Chapter 26
Social Networks: Connections in Structures

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Abstract Social network is a structure made up of a set of social actors and a set of ties between these actors. The social network provides an analysis of the structure of social entities as well as a variety of theories explaining the patterns observed in these structures (Wasserman and Faust 1994). The nodes may be individuals, groups, organizations, or societies. It is focused on uncovering the patterning of people's interaction. These patterns are important features of the lives of the individuals. Our choices depend in large part on how that we are tied into the larger social network. In conclusion, investigating interactions is important for understanding patterns because interactions help to define and identify groups or organizations and the members within these entities. In addition, the investigation of interactions may provide a better understanding of how leaders may appear within organizations because interactions help to define structure and context.

Keywords Social networks · Structures · Connections in structures

26.1 Introduction

Social network is a structure made up of a set of social actors and a set of ties between these actors. The social network provides an analysis of the structure of social entities as well as a variety of theories explaining the patterns observed in

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these structures (Wasserman and Faust 1994). The nodes may be individuals, groups, organizations, or societies. Researchers have examined a broad range of types of ties. These include communication ties (such as who talks to whom, or who gives information or advice to whom), formal ties (such as who reports to whom), affective ties (such as who likes whom, or who trusts whom), material or workflow ties (such as who gives money or other resources to whom), proximity ties (who is spatially or electronically close to whom), and cognitive ties (such as who knows who knows whom) (Katz et al. 2004).

Social networks are an interdisciplinary field that emerged from social psychology, sociology, statistics, and graph theory. Georg Simmel mentioned early structural theories in sociology emphasizing the dynamics of triads and "web of group affiliations" (Scott and Davis 2003). Jacob Moreno is the first researcher developing the sociograms in the 1930s to study interpersonal relationships. These approaches were mathematically formalized in the 1950s (Wasserman and Faust 1994). Social network analysis is now one of the major paradigms in contemporary social and behavioral sciences. Together with other complex networks, it forms part of the nascent field of network science (Borgatti et al. 2009; Easley and Kleinberg 2010).

In the late 1890s, Émile Durkheim and Ferdinand Tönnies introduced the idea of social networks. Tönnies (1887) argued that social groups can exist as personal and direct social ties that either link individuals who share values and belief (Gemeinschaft) or impersonal, formal, and instrumental social links (Gesellschaft). Durkheim (1893) mentioned a non-individualistic explanation of social facts, arguing that social phenomena arise when interacting individuals constitute a reality that can no longer be accounted for in terms of the properties of individual actors. Georg Simmel pointed to the nature of networks and the effect of network size on interaction and examined the likelihood of interaction in loosely knit networks rather than groups (Wasserman and Faust 1994).

Several groups in psychology, anthropology, and mathematics make major contributions in the field. In psychology, Jacob L. Moreno began systematic recording and analysis of social interaction in classrooms and work groups in 1930s. In sociology, the early work of Talcott Parsons set the stage for taking a relational approach to understanding social structure (Parsons 1951). Later, the work of sociologist Peter Blau provides a strong impetus for analyzing the relational ties of social units with his work on social exchange theory (Blau 1960).

The social network is a theoretical construct in the social sciences to study relationships between individuals, groups, organizations, or even entire societies. Social network describes a social structure determined by such interactions. These interactions namely the ties through which social unit connects illustrates the convergence of the various social contacts of that unit. This relational theoretical approach indicates an axiom of the social network approach to understanding social interaction, as social phenomena should be primarily conceived and investigated through the properties of relations between and within units.

26.2 Types and Quality of Ties

Another aspect to analyze about the use of social capital in an organization is the types and quality of the ties in the network. Three aspects of network have to be considered in assessing the quality of the ties. They are direct ties, indirect ties, and structural holes (Ahuja 2000; Burt 1997; Granovetter 1973). The more direct ties an organization has, the greater the innovation output. Indirect ties also produce greater innovation output but are related to the level and quantity of direct ties. Structural holes, requiring competent and knowledgeable persons to connect different groups, are beneficial in large organizations. Optimal structure of networks depends on the objectives of the network members (Ahuja 2000; Hansen 1999).

Burt (1997) indicates that the number and quality of ties make a difference to the value of social capital in an organization. The value of social capital is contingent on the number of people doing the same job (Burt 1997). As the leader comprises more structural holes, more diverse contacts and the better quality of information will be gathered and shared (Burt 1997; Ahuja 2000; Granovetter 1973).

Social groups and actors would likely benefit from having both weak and strong ties for exchange of knowledge. Entities can quickly gather and share less complex information from a variety of sources with weak ties. More complex information would benefit from exchange in a strong network. As the leaders recognize the value of creating communities of practice to promote social capital in their groups, it will be critical to address the creation of efficient networks for building vertical and lateral capacity for both communication and transfer of knowledge purposes (MacIver and Farley 2004; Burch and Spillane 2004).

Few complete theories have been produced from social network analysis. One of them is the Heterophily Theory. The basis of Heterophily Theory is that numerous weak ties can be important in search of information, as cliques have a tendency to have more homogeneous opinions and share many common traits. This commonness is the reason for the members to be attracted together. However, being similar, each member of the clique would also know more or less what the other members knew. To find new information or insights, members of the clique will have to look beyond the clique to its other friends and acquaintances. This is what Granovetter named “the strength of weak ties” (Granovetter 1973).

26.3 Structural Holes

In the context of networks, social capital exists where people have an advantage because of their location in a network. Contacts in a network provide information, opportunities and perspectives that can be beneficial to the central actors in the network. Most social structures tend to be characterized by dense clusters of strong connection (Burt 2004). A network that bridges structural holes will provide network benefits that are in some degree additive. An ideal network structure has a

vine and cluster structure, providing access to many different clusters and structural holes (Burt 1992).

Networks with rich structural holes are a form of social capital in that they offer information benefits. The main actor in a network that bridges structural holes is able to access information from diverse sources and clusters (Burt 1992). This is beneficial to an individual's position because of the reaching information about opportunities whether network spans a wide range of contacts. In 2004, Burt studied 673 managers who ran the supply chain for one of America's largest electronics companies (Burt 2004). He found that managers who often discussed issues with other groups were better paid, received more positive job evaluations and were more likely to be promoted (Burt 2004). Thus, bridging structural holes can be beneficial to an organization, and in turn, to an individual's career.

In conclusion, investigating interactions is important for understanding patterns because interactions help to define and identify groups or organizations and the members within these entities. In addition, the investigation of interactions may provide a better understanding of how leaders may appear within organizations because interactions help to define structure and context. Network theorists contend that social context (rules, constraints, beliefs, norms, experiences, etc.) is understood and captured best by structural investigations.

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