# Organizational Impacts of Social Network Analysis for an Italian multinational enterprise

Susanna Tonti, Rodolfo Baggio

Bocconi University, Milan, Italy

## Abstract

Social Network Analysis methods are used to study the effects of an intranet collaborative platform in the process of reorganization of an Italian multinational enterprise. The analysis highlights the level of participation by the employees and testifies the extent of collaboration between them beyond the strict hierarchical affiliation. It proves how informal connections are established autonomously and how these connections help in the process of merging different units. It also shows the important role of middle hierarchical levels in fostering this process.

## Introduction

The contemporary organizational environment strongly relies on the concept of "knowledge society" (Drucker, 1968; Bell, 1973; Toffler, 1990). This emphasizes the idea of knowledge for organizations and, as a consequence, the importance of the quest for continuous innovation. In particular, in the multinational context it is extremely hard for organizations to compete and survival is possible only acquiring scale and scope economies, or gaining advantage over the imperfections of labor, goods or capital markets. It has to be considered that multinational enterprises (MNEs) exploit advantages hailing from outside the national boundaries, competing in a global environment where they can find the optimal kind of labor and goods sources. Nowadays, the strengths of MNEs lie in their own ability to share knowledge and set environment for collaboration within business units, subsidiaries and cross-departments located in different places in the world. The main tools that organizations could use are Communities of Practice (CoPs) (Wenger, 1994). The concept of "community" should be intended not just in a physical manner, but especially in a sociological way. This is the reason why a CoP could be settled among geographically dispersed individuals. What is

important in fact is the common end of the CoP itself. The traditional CoPs were difficult to be managed and the systems for collaboration were limited and not well integrated into organizational structures. Nowadays, the advent of 2.0 technologies has gradually shaped the dynamics of traditional CoPs and, for this reason organizations need to fully understand the potentials for the systems to support collaboration tendencies across all functions and within geographically dispersed subsidiaries. In particular, human resources development (HRD) is the main organizational field where the efforts to meet rapidly changing business environments are constantly faced. Indeed HRD, as a social field, is the most suitable discipline to explore the theoretical implications of knowledge management issues in the workplace, and to recognize its potential as a conveyor of benefits to employees, work teams and the entire organization. Knowledge capital, as a fundamental input for the organization's production performance, completely shapes the application of organizational resources. The strong tie between knowledge management and HRD stands on this relational view of the phenomenon. In fact, the field of HRD gives high relevance to the connections among employees and between them and the organizations themselves. The enhancement of these relationships could improve the human capital development in order to accomplish company's performance objectives.

Traditional organizational theories lack a concrete correspondence with mathematical studies and in this respect we sought to identify a correspondence. Social Network Analysis (SNA) is the mathematical methodology that could be applied to identify whether knowledge management practices have a real effective impact on the organizational performance. After having explored the dynamics of collaboration through a social network analysis applied to an Italian MNE, we will use this methodology to analyze the creation and configuration of communities of practice and to identify possible barriers to effective interaction. Indeed SNA can help to detect actual expertise and consequently project the potential losses deriving from an inefficient flow of knowledge (Inkpen & Tsang, 2005; Wu et al., 2004). In addition, we will be able to define roles in the organizational networks and make an evaluation of informal organizational structures over the formal one. This is an extremely valuable finding for organizational theories because it provides another perspective over the planning and management of human capital.


## Social Network Analysis for measuring the hidden power of human and social capital

In order to understand how information flow in an organization and the way tasks are accomplished, the formal structures are not explicative enough. Indeed, the dynamics that lie behind organization movements are pushed by the collaborative interdependences among people. These interdependences are difficult to be assessed and measured, so that often we do not completely recognize the power of "informal structures". As every theorist of organizations would acknowledge, the best way to push the organization toward goal's achievement is to explore the environment, both internal and external, in which interventions are deployed. However, is always extremely difficult to give quantitative measures to what is, for its essence, qualitative. In this sense, Social Network Analysis (SNA) represents a valuable support to understand both the qualitative and quantitative measures of organizational dynamics. In particular, when referred to organizations, SNA assumes the connotation of Organizational Network Analysis (ONA) (Tichy et al., 1979).

