

Using social network analysis and network “numbers” to disentangle complexity



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In questo numero Giuseppe Soda e Manuel David Gomez Solórzano, dopo averci introdotto alla social network analysis, così da capire come si interpretano i numeri di questa metodologia, ci sorprendono con alcuni risultati relativi alle motivazioni degli employees e al knowledge sharing. Per esempio, si è più propensi a ricevere conoscenza da quanti hanno un ruolo inspirational, anche se in assenza di rapporti di amicizia, piuttosto che da persone con cui si è amici. Il carisma influisce più dell'amicizia, dunque... Buona lettura!



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One of the key contribution of social network analysis (SNA) is to offer a different perspective of how organizations really work behind formal structures and mechanisms. This innovative analysis helps to understand how the informal and emergent patterns of interpersonal relationships complement the formally designed mechanisms of organizational functioning.

In fact, social network analysis (SNA) is a theory and a diagnostic method useful to analyze the patterns of interactions among organizational actors (individuals, teams, units, firms). Networks connecting actors can be used to represent many different phenomena, resulting in value from adopting the SNA perspective across a wide range of disciplines such as management and organizational studies, economics and finance. Network analysis is also wi-

dely used in sociology, anthropology, natural sciences, biometrics, and many others. This theoretical and analytical approach is particularly relevant in a connected, complex world in which phenomena are intrinsically “relational”. For instance, innovative and successful organizations (i.e. Netflix, Facebook, Amazon) adopt for their go-to-customer strategies a network approach and they manifest growing needs of expertise and competencies in network theory and analysis.

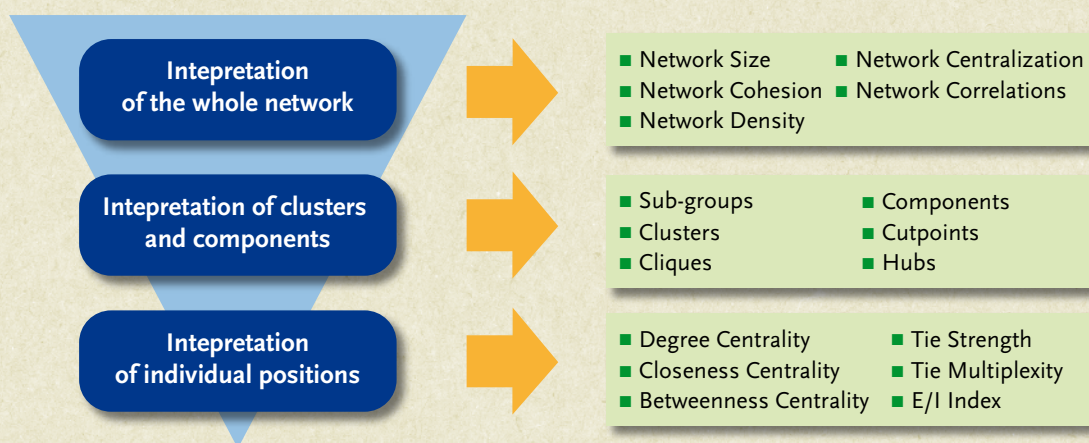
Broadly, in any professional setting, networks flourish spontaneously: human nature, including mutual self-interest, leads people to share ideas, knowledge, information, sentiments, and work together even when no one requires them to do so. As they connect around shared interests and knowledge, they may build networks that can range in size from fewer than a

FIGURE 1 | NETWORK METRICS

Overview of social network analysis

BASIC NETWORK METRICS

THE INTERPRETATION OF A NETWORK ANALYSIS CAN BE DISTINGUISHED ACCORDING TO THREE DIFFERENT ANALYTICAL LEVELS:



dozen colleagues and acquaintances to hundreds. Research scientists working in related fields, for example, investment bankers serving clients or human resource management departments located in different countries in large corporations frequently create informal – and often socially based – networks to collaborate. Most large corporations have dozens if not hundreds of informal networks, which go by the name of peer groups, communities of practice, or functional councils – or have no title at all. These networks organize and reorganize themselves and extend their reach via face-to-face interactions, cell phones, community Web sites, and other devices of the digital age. As networks widen and deepen, they can mobilize talent and knowledge across the enterprise. They also help to explain why some intangible-rich companies have increased in scale and scope and boast superior performance.

