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# Technology and Organization Settings in Knowledge Networks: An Empirical Research in the Banking Industry

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# TECHNOLOGY AND ORGANIZATIONAL SETTINGS IN KNOWLEDGE NETWORKS: AN EMPIRICAL RESEARCH IN THE BANKING INDUSTRY

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## Abstract

*This paper presents a theoretical and an empirical study of knowledge networks. This is an emerging phenomenon and a common form of work structure adopted also in the banking industry. Starting from the theoretical perspective, this work focuses on knowledge as an important factor in the modern economy of hyper-competition, needed not just to win, but also to play. In fact, the structure of economy has shifted from a product-based strategy to a knowledge-based business. Among numerous definitions of knowledge proposed in the literature, we share the hermeneutical one. Successively, this paper studies network phenomenon as a form of collaborative work based on communication and collaboration. We aim to demonstrate why network structure best allows knowledge sharing practices inside a firm. Finally, we propose a study on sixty banks, realized using structured and unstructured questionnaires and interviews. Questionnaires try to analyse two main changing dimensions related to knowledge networks implementation: the organizational one and the technological one. We observe that a change toward a knowledge sharing culture and perspective is just in the early stage. Moreover, analysing the empirical results reached examining the sample, we demonstrate that banking industry can face many barriers to knowledge sharing practice through networks.*

*Keywords: Knowledge networks, Team work, Technology adoption*

# 1 INTRODUCTION

Knowledge is becoming one of the main strategic assets in the modern economy of intangible assets, needed not just to win but also to play in the market (Druker, 1993; Nonaka, 1991). According to Druker (Druker, 1993), the period we are going through has to be considered and defined post-capitalist because of the increasing interest of firms on knowledge as the only factor of production which can let firms to compete. In the past, knowledge was important as well and it cannot be different since every action implies knowing about what to do. It is a strategic asset that brings to the sustained growth and competitive positioning of the organization (Zack, 1999). Because of the rapid change and globalization, information gained about market, competition and competitors also play a strategic role, reducing uncertainty on business. Thanks to the new technology of information and communication, firms are managing in a better way information and knowledge inside the firm. But investing in technology is not enough: becoming a knowledge creating company means not just investing in ICT, but also creating a new form of organization – a more flexible one -and creating a new culture of cooperation and coordination. Consequently, it's necessary to adopt new roles using flexible knowledge culture and advanced IT. A change in this way implies a deep commitment of management, who has to focus his attention at the same time on people, processes, places and technology.

The firm is becoming a learning system thanks to the creation of technological and virtual links, which characterize a network, that allow people and business units - considering a single firm – to communicate and cooperate. This network between members brings to the creation of a firm's knowledge base: every firm does not create its knowledge by its own, but the organization members produce it (Nonaka, 1991). The development of organizational repositories of knowledge allows the firm to reach excellent results of economic performance (competitiveness or remunerative-ness) and social performance (for example empowerment, quality of work, job rotation). But not only: knowledge and learning are also basic activity for the innovation process, which is essential to survive in a hyper-competitive context. These are the main reasons of the increasing importance of knowledge sharing inside the organizations.

This paper is organized as follows: after a brief introduction, it focuses on the existing pertinent literature to explain what can be defined organizational knowledge. Than the research model developed here examines and answers to two main questions: (1) why knowledge can be best managed using network forms of working structure and (2) why the importance of technology is increasing in supporting knowledge network systems. After proposing the literature review, this paper offers the empirical research results and findings relative to the Italian banking industry, focusing on a critical view of technology adoption in this industry. Particularly, through the empirical research on the banking industry, this paper is also trying to analyse (3) Italian banks behaviour towards individual and collective knowledge sharing programs.

