THE BROKERAGE ROLES IN THE ORGANIZATIONAL NETWORKS AND MANIPULATION OF INFORMATION FLOW

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Abstract

Improvements in information & communication technologies have reshaped production and consumption relations in the post-modern era. Societies have tried to readapt themselves to the requirements of new knowledge based economy. It has also became vital for the organizations to answer the needs of knowledge society. Whether they are public or private, organizations will play a key role during the transformation process of the societies and economies. It is not only important for the organizations to use the latest information technologies but also create social structures which can ease information flow throughout the organization.

Social network studies which are quite different from traditional approaches in sociology can be used as a tool to understand and manipulate organizational networks. The results of several research activities have shown that actors use their social connections to reach information, resources and possible opportunities (Garguilo and Benassi, 2000). It is not enough to use advanced information technologies in the organization to build an effective knowledge distribution system regarding to social network perspective, it is required to understand the patterns of social interactions between actors and to find a fit between technical structure and social structure for effective knowledge based organizational design.

Structural holes theory (Burt, 1992) emphasized importance of brokerage roles of the actors in a social network. Structural holes, represent unconnected parts between actors and brokers are the actors who connects the unconnected parts of the social systems (Burt, 1992). If there are lots of structural holes in an organization, there will also be lots of brokerage opportunities for some actors in an organizational network. Brokers are the bridges and gatekeepers who are

controlling information flow in the organizations. It is vitally important to explore brokerage patterns in an organizational network for an effective knowledge based design. This study is a conceptual framework aims at bringing an explanation to socially created information flow structures in the organizations by using structural holes theory.

Keyworks: *Social networks, structural holes theory, brokerage roles & information flow*

JEL Classification: Z13

1. INTRODUCTION

The intention of human being to control the nature and to shape the nature for its own benefits has begun with the principles of Newton three centuries ago. Newtonian mechanics and paradigm have effected the development of each scientific field and construction of the modern society. First technological revolution which begun with the invention of steam machine has changed the relationship between production and consumption and reshaped social life by creating big cities and modern organizations. The intellectual movement through modernization had assumed human as a rational actor who can serve for the needs of consumption based society. This aspect of modernization movement heavily ciriticized for being unrealistic to reflect the exact situation of man in industrial period. According to Elton Mayo - founder of human relations school, industrial revoluton had taken away man's sense of meaningful work and led to his sense of alienation (O'Connor, 1999: 226). Social life in small towns which mostly consisted of farming activities converted the simple life of preindustrial man to a lonely man living in big cities and working in big organizations. The misfit between technical system and social system during industrialization period was seen as one of the major causes of the 30's economic crises according to lots of intellectuals.

The movement through second technological revolution has started during the Second World War period. It is possible to indicate that, various scientific and technological developments that took place during and postwar period had a considerable effect on the formation of today's postmodern society. The intensive studies in major scientific fields of physics and mathematics had leaded to invention of space technologies and atomic power. However, neither of them was responsible for emergence of new type of society by changing the production and consumption relations. Improvements and inventions (fiber optics, packed switching, internet, personal computers, computer networks, satellite technologies, cell phones,..etc.) in information and communication technologies have transformed industrial society to information society. The way of doing business

has been shaped by the rapid developments in ICT's during the last two decades. Workforce has shifted from blue collar workers to white collar workers as well as manufacturing sector to service sector because of widespread use of computer aided design and computer aided manufacturing technologies. Information era was heavily criticized for creating tools, which restricts the independence of human being. ICT's have eased business processes and communication between individuals in social and work life by the usage of computer networks, e-mail, databases, video-conferencing technologies and various software tools but, information infrastructures of the organizations have been developed without paying attention to the interaction between social elements and social structure.

At this point, integrating ICTs' and social communications infrastructures in organizations can be defined the concept of "knowledge management systems" (KMS). There are two basic dimensions while evaluating the concept of KMS in organizations. The first dimension includes technological aspect. This perspective "refers to a class of information systems applied to managing organizational knowledge. That is, they are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application" (Alavi and Leidner, 2001). The second dimension of KMS indicates the social aspect, which is focused on communities of practice and socializing people with sharing their expertise knowledge at the work environments. Knowledge sharing is the process mutual communication of knowledge created by individuals or groups and teams in organizations. Thanks to the social communication infrastructure, employees can appear own tacit knowledge as formal and informal ways and easily construct networks environment socially (Sağsan, 2007: 133).