Moreover, the social network analysis applies methodolo-

gies and concepts in organizational settings which can be used as a diagnostic tool for:

1. uncovering the “hidden” networks – how work really gets done in organizations;
2. making invisible patterns of interaction in strategically important groups visible;
3. identifying individuals, teams, and units who play key roles in the informal network;
4. discerning information breakdowns, bottlenecks, structural holes, as well as isolated individuals, teams and units;
5. leveraging peer support, expertise and other resources embedded in the informal network;
6. identifying and accelerating information and knowledge flows among individuals and across functional and organizational boundaries;
7. improving the efficiency and effectiveness of existing formal communication channels.

Beyond the analytical impact, SNA is based on the idea that interactions among people matter and shape the functioning of complex organizations. The mathematical foundations and the development of SNA have provided a comprehensive set of metrics that can be applied to enhance the understanding and support organizational change actions. The basic set of network metrics is reported in figure 1.

■ An example of application of SNA

To whom to turn for career advice and knowledge exchange at the firm: to my muse or to my friend?

Leading employees to willingly put forth high levels of effort in their tasks toward the achievement of the goals of the firm has been, is, and probably will be, the quintessential objective of every manager working in a competitive and dynamic market; especially in one where individual talent is the critical ingredient of sustainable competitive advantage.

Motivation is not only important to influence employees' behaviors within organizations, but it is also a key element to retain critical employees. Traditional views of employees' motivation have focused on formal aspects of the organization, such as job characteristics and rewards systems, as the main channels through which firms can motivate their employees. Similarly, one of the main roles that leaders are expected to play within organizations is that of motivating and inspiring others, usually those who work under them – however, leaders are usually viewed only as those formally holding a leadership position. These approaches greatly underestimate the power that informal relational factors can wield over the behaviors of individuals, and how they can affect strategic organizational processes as knowledge exchange and career advancement, which eventually hit organizational performance. During the last few years, management scholars have acknowledged the role that informal networks play within organizations and the potential “compensational” or “complementary” value they can provide against rigid formal structures and organizational features. Nonetheless, managing social networks within the firm still remains an elusive managerial task, making the

understanding of employees' relational behaviors a critical endeavor for managers working under today's post bureaucratic economy which dramatically requires more collaboration, recombination and coordination.

Creating opportunities for employees to get in contact with others that can benefit from them can also arouse greater levels of effort from both parties and vividly increase helping behaviors among them. When employees feel demotivated, are facing a very taxing task or are just having an “unhappy” day, they are likely to turn to people from whom they can obtain positive energy and inspiration that helps them to get through and regain their interest and stimulus toward their tasks. It has been traditionally argued that people tend to seek friends for advice on job-related matters and that friendship serves as a conduit that facilitates information and knowledge sharing, and that benefits social identity and communal behavior. Yet the question “*how different types of social networks affect strategic organizational processes?*” remains an open question of great interest for both practitioners and academics alike.

To address this question, we conducted a network analysis at the corporate R&D laboratory of an international pharmaceutical company. As employees tend to develop different informal networks depending on the type of relationship and on the content that flows through them,

Post bureaucratic economy dramatically requires more collaboration, recombination and coordination

we analyzed four different types of networks: two expressive and two instrumental types of relationship. We asked employees for information regarding with whom they usually exchange *technical knowledge* and who they seek to get advice related to *professional growth and development* (figure 2 shows the knowledge network and figure 3 shows the professional advice network). Similarly, we asked all employees to provide us with information regarding the people who they considered to be their *good friends* and the people who made them feel *motivated or*