# 2 THEORETICAL FOUNDATION AND LITERATURE REVIEW

Many are definitions of knowledge proposed by literature. In particular, this paper shares an hermeneutical view, which implies a distinction between data, information and knowledge (Leonard-Barton, 1995; Huber, 1991). Data are raw numbers with no meaning and which are not interrelated (Davenport, Prusak, 1998); information are connected data with a particular meaning referred to the context in which they are used and reused (Laudon, Laudon, 1991); knowledge is information enriched by experience and evolves every time someone's intuition, perspective, information, mental models or experiences change (Alavi, Leidner, 2001; Bourdreau, Couillard, 1999). To create knowledge is than important the human element: workers give to information a meaning, depending on their competences, their know-how, abilities, culture or thoughts. The reason for choosing this particular view is that we think it strongly underline the difference between information and knowledge also in terms of their management using IT: sharing this definition, information can be than well controlled and managed using technologies of communication, while knowledge implies

something more - the human element – and so information technologies are not enough to keep it under control. Using the empirical research, starting from this definition and distinction, we analysed both aspects: we verified the ways banks manage information – considering data collection - and the way they manage knowledge – considering the human element.

Knowledge can be the result of an individual or a group learning process (Bourdreau, Couillard, 1999). Passing from an individual to a collective view, in Knowledge Management perspective organizational knowledge becomes a strategic asset – because it brings the organization to innovation - according to the organization's capacity of continually and consistently creating, disseminating, reusing everyone's knowledge and information (Nonaka et al., 1998). Nonaka also pointed out how organizational knowledge can be created using a spiral mechanism: passing from a single level to a collective level, knowledge is recombined using adequate mechanism of interaction and cooperation and creating shared spaces or "ba", supported also by technology (the cyber "ba" marks the increasing importance and use of IT to share knowledge), where individuals can interact one with each other (Nonaka, Konno, 1998).

What is different from the past is not the meaning but the way knowledge is managed. Firms are paying attention to every human source as a strategic one because of information, know-how, competencies, skills which characterize them. A knowledge based approach in fact aims to valorise the importance of every single member's knowledge, trying to diffuse it in the organization and letting others to use it, after making it explicit: all this implies an effort from both the organizational and technological point of view to allow knowledge sharing practices. This is what we will examine answering to our third research question.

One of the biggest obstacles from the organizational point of view is the high presence of tacit knowledge inside a firm. As Polany stated (Polany, 1966), knowledge can be classified in tacit or explicit. The explicit form is the one which can be best managed, incorporated in physical supports, transmitted using technology and virtual links. Making knowledge explicit implies also organizing personal knowledge domain (Hollingshead, 2000).

In this work, for organizational knowledge we intend a combination of tacit and explicit contextualized information, which supports both individual and collective decisional processes (Davenport, Prusak, 1998). This definition of organizational knowledge implies than a consistent knowledge sharing between members thanks to physical or virtual communication and collaboration: in other words, it is supported by network forms of cooperation.

Networks theories can so be applied to the management of knowledge. The first form of network was adopted in USA in 1969, when computers of different universities have been connected one to each other in conforming with a project of the Department of Justice. Networks support a high innovative work, because of their capacity of creating, between members and their knowledge, cognitive networks supported also by ICT (Vicari, 2001). Cognitive networks create a context of creative chaos, which has been theorized by Nonaka (Nonaka, Tacheuki, 1995) and which is the starting point for innovation.

Thanks to these links, supported by both formal and informal channels, and thanks to communication supported also by ICT, a firm provides the basis for collective learning (Moreland et al., 1996; Hollingshead, 1998). Since organisational knowledge is distributed in different minds, to use it effectively the organisation should make it accessible after making it explicit: what is relevant is that individuals can have access to others knowledge. A contribute to this theory, which is referred to as "transactive memory", is offered by several authors (Moreland, 1999; Wegner, 1987): knowledge repositories are linked to a bigger domain thanks to technologies of information and communication, which facilitate the storage and processing of information. This is one of the main reason to justify the second of our main questions, the increasing importance of ICT. Also through the empirical research, we will analyse the importance that banks give to this factor and, in particular, what typologies of technological tools they prefer.

Analysing the organizational perspective, many theories support the creation of networks for knowledge sharing inside a firm. In their work Alavi and Leidner (2001) state that interaction and cooperation inside the firm is encouraged by the aim of creating a competitive advantage which is unique and not simply to imitate. This occurs because knowledge is strongly related to its bearer and strongly refers to the context in which it is created (Nonaka et al., 1995).