The human being as a social existence cannot live without interacting with the others in their social environment. Granovetter (1985) indicated that the effect of social relations on human behavior and decisions in premodern times has not changed or changed a little despite modernity. Modern day organizations consist of large number of interacting individuals. These social interactions form complex organizational networks, which are vitally important to understand information flow, power relations, the roles of actors, sets of relations in the organizational system. According to Hammond and Glenn (2004: 16) the primary reason of social relations construction between parties is information exchange. Thus, the structure of intraorganization networks can be used to define the paths of information flow in the social system. IT specialists are using various system analysis tools to determine the information needs of the employees working in the organizations but, information systems which designed by using certain social research methods (interviews, surveys, observations) are insufficient to reflect the social network structure inside the organizations. According to social network theory paradigm it is rational to find the best match between social networks and technical information

flow design for the effectiveness of information systems in organizations. Theoretical and methodological approaches in organizational network studies field may be quite helpful to find and map the links between actors before the technical design of information systems.

2. SOCIAL NETWORK THEORY & ANALYSIS

There is an increasing trend in different fields of social research towards social network analysis. The sociological research studies benefit from network analysis have significantly increased after the publication of two journals called "Social Networks" and "Connections" at late 70's (Emirbayer & Goodwin, 1970: 1411). This method of analysis is quite different from the other fields of sociological inquiry because the behavior of focal actor is explained by the pattern of interactions with the other actors (Monge & Contractor: 2001). Social network analysis totally refuses "social behavior is a result of individual behavior" assumption of traditional sociological approaches and examines the relationship patterns emerge from the interactions within the social system (Emirbayer & Goodwin, 1970: 1414). Social network analysis can provide rich social information about dynamics and information flow structures in organizations for the predesign stage of information systems if it's compared with the well known social research methods.

Social network analysis is an effective tool to understand the characteristics of information circulation, social barriers to reach information & knowledge, closed sub networks groups and actors playing bridge and gateway roles inside an organizational network. Jablin and Putnam (2001) defined the status of knowledge & information flow in the social networks under two groups:

a) Mobile Information or Knowledge: The information transmitted form one node to the others, which can flow and be accessed easily (designs, personal thoughts, articles, books and computers).

b) Embedded Knowledge: Profession based knowledge circulated between groups and individuals, which is mostly related to craftsmanship, individual skills and attitudes. It generally flows through a specific part of the network and it is hard to analyze.

Measurement tools and variables used in social network analysis methodology is different from well known research methods as indicated before. Focus of network research methodology is to determine the connections between nodes and to define the network by using specific terms & measurement variables. Jablin and Putnam (2001) defined some of the specific terms & measurement items under three groups:

1. **Measurement Items Used for the Relations in Social Networks**

a. Indirect Relations: The relationship between two actors through brokers.

b. Frequency: The number of interactions between two actors in certain amount of time.

c. Stability: The length of the relationship between two actors.

d. Power of the relation: Amount of time separated for the relation, emotional density of the relation, importance of the relation for both sides.

e. Direction of the relation: From node A to B or node B to A.

2. **Measurement Items for the Actors in Social Networks**

a. Degree: Number of direct relations with the other actors.

b. Indegree: Number of ties form other actors to the focal actor.

c. Outdegree: Number of ties form focal actor to the other actors.

d. Closeness: The focal actor's ease of access to the other actors. The mean value of direct and indirect relations of an actor.

e. Betweenness: The degree of brokerage of an actor in a network.

f. Centrality: The degree of central position of an actor in a network.

g. **Roles of actors inside the network:**

g1. Star: Actors who have high level of centrality.

g2. Broker: The actors who connect to or more unrelated sides.

g3. Bridge: The actors who are member of 2 or more groups (network sets).

g4. Gatekeeper: The actors who control the information flow from one part of the network to another part with a single link.

g5. Isolated: Actors who have very few or no links with the others.

3. **Measurement Items Used to Define the Social Network**

a. Size: The number of actors inside the network.