FIGURE 2 ORGANIZATIONAL KNOWLEDGE NETWORK

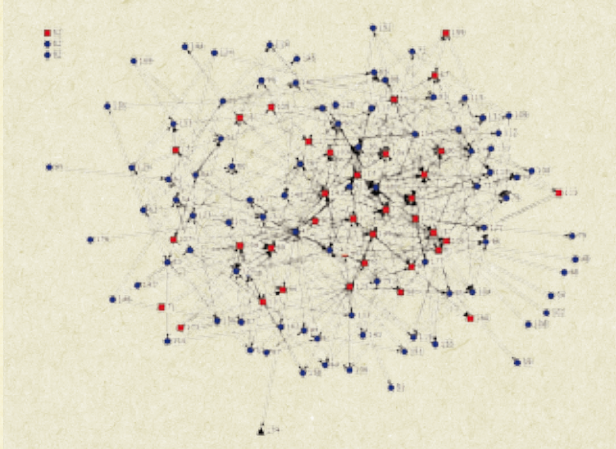


FIGURE 3 ORGANIZATIONAL PROFESSIONAL GROWTH AND DEVELOPMENT NETWORK

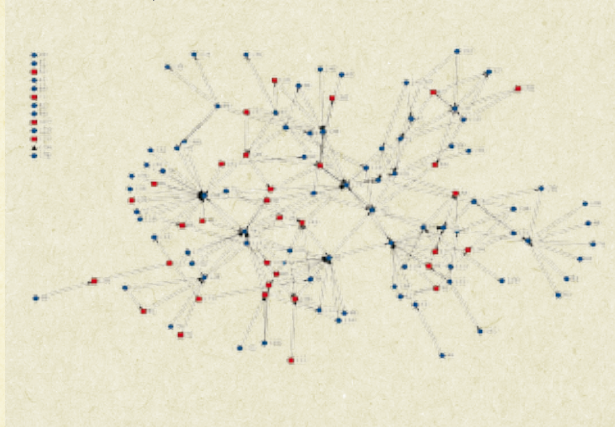


FIGURE 4 ORGANIZATIONAL MOTIVATION NETWORK

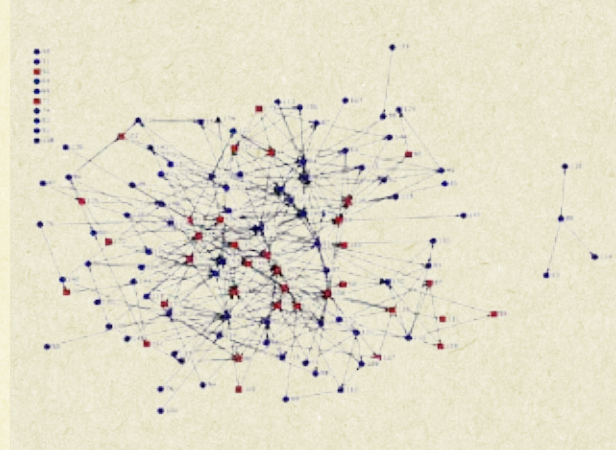


FIGURE 5 ORGANIZATIONAL FRIENDSHIP NETWORK

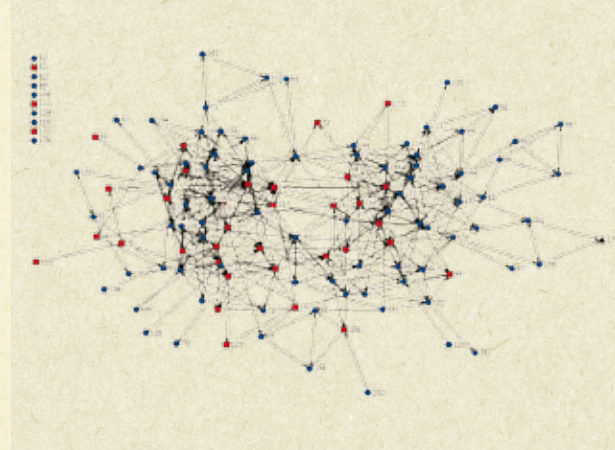


FIGURE 6 PROFESSIONAL ADVICE AND KNOWLEDGE EXCHANGE: CORRELATION WITH MOTIVATION AND FRIENDSHIP NETWORKS

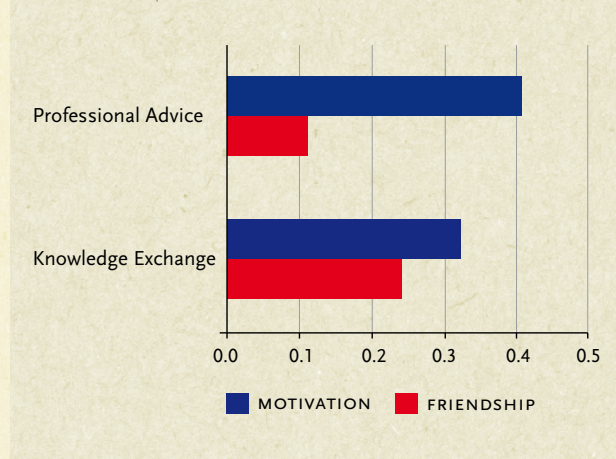


FIGURE 7 MOTIVATION – PROFESSIONAL GROWTH MULTIPLEXITY

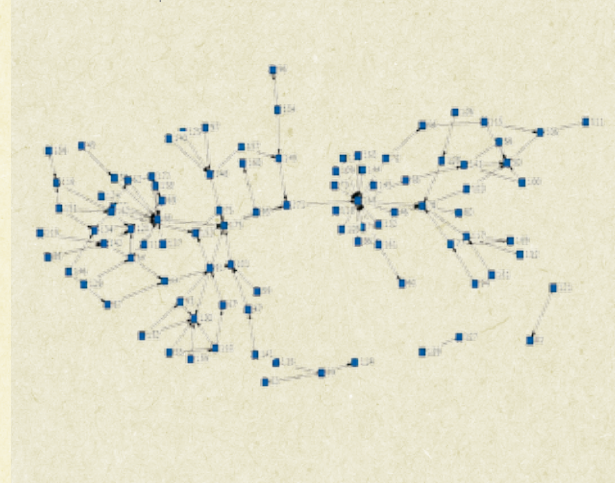


FIGURE 8 MOTIVATION – KNOWLEDGE MULTIPLEXITY

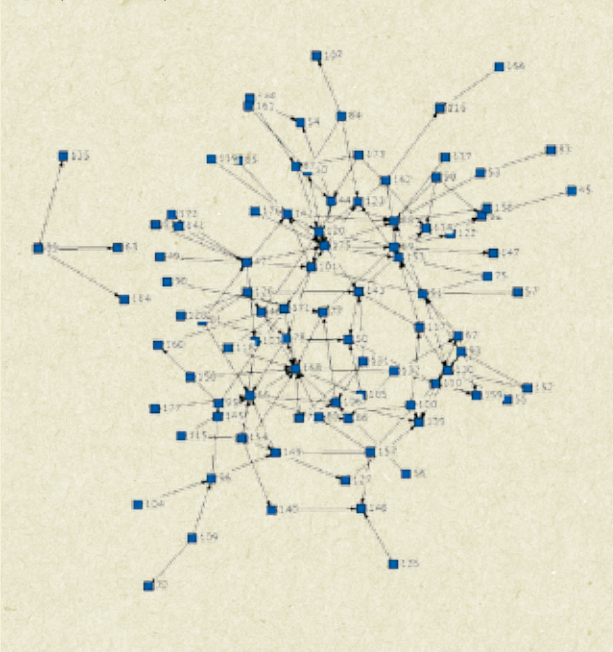


FIGURE 9 ORGANIZATIONAL KNOWLEDGE NETWORK

	E-I Index
Knowledge	-0,18
Professional Advice	-0,61
Motivation	-0,28
Friendship	-0,21

stimulated them when they interacted with them (figure 4 shows the motivation network and figure 5 shows the friendship network).

By performing a statistical analysis on these networks, we found some patterns suggesting interesting behaviors in our setting. For example, employees tend to be more inclined to exchange knowledge and to seek professional advice from those people who motivate them instead than from their friends (figure 6 shows the correlation between motivation and friendship networks with knowledge and professional advice networks). Not surprisingly, some of the formal leaders (e.g. number 168 in figures 7 and 8 is the head of a unit) were found occupying very central positions in motivation, professional advice and knowledge networks. These employees represent what can be referred to as true “formal leaders”, managers who are perceived as inspirational figures (“muses”) and trustworthy sources of knowledge and career advice (“experts”). They do not however occupy relevant positions in the friendship network, suggesting they do tend to keep relationships on the professional side.

Similarly, the main sources of professional advice are those from whom people tend to seek motivation as well, which

is consistent with the notion that *you want to become as those whom you most admire and who inspire you*. Alike, knowledge tends to be sought more from those who motivate employees than from friends, even when we studied scientific and technical knowledge, which is considered to be more tacit and complex and thus difficult to transfer.

The suggestion that a friendship relationship can make the transfer of tacit and complex knowledge easier given friendship’s inherent reciprocation and trust seems to hold here. However, it is also evident that the inspirational aspect of some individuals also elicits a disposition to put more effort on knowledge exchange from both source and recipient. Lastly, social networks still remain confined to the formal boundaries of organizational structure, some more than others.

As evidenced by the negative values of the E-I index for all networks relative to formal departments (figure 9), employees still seek professional advice and motivation from those most proximate to them. Opportunely, knowledge seems to permeate formal boundaries, carried to some extent, through motivational and friendship relations, which serve as the vehicle to convey the active ingredient. ■