The resource dependency theory explains the reason for turning to someone's help (Pfeffer et al., 1978). Many theories of firm's organization explain why members in a network share their knowledge. We refer to the homophily theory (Brass, 1995) and to the physical proximity theory (Johnson, 1992). The first theory states that employees create links of communication – and so networks – with all those individuals who are similar. Similarity or homophily in fact makes easier communication because between members who have similar interests a climate of trust is usually created. The second theory states that communication is easier if members are closed to each other – proximity – and can interact. The organisation increases the probability of co-operation if spaces for interaction, incentives and time are provided. Only if people can talk to each other, they know others interests and beliefs. This the starting point for sharing implicit knowledge (Nonaka, Konno, 1998). Knowledge networks creation can be supported and explained also by social theories, including theories on social capital (Lin, 2001; Coleman, 1990), theory of structural holes (Burt, 1992), theory of the strength of weak ties (Granovetter, 1982). As concerns the first research question, networks for knowledge sharing represent a good alternative to market also because they are based on a more flexible and collaborative business instead of a price mechanism, which could bring to opportunist behaviour (Williamson, 1975; Jones et al., 1997).

According to Miles and Snow (Miles, Snow, 1986), networks - considered as forms of flexible work - encourage cooperation also because of the informality which characterize them. Informality of inter-personal relationship brings people to share more knowledge in the explicit form, which is usually hard to make explicit (Nonaka, Takeuchi, 1995).

As concerns the second research question, analysing the technological perspective, Poole (Poole, 1999) stated that new organizational forms and structures, including networks, are characterized for an increasing use of information technology to support a better and strategic distribution of knowledge inside the organization. Focusing on technology adoption, proliferation of information and communication technologies in the workplace has facilitated the overcoming of distance obstacles. Knowledge networks are defined as "distributed repositories of knowledge elements from a larger knowledge domain that are tied together by knowledge linkages" (Monge, Contractor, 2003). The presence of technological aspects is than relevant in the previous definition.

Creating a knowledge sharing vision supported by networks implies than not just technological changes, but also organizational one. In particular, adopting a new way of organizing work means also cultural change. New organizational forms are moving towards new concepts: team work, flexibility, job rotation and job enlargement are new forms of working adopted to promote a better sharing of know-how, information and knowledge, which need to be supported by a culture of acceptance of mistakes, collaboration, willingness. Unluckily, cultural changes are always the hardest to implement as we find out through the empirical research, answering to the third research question.

The situation we have presented raises many managerial challenges empirically analysed in the banking industry. This paper will focus on an empirical study considering both the organizational and the technological dimensions necessary to implement an efficient knowledge network inside the firm.

# 3 RESEARCH METHODOLOGY

For this study, a sample of the first sixty banks in Italian classification has been interviewed through structured questionnaires, which have provided with quantitative data and through semi-structured interviews, which have provided the research with qualitative results (Jarvinen, 2001, Yin, 1989, Kraemer

(1991, Grandori, 1997). The banking industry was chosen thanks to the deep transformations and technological and organizational innovations that characterize the organizations that belong to it.
The revenue percentage has been 59%. The sample has been classified in relation to the classification of Bank of Italy1: major banks, big banks, medium banks, little banks, minor banks, banks with particular activities, online banks (see table 1).

| Type | Description | Composition (%) |
|---|---|---|
| Major banks | Managed accounts, deposits and exchange funds > 45 billion euro | 40% |
| Big banks | Managed accounts, deposits and exchange funds between 20 and 45 billion euro | 10% |
| Medium banks | Managed accounts, deposits and exchange funds between 7 and 20 billion euro | 5% |
| Little banks | Managed accounts, deposits and exchange funds between 1 and 7 billion euro | 40% |
| Minor banks | Managed accounts, deposits and exchange funds < 1 billion euro | 10% |
| Banks with particular activities | Banks that perform particular activities | 0 |
| Online banks | Banks that use exclusively the virtual channels | 5% |

*Table 1: Sample composition (n=60)*

Quantitative and qualitative analysis have brought to the description of knowledge management state of the art in the Italian banking industry, analysed from organizational and technological point of view. Statistic analysis of questionnaires let us to highlight bank's strategic choices referred to the management of knowledge. The analysis also pointed out the reasons which lead to these choices.

