases are drawn by hand. The companies also carry out experiments with regard to processes in 40.5% of cases and the product in 97.6%.

35.7% of companies surveyed are also careful to innovate with regard to their organization, through the relocation of some high labour intensity production processes, maintaining the entire procedure of design, fashion and innovation, the creators of value, 'in house'.

The lively innovative performance, met with in this traditional sector, reflects the importance that is attributed to the exchange of information and knowledge.

Great importance is attached (in 100% of cases) to information relating to innovative knowledge and the market, obtained mostly from trade fairs (77%), national and international markets (81%), customers (75%), specialist magazines (67%) and contact with other IT firms in same sector (65.5%). Knowledge is also acquired by contact with other foreign firms in the same sector (57%), contacts with commercial agents (57%), suppliers both internal and external to the system (51.18%), by consulting specialist journals (43.3%) and through the association (49%).

5.Conclusion

The results of the case study show that the relationship between knowledge and innovation does not only involve large enterprises but small and medium-sized businesses as well, where innovation is to be understood not only as an investment in research and development and in the adoption of new technologies, but also as the gradual change of types of product, adapting to constant changes in consumer tastes, implementing new organizational methods, both internally and in their relationship with other companies, customers and suppliers (Cappellin 2010) as well as creating new types of contract, means of distribution, marketing slogans and new individual ways of working (Tether *et al.* 2005), marketing and design innovation. The firms in our sample represent the organization where knowledge is not produced through a process of the integration of learning and formal research, but represent places of specific competences and capacities. On

the other hand, the issue of training leads neatly on to the characterization of a cluster or an industrial district, as tacit knowledge is transmitted through learning by doing. This having been said, the sample firms underestimate the importance of investing in human capital, training and the formation of general skills and specific skills (Becker, 1964) as important in determining productivity and growth. Many of the firms require specific skills which cannot be provided by general-purpose education and new technologies, and organizations require continuous learning, best accomplished by workplace training.

From the results of the survey it was also found that the performance, class size and the strategic choices in the sector examined is different even though the companies are located in the same area. This reflects the presence of a range of enterprises characterized by specific features, in the same local context where the firms at work are characterized by high flexibility and adaptability to demand for which they are able to create market niches given the specific nature of the product, but still suffer from international competition.

It would seem that in the sector on our study there is a lack of belonging and confidence that goes on to impact on the types of relationships that are established between the agents in the cluster. There are strong ties within a particular enterprise as these are often family-run structures that are typical of the southern Italian industrial system, while with the other agents weak ties the are most common (Granovetter, 1973, 1983). Their strength lies in the fact that through weak ties, people moving in different environments are more likely to come into contact with people who have information and useful contacts for both the employer and the employee, becoming, in fact, a source of information that enables the mobility of labour. The importance of establishing ties outside a small circle of friends and family that characterizes the strong bonds is that the information circuit ends up being too small, but the sense of cooperation and trust is higher. Thus, paradoxically, the rather weak ties, driven by opportunism, are needed to integrate oneself into a community that is part of a cluster.

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