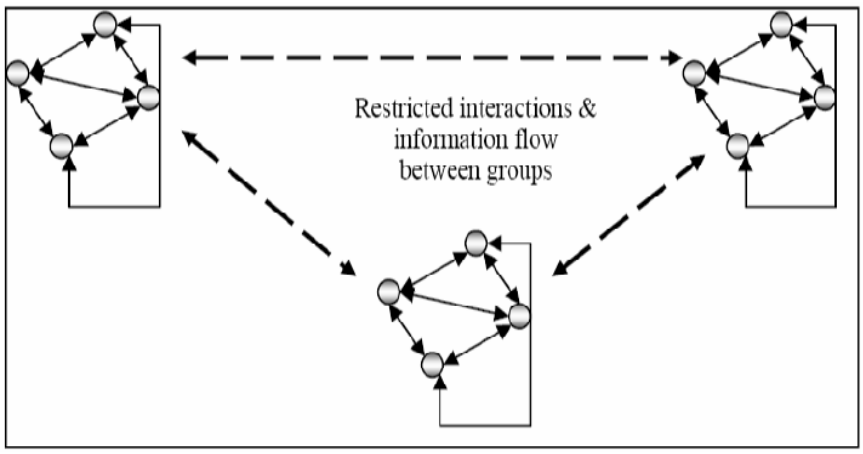
b. Density: The rate of current links to the possible links.

c. Component: The biggest sub network group which does not have connections with the other actors & groups in the social network.

The accessibility of information from the social system mostly depends on the relationship patterns between actors. The degree of information shared in a network mostly depends on closeness or openness of the social structure. This situation

explained by two major network theories. Granovetter (1973) asserted that, weak ties which is defined as the nonsocial and arms length relationships can easily carry the information to all parts of the network. Weak ties are rational, transaction related and less frequent network relationships. According to "strength of weak ties theory"; new ideas will diffuse slowly, scientific efforts will be prevented and subgroups of networks may emerge in the social systems which have less number of weak ties (Granovetter, 1983: 202). The opposite theory defends the advantage of strong and socially intensive tie formation between the parties. The actors in an organizational network try to improve the mutual relationship with the others to gain benefits, security and strength inside a social system according to some of the network theorists (Bordieu 1983, Coleman 1988 and Podolony 2001). Coleman (1988) emphasizes the role of close social ties on the creation of norms and harmony that facilitates formation of trust based on mutual work relations. Two actors perceive themselves trustable and develop a common viewpoint as the frequency of their social relationship increase during a certain amount of time. If the actors attempt to form strong social ties with the others, it is possible to expect emergence of close groups inside a network.

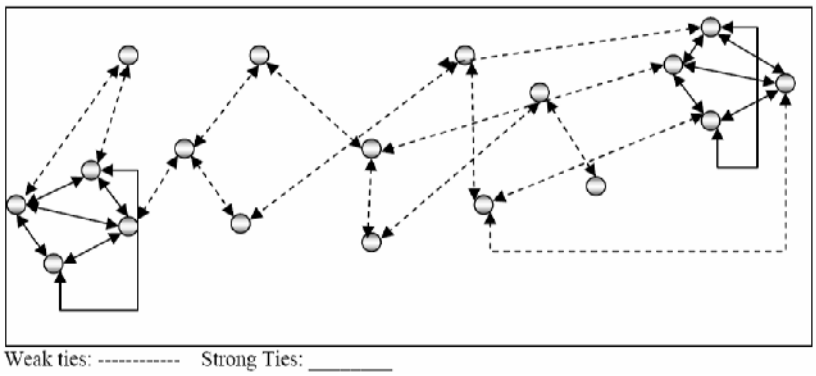
Figure-1: Strong Tie Domination in an Organizational Network



As it is seen in Figure-1 the social network structure in an organization is divided into a number of network sets in case of social based relationship domination between nodes. This type of social structure has two important outputs in terms of information flow inside the network; (1) groups attempt to control information and share the produced knowledge only with their group members, (2) close network sets prevent the flow of information to the other groups. The strong tie network sets in an intraorganizational network may behave as black holes inside the system. These black holes collect information from outside and share the produced knowledge within the group but do not want to transmit these to the other parts of

the social system. These closed network sets could be formed by the common features between actors like working in same department, friendship and being in the same profession in organizations. In general, this kind of social network structure in an organization may influence effectiveness of information systems. Even if it is perfectly analyzed or designed by the latest