The questionnaire was separated into two parts: the first one is dedicated to organizational aspects, analysed through the study of People and Processes variables; the second one is dedicated to technological aspects, analysed using Places and Things variables. While the first two sections identify the organizational dimension of banks, the last two refer to the technological dimension.

In particular, each questionnaire was composed as follows:

- 10 questions on bank's general information (for example, dimension, meaning and importance of knowledge management, reasons to adopt a knowledge sharing culture, investments in knowledge management projects);
- 12 questions on the People variable, including turnover and job rotation levels, sponsor of the project, obstacles to knowledge management);
- 12 questions on the Processes variable, including level of knowledge formalization, kind of informative sources, level of horizontal communication, tools utilized to coordinate members inside the firm;
- 4 questions analyse the Places variable. They concentrate on the existence of virtual spaces for collaboration, fair incentives to cooperation);
- 7 questions on the Things variable, which analyses, for example, the existence of technological components for knowledge sharing, the existence of instruments for the management

[1] As reported in the Bank of Italy annual document "Relazione Annuale 2004"

of information, including their elimination.

Interviews, that have been conducted, were directed to testing some qualitative conditions that are:

- Motivations and necessity for the adoption of KM systems;
- Main advantages and main obstacles (both technological and organizational) to the use of KM systems;
- Perception of the importance of IT in KM projects;
- Perception of the importance of organizational aspects in KM projects (incentives, creation of new professional roles, top management commitment etc);

Data collecting started in November 2003 and finished in July 2004. Questionnaires and interviews have been directed to KM responsible (where existent), organizational and/or IT managers.

# 4 DATA ANALYSIS

The sample characteristics are described as follows, analysing and elaborating some of the questionnaires answers.

Considering every bank's dimension, such as proposed by the Bank of Italy classification (it valuates the amount of intermediated founds), the sample has been classified as follows: 28% major banks; 11% big banks; 22% medium banks; 16% small banks; 6% minor banks; 11% particular activity; 6% telematic banks.

To understand the level of organizational changes and technology adoption to support knowledge sharing in the banking industry, it is useful to verify how many of the banks share a knowledge management vision. The results on the sample show that only 18% is not thinking about adopting a more flexible way of managing organization, such as theorized in Knowledge Management theories (Davenport T. H., Prusak L., 1998; Bair, Stear, 1997). The remaining part of the sample is composed as follows: 58% has already foresaw a change in this direction in current budget; 12% has already finished its implementation; 12% is going to implement this project soon. Still a pretty high percentage of banks than do not think knowledge management tools implementation can support a better knowledge sharing.

Considering all those banks which have already implemented this project or that are going through it, we verified that more than 55% of knowledge management projects are localized at governance level, 60% also at business unit level and more than 20% at branch level.

We asked to give a definition of knowledge management projects, choosing between the following items: Knowledge Management is the management of technologies, of collaboration spaces, people or processes. Banks gave to each of those items an importance level included between 1 and 7. The results are represented in the following table (table 2):

**What do you think knowledge management is?**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Process Management | | | 6% | 27% | 7% | 47% | 13% |
| People Management | 7% | | 13% | 7% | 33% | 20% | 20% |
| Collaboration Spaces Management | 7% | 14% | 29% | 7% | 36% | 7% | |
| Technology Management | 7% | | 14% | 14% | 22% | 36% | 7% |
| | level 1 | level 2 | level 3 | level 4 | level 5 | level 6 | level 7 |

*Table 2: definitions of knowledge management*

As we can see, banks identify a knowledge management project especially with processes management (56% of the sample gives to this item an importance between 6 and 7). Banks, in fact,

consider their processes as knowledge intensive because they collect the way of working inside the organization. Mapping business processes means knowing everyone way of operating and so describing the organizational system. Banks also identify knowledge sharing projects as management of people (38% gives to this item an importance equal to 6 or 7). As stated by Nonaka (Nonaka et al., 1998), this implies valorising every organization's member and promoting the shift from individual knowledge to knowledge as an organisational asset. Finally, 47% of the sample thinks about knowledge sharing projects as the management of technology, which can support the creation of "ba", as stated by Nonaka and Konno (1998) in their work. Actually all those four variables are equally important (Monge, Contractor, 2003). The evidence that banks do not give enough importance to the management of collaboration spaces is contrasting. In fact, the banking industry has understood the importance of knowledge as a strategic asset, but we ask how it can be sufficiently evaluated if people have not enough places, time or incentives to collaborate and to creatively compare what they know, their ideas and their suggestions, creating a context of useful chaos (Nonaka, Takeuchi, 1995).

Studying the importance given by banks to knowledge sharing project, more than 50% of the sample gives to this project a quite good importance. The management of knowledge is than considered important, especially by those banks which belong to major, big and medium classes. Generally, considering the amount of investment on a knowledge sharing project, this depends on dimensional class. Finally, few banks have thought about defining the ROI of the investment and few banks have realized some methods to measure and valuate knowledge. As concerns the first research question, considering the reasons for implementing projects of knowledge sharing through networks, banks give importance to the evidence of the improvement in processes efficiency, the need for better communication mechanisms, the need for formalized and explicit knowledge as source of competitiveness to survive in a turbulent market. But many are also the obstacles pointed out by banks as the perception that it is not a useful project and that is just a waste of time, lack of competencies, a cultural barrier from individuals who do not want to share their knowledge. It also seems to be that the top management is not really involved in knowledge sharing projects and it does not stimulate as it should employees.

Considering the people variable, the percentage of people who are dedicated to knowledge management projects is really low: 56% of banks say it is less than 1% on total of bank's employees. This is a data which marks how the moving towards more efficient projects of Knowledge Management is still at the beginning in the Italian banking industry. In many cases however these people are distributed on many organizational units. This fact shows that knowledge sharing projects are going to involve, may be in the next years, the whole of the bank. This also demonstrates that banks have understood how everyone's knowledge is important and has to be considered strategically relevant (Nonaka et al., 1998). Questionnaires have also pointed out that people turnover is too often low. Job rotation level is also low (between 2 and 5%) in 47% of the sample. Just few banks adopt a high level (more than 20%) of job rotation. This is a not positive data: in fact job rotation can be considered as a tool to promote the creation of "ba" (Nonaka, Konno, 1998) and also to support collective learning practices (Moreland et al., 1996; Holligshead, 1998). Job rotation is a flexible way of managing employees and work, that can bring also to a better management of knowledge. Considering the first research question, job rotation allows employees with different cultural background to recombine their knowledge and this is a good way to reach new ideas and innovation (Nonaka et al., 1998).

As concerns the Processes variable, level of formalized processes of a bank is medium. In many cases, it has been reached using technological tools. As regards the second research question, banks consider technology a tool to reach a better explicitation of processes and make it available to all employees. Passing from the analysis of formalized processes to formalized knowledge, this is not well managed. Levels of formalized knowledge inside a bank are really low, but we have to consider that these projects are just at the beginning in the Italian industry.

Considering the Places variable, it represents all initiatives for creating physical or virtual collaboration spaces or "ba" (Nonaka, Konno, 1998). The questionnaire asked the level of informal teams and communities of practice creation, relative to many activities: front and back office, staff and governance activities. In fact, these are forms of network which allow people to share a high level of tacit knowledge, thanks to the informality which characterize them (Miles, Snow, 1986). The results are showed in table 3.

**What kind of informal network are created in your bank and at what levels?**

| | | | | |
|---|---|---|---|---|
| Informal Teams | 39% | 17% | 11% | 39% |
| Communities of Practice | 55% | 17% | | 17% |
| Other kinds of Networks | 44% | 6% | | |
| | No | Front Office | Back Office | Staff |

*Table 3: informal teams and communities of practice*

As we can observe, a high percentage of banks do not use any kind of network to support knowledge sharing practices. Informal teams are used by 39% of the sample at staff level and by 22% at governance level: these data show how banks consider important knowledge sharing projects just at high levels of hierarchy, but not also to support front and back office activities. Communities of practice are not very much diffused in this industry, but they would be a tool to reach high levels of implicit knowledge sharing, because of the informality which characterise the relationship between members. As concerns the first research question, we can say that communities of practice are not considered important by banks yet.