Organizational Network Analysis reveals the collaboration tendencies among employees in the working environment, and helps to identify possible interventions to solve inefficiencies in the communication process.

Social Network Analysis is characterized by a mixture of elements hailing from mathematics and psychology. The kind of assessment provided by SNA provides a representation of ties (networks) in an organizational environment, and address managers' attention towards a full understanding of strengths and weaknesses in the communication / collaboration milieu (Burt, 2000; Inkpen & Tsang, 2005; Tichy et al., 1979).

### *Measures for network evaluation*

In a network analysis process, information are gathered in different ways: by interviewing employees about their interactions with others organizational members, by observing the dynamics, or by extracting measurements from statistics if an information technology collaboration system is present.

Several measures are used to evaluate networks and to describe their characteristics. The most used can be divided into two classes: group (or global) and individual (or local) measurements. The most important and widely used are the following (Baggio et al., 2010; da Fontoura Costa et al., 2007; Scott et al., 2011):

Group measurements:

1) Density: the ratio between the number of connections present and the maximum possible when all network nodes are connected among them.

2) Cohesion: the average of the distance among pairs of people in the networks, i.e. the average number of steps along the shortest paths for all possible pairs of network nodes.

Individual measurements:

1) Degree centrality: the number of connections each individual has.

2) Betweeness centrality: a measurement of how an individual connects others in the network.

3) Closeness centrality: proximity of a node to all others, measured as the inverse of the sum of all the distances from the node to all others

# The flow of knowledge in a MNE

The company under analysis is an Italian MNE whose main activity is of providing services to travelers. The company bases its business on people, whether customers or employees, who are its main asset and therefore require attention and investment. Respect for the cultures, traditions and laws of the countries in which the Group operates together with demographic changes in the Group's workforce, growing diversification of customers and markets and new work methods make the development of human capital increasingly important. The main lines of action in this context are: general and professional training, development of personal skills and career plans, inter-functional and international mobility projects, team work and open communication.

The management believes it is important to act as a catalyst for the "culture of diversity" outside the Company as well. This is why it promotes awareness raising initiatives and takes part in research/study groups to identify and develop diversity management practices.

### *International appraisal of human capital*

In 2009, on completion of the process of integration of companies acquired in 2007 and 2008, the Group's human resources department coordinated the activities of HR functions in the various business sectors and countries and the standardization of human resources management systems. To this end, it launched the global project to build a platform common to all countries and sectors and introducing a standard terminology for people management (grading, professional families, other indicators, etc.).

The objective for the next years is to integrate the system into management practice and extend it to the other business units. The company is working towards a consolidated HR

management system and culture based on two distinct aspects: the role and development of the individual on one hand and operating performance on the other. The process will drive personnel training and development initiatives over the coming years. The new system is based on eight distinct skills (vision, innovation, flexibility, customer orientation, team work, guidance and coaching of employees, and intercultural and interpersonal intelligence) and reflects the organizational requirement of interpreting roles with greater managerial effectiveness in increasingly complex and structured contexts.

At the end of 2009, the Company under analysis launched the new intranet portal in Italy and United Kingdom. It is an important tool of communication, information, collaboration and company-employee contacts. The portal gives employees the facility to create Communities based on their interests and used to discuss issues related to the working practices and environments.

The Communities created, along with their participants, have been mapped and analyzed in terms of: hierarchical level and functional area / subsidiary company of the participants and cross participation in different communities by the employees.

### *Results of the analysis*

In the study period, from December 2010 to February 2011, the total number of employees that have used the portal and created communities, is 350 out of 512 (the total number of people that have access to the platform). The functional areas that more than others have used the communities are: ICT (30 communities), HR (18 communities) and Marketing (16 communities). Other organizational areas are getting more and more active and the trend of participation is increasing considerably.