Considering physical proximity (Johnson, 1992), many banks have stated that it is not important to collocate units physically one next to each other. As concerns the second research question, IT supports virtual forms of collaborative networks. Considering them, we find out from our empirical research that 20% of the sample does not have these kind of spaces for distance cooperativeness. The remaining 80% adopt the following kind of collaborative networks (each bank can indicate more than one item), as showed in table 4:

**Do you use any kind of virtual network for distance learning?**

| | |
|---|---|
| Brainstorming | 22% |
| Discussion Forum | 17% |
| Mailing Lists | 33% |
| Videoconferences | 44% |
| Something Else | 17% |
| Nothing | 22% |

*Table 4: virtual spaces dedicated to collaboration practices*

Videoconferences are the most used tool to support long distance learning, but still a high percentage of the sample analysed (22%) do not use IT to support virtual knowledge sharing. Mailing lists can also be classified as a tool which support activities of routine in the banking industry, while discussion forum or brainstorming are not diffused yet inside this industry.

Communication level has to be considered the most important factor to support a knowledge sharing project (Davenport, Prusak, 1998). It is in fact the main tool through which knowledge can be diffused inside a firm. In particular, horizontal communication seems to be quite developed at business unit level. Tools which are used to promote it are usually face-to-face meetings, telephone, e-mail and intranet as showed in table 5.

**What are the main tools used to support horizontal communication?**

| | | | | |
|---|---|---|---|---|
| Governance Level | 78% | 57% | 66% | 37% |
| Business Unit Level | 82% | 94% | 86% | 42% |
| Branch Level | 34% | 65% | 54% | 58% |
| | Face-to-face | Phone | E-mail | Intranet |

*Table 5: main tools utilized by banks to support horizontal communication*

While at governance level a traditional way of knowledge sharing (face-to-face) is used, at business unit level banks use also phone and mails to support horizontal communication; at branch level phone, mails and intranets are all diffused.

The technological variable wanted to evaluate all those tools and components which make easier the virtual process of knowledge sharing. The main technological components (which have been indicated by banks as more suitable to support a knowledge management project) are represented in the following table (table 6):

**What kind of technologies support your knowledge sharing processes?**

| | | | |
|---|---|---|---|
| Portals | 25% | 44% | 18% |
| User Interface | 33% | 27% | |
| Browsers | 19% | 31% | 13% |
| | Level 5 | Level 6 | Level 7 |

*Table 6: main technologies to support knowledge sharing*

The technological analysis also pointed out that banks classified as major, big and medium prefer to use portals as tools to manage knowledge, while small banks prefer browsers. Less importance is attributed to other kinds of technological support which can be considered networks, as table 7 shows:

**What are other technologies used?**

| | | | |
|---|---|---|---|
| Teamware | | 61% | 15% |
| E-learning | 7% | 27% | 33% |
| Collaboration Services | 27% | 27% | 13% |
| Workflow | | 14% | 35% |
| | Level 3 | Level 4 | Level 5 |

*Table 7: other technologies to support knowledge sharing*

Finally, we asked what main technological tools are used to support the management of knowledge. Banks use mainly firm repositories and collaboration tools. It seems to be that paper supports are not frequently used.

# 5 RESEARCH FINDINGS AND ANALYSIS

This paper analyses the concept of knowledge sharing and the usage of knowledge as a strategic asset in the Italian banking industry. As regards the third research question, a desire for knowledge as a strategic asset, the starting point of innovation thanks to the recombination of everyone knowledge (Nonaka et al., 1998), is always actual. As concerns the first and the third research questions, banks know the importance of adopting informal forms of collaboration between employees, since they

realise this is a good opportunity to transform knowledge from implicit to explicit form, because of the informality which characterise their relationships (Miles, Snow, 1986) and because of the climate of trust which arises according to the homophily theory (Brass, 1995). To shortly answer to our third research question, results show that a knowledge sharing perspective is than relevant in this industry: the majority of the sample has already started Knowledge Management projects, but there still are many improvements that need to be done. The reason, for example, is that the analysis on knowledge sharing vision adopted by the sample has pointed out that many are those banks which do not manage in a flexible way their people. This means that banks do not too often realise spaces for collaboration (as showed in table 2 and 3) and that they use few fair mechanisms to persuade people to share what they know. Fair incentives are important because people in most cases are not sure about sharing their knowledge and are afraid of opportunistic behaviours. This is because what everyone knows is considered a tool of power for carriers construction. Banks should create more mechanisms of interaction, such as informal teams or communities of practice. These are social networks (Wenger, 1998) characterized by informality of action and for this reason they make easier a knowledge sharing practice, discussion and mutual support, also improving the tacit knowledge sharing level. Also theories of homophily and physical proximity (Johnson, 1992) mark the importance of physical or virtual proximity in order to increase the probability that people interact and to facilitate communication between members.

As concerns our second research question, the creation of technological networks among members is also important because it allows people - with low costs and low time - to share ideas, know-how, intuitions which can be relevant for new knowledge creation (Nonaka, Takeuchi, 1995). But not only. If members are connected, the social capital theorized by social capital theories can be created (Lin, 2001; Coleman, 1990). This is a strong element which can be considered the starting point for knowledge sharing, especially as regards tacit knowledge. Realising links between members also facilitates the meeting between demand and offer of information and knowledge, reducing inactivity of persons when they do not know how to face a problem. Network forms of cooperation between members inside a firm also reduce money and time wasting for the recreation of knowledge which already exists, but which is not diffused inside the workplace. When this happens, the organization activity is slowed down by bureaucracy and knowledge based approach does not succeed.

As regards the last research question, too often banks identify processes of knowledge sharing just with one of the four variables (People, Processes, Places and Things) proposed in the empirical research, as we can easily understand from the meaning banks attribute to Knowledge Management (table 1). There is also a scarce technological infrastructure to support activity of knowledge sharing through network forms of working collaboration – as showed in tables 3, 5 and 6. The lack in the informative system adoption seems to repress especially virtual collaboration between individuals who are localised far away one from each other (check table 3: virtual spaces dedicated to long distance collaborative practices are not highly diffused). Co-ordination seems to be imposed only by procedure in the banking industry (high importance is given to processes management, as showed in table 1). Just for important projects, such as Basil 2, IAS or Euro, banks create integrative staff to support the activity and collaborative business. But if perceived as a strategic asset, knowledge network creation and cooperation should become a routine inside the bank. In particular, an efficient technology to support knowledge networks creation should be user-friendly (based on user's needs), accurate, compatible with pre-existent platforms (Bourdreau, Couillard, 1999).

Another main finding of this empirical research is the evidence that banks need to intervene on cultural aspects. Culture can be, in fact, considered one of the most critical success factors to make Knowledge Management systems succeeding. In the banking industry, culture is still too much bureaucratic, there is a scarce propensity to collaborative business and too often people adopt a "not invented here" or "this is not my knowledge" attitude towards colleagues. A cultural change implies that information and knowledge are not considered as simple sources anymore, but the only sources to compete (Druker, 1993). A cultural change is necessary to make people share what they know, because if people do not understand the advantages of the project (flexibility, job enrichment, job

enlargement, satisfaction), they will always contrast with it (March, 1997). If there is a valid cultural support, practices like cooperation, teamwork, sharing activities, sharing networks and participation should become standard attitudes of the bank. A reason – that emerges from the empirical study and concerns the last research question - for a not relevant result in knowledge sharing in the banking industry is the scarce commitment of management, who does not propose fair incentive for knowledge sharing and who does not communicate efficiently the reasons for this change. In fact a strong management leadership is another of the main factors needed to succeed (Davenport et al., 1998).

Finally, we observed that there is not a strong interrelation between the organizational and the technological dimension, that instead would be appropriate. In fact, if there is not a cultural change toward a reciprocal trust, respect, collaboration and cooperation, investing in adequate technology of support has no meaning and it is not useful. Technology by its own does not create new organizational knowledge if people are not inclined to share what they know.

About the last research question, the state of the art of knowledge sharing practices adoption through network forms of collaboration, Italian banks can be localized at the starting point of a changing perspective: they are moving from an information management towards a knowledge management, modifying both organizational and technological aspects and starting adopting flexible forms of co-operation. But considering the organisational perspective, still many changes can be brought, such as a more efficient communication, a stronger commitment of the management, a better predisposition of fair incentive. From the technological point of view, the banking industry needs to improve its IT, trying to realize a better integration between people, processes and technologies.

# 6 CONCLUSION AND RESEARCH PERSPECTIVES

As concerns the Italian banks behaviour towards knowledge sharing projects, the analysis on the banking industry shows that an inclination towards the adoption of Knowledge Management systems supported by networks to favourite knowledge and information sharing is present. Those projects though are more encouraged at governance and business unit level, not also at branch level. This demonstrates how a change towards a more flexible way of organising work is present in the banking industry, but we still are at the beginning of their implementation. Using an empirical research, we focused on two main aspects: we studied the technological and the organizational variables. We found that those two variables are not strongly related yet, as the literature states and suggests it should be. In many cases banks refer to Knowledge Management projects focusing on just technological or organisational aspects. But organisations cannot consider a change toward a more flexible way of managing knowledge just as a technological or as an organisational one. Creating knowledge networks to support a good management of knowledge inside the organisation implies managing a change which is cultural, organizational and that also implies investing in adequate technologies of support. Knowledge cannot be simply elaborated as information, using just technology, because it is continuously recreated and rebuilt thanks to social interaction (Rubenstein-Montano et al., 2001). People and culture are than essential factors for promoting knowledge sharing.

We found that the banking industry has still not implemented a perfect change in this way, considering both organizational and technological changes needed to succeed. We can state that banks have understood the importance of valuating member's knowledge and making it explicit, but in many cases top management does not communicate the strategic importance of a knowledge sharing project. As regards our second research question, the importance of ICT, banks are moving from an information management towards a knowledge management supported by technologies. While information management focuses on an efficient use of information, which need to be controlled, classified and distributed inside the organisation thanks to IT, knowledge management focuses on people. On the other side, the management of knowledge gives attention and valorises every human resource, focusing on collaboration and inter-individual relationship but also uses technologies to make possible and easier the meeting between who need a particular kind of knowledge and who owns it (Bair, Stear, 1997).

From the organizational perspective, many are still the indispensable changes to create a strong knowledge sharing culture. We refer, for example, to the necessity of creating a good communication work atmosphere, a stronger management commitment, fair incentives, adequate leaders who can efficiently manage this change. Networks like communities of practice or informal teams should also become a routine inside the organization and need to be supported by a valid technological infrastructure to allow processes of knowledge sharing between members who are not physically closed. As regards the importance of flexible forms of working structure, networks in the form of communities of practice and informal teams are in fact a good way to create new knowledge and allow recombination of the existing one. They stimulate discussion and communication between members who can share information, know-how, ideas and can get to problem solving in an easier way (Nonaka, Takeuchi, 1995). They also create a climate of trust and reciprocal knowledge that allows members to share the mission and the vision of the firm, without feeling the weight of authority (Lin, 2001).

Considering the technological variable, we found that a more integrated infrastructure is needed to win and to manage efficiently knowledge. As concerns the importance of IT, our second research question, it would also be better to create mechanisms for information control. We refer, for example, to all those tools like metadata, classifications or archives, which make easier information management. Thanks to those mechanisms, useful for an advanced management of information, information can be transformed easier and efficiently into knowledge, using retrieval and recombination activities.

For further research, it would be interesting to investigate and compare the state of the art of the Italian banking industry to those of international countries. This research could also be the starting point for a longitudinal analysis which finds out the organisational changes and consequences of a strategy of knowledge sharing projects implementation. The analysis task could try to understand the implementation choices of a knowledge management system, in order to answer to the following questions: what will be the evolution of knowledge management and knowledge network topics? Will we get to a different and shared definition of knowledge? What will be the role of IT and what its relationship with the organisational variable, in a context of knowledge network adoption?

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