The resulting network is composed of two types of nodes: employees and communities where a link represents the active participation of an individual to the community. Technically this is a 2-mode (or bipartite) network which can then be studied by obtaining two derived networks: 1) a people network where two individuals are connected if they take part in the same community, and 2) a communities network where two communities are connected if they share at least one participant. The two networks are depicted in Figure 1 and 2.
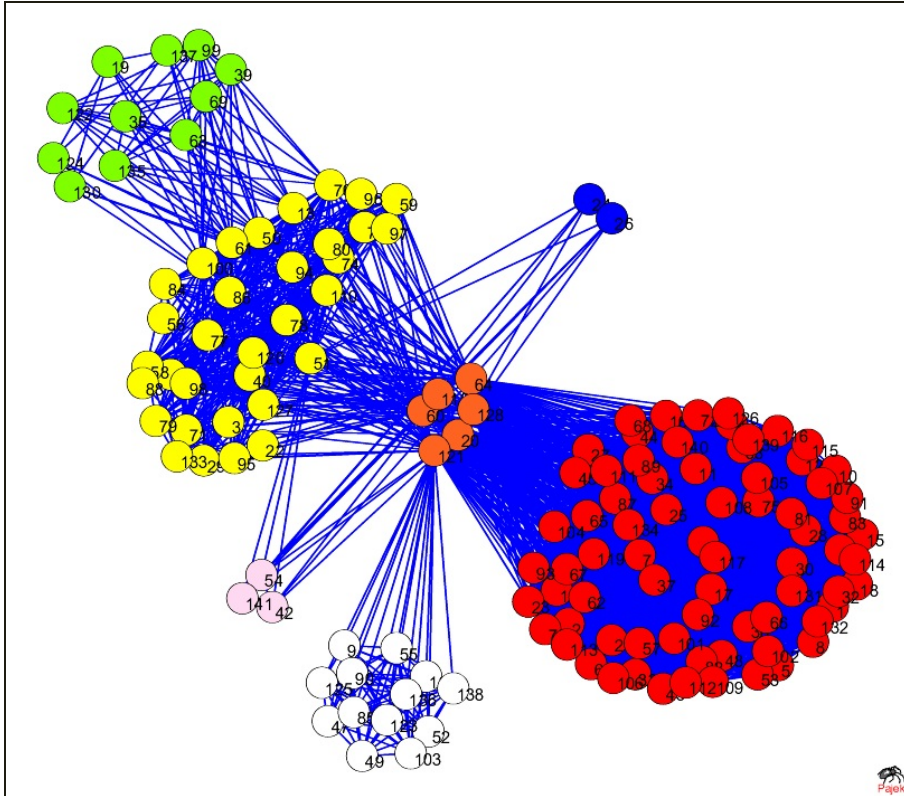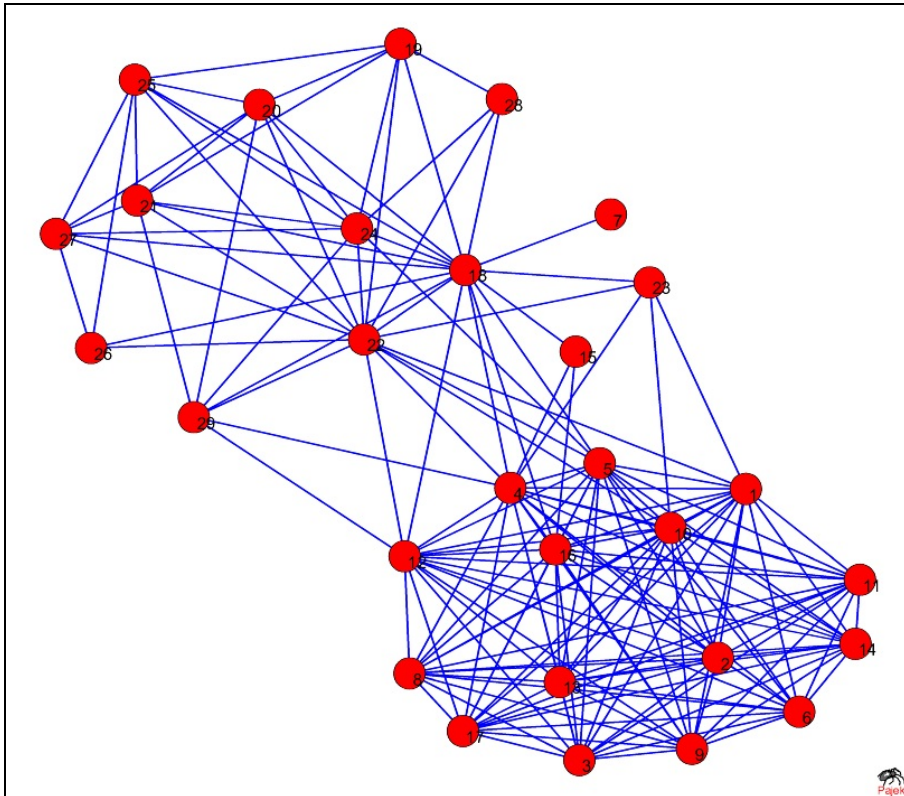
Figure 1: The people network



Figure 2: The communities network

In particular, figure 1 represents the connections among people belonging to different company's subsidiaries which are located all around the globe (each color corresponds to a country). This graph shows how social network linkages shorten distance and facilitate collaboration within a multinational context.

Starting from the data collected for each employee, we have calculated the basic network metrics and have combined them into a single synthetic measurement by taking the geometric mean (Geo-Mean). In this way we have a single indicator of "importance" of the position of an individual in the network which represents the intensity of activity in the communities (the employee with the highest Geo-Mean is the more active and the more connected within the network).

We have then put in relation this indicator with the hierarchical level of the employees (0 is the highest and 6 the lowest). In this way we were able to explore which employees are more oriented towards the use of the communities (Figure 3).
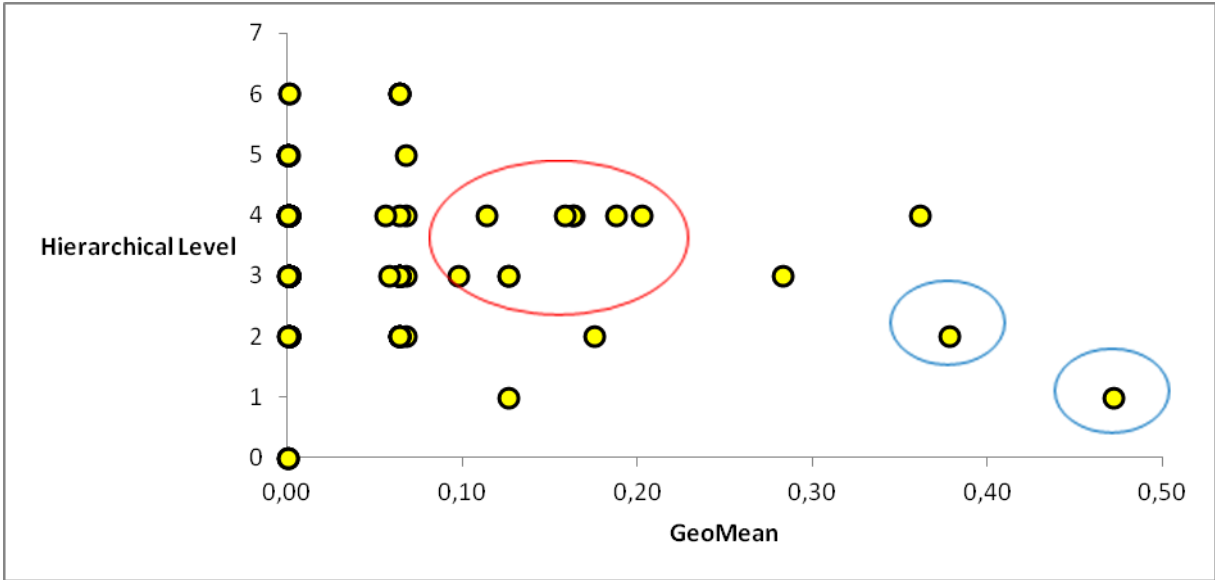


Figure 3: Employees' use of the platform communities

The graph shows that the middle-level management (hierarchical levels 3 and 4) has the highest level tendency to collaboration and is the most connected and active within the network. Two top-level managers (level 1 and 2) use the network in a proactive way by participating and collaborating to a large number of communities. These two managers are respectively the Group HR Officer and the Chief Information Officer, their role as promoters and activators of the tool is evident, in fact they have contributed respectively to the "soft"

part of the tool acceptance (Group HR Officer) and to the "hard" part that entailed the system's implementation (Chief Information Officer).

All in all we can state that the collaborative platform has provided an outstanding contribution to the creation of connections among employees belonging to different functional groups for the accomplishment of a difficult integration task. The platform, and the networks it has helped to establish, has been the first pillar for the creation of a common culture for collaboration in a way that is transversal to all the subsidiaries involved in the use of the tool.

## Concluding Remarks

Through Social Network Analysis we have shown that the collaborative the platform implemented is gaining acceptance by the employees. In particular we have discovered that the middle-level management has the highest level of tendency to work together and is the most connected and active within the overall network. In addition, we have identified the top-level managers that use the network in a proactive way by participating and collaborating to a large number of communities. These two managers are respectively the Group HR Officer and the Chief Information Officer who have actively promoted the implementation and the use of the technological collaborative platform. Furthermore, through the analysis of the network of connections among employees, as a result of their participation to more than a community, we can state that the intranet has provided a large number of ties among geographically dispersed employees. In fact, at the very center of the network graph we find Group functions that provide cross-connections among people and within different subsidiaries. In particular they are in that position for their participation to many communities, and at the same time have membership to the seven groups that form a strategically important project for integration and transformation, after the acquisition, of two main companies of the Group.

The connective power of the platform shows that the tool has provided an outstanding contribution to the creation of intra-group connections among employees, achieving a difficult integration task.

Both the platform and the networks have been the first pillars for creating a common culture for collaboration in a way that is transversal to all the subsidiaries involved. This has been the first initiative that the Group has undertaken concurrently and for this reason has in it a great potential for future developments.

The platform has proved to be a valuable tool for this Italian MNE, and has to be enhanced in order to accomplish the objective of full employee participation.

The full acceptance of the tool, and the involvement of employees, can be pursued by exploiting the influence that middle-management can exerts in two directions, linking the top and bottom parts of the organization. Moreover, this study has shown the value of social network analysis as a support to organizational research applications and strengthened the importance and usefulness of knowledge management theory for a deeper understanding of organizational phenomena.

# References

Baggio, R., Scott, N., & Cooper, C. (2010). Network science - a review focused on tourism. *Annals of Tourism Research, 37*(3), 802–827.

Bell, D. (1973). *The Coming of Post-industrial Society: A Venture in Social Forecasting*. New York: Basic Books.

Burt, R. S. (2000). The network structure of social capital. In R. I. Sutton & B. M. Staw (Eds.), *Research in Organizational Behavior* (Research in Organizational Behavior, Vol. 22, pp. 345-423). Greenwich, CT: JAI Press.

da Fontoura Costa, L., Rodrigues, A., Travieso, G., & Villas Boas, P. R. (2007). Characterization of complex networks: A survey of measurements. *Advances in Physics, 56*(1), 167-242.

Drucker, P. (1968). *The Age of Discontinuity: Guidelines to Our Changing Society*. New York: Harper and Row.

Inkpen, A. C., & Tsang, E. W. K. (2005). Social capital, networks, and knowledge transfer. *Academy of Management Review, 30*(1), 146-165.

Scott, N., Baggio, R., & Cooper, C. (2011). Network analysis methods for modeling tourism inter-organizational systems. In C. Megehee, A. Ogle & A. G. Woodside (Eds.), *Advances in Culture, Tourism, & Hospitality Research* (Vol. 5, pp. 177-222). Bingley, UK: Emerald - JAI Press.

Tichy, N. M., Tushman, M. L., & Fombrun, C. (1979). Social Network Analysis for Organizations. *The Academy of Management Review, 4*(4), 507-519.

Toffler, A. (1990). *Powershift: Knowledge, Wealth and Violence at the Edge of the 21st Century*. New York: Bantam Books.

Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.

Wu, F., Huberman, B. A., Adamic, L. A., & Tyler, J. R. (2004). Information flow in social groups. *Physica A, 337*, 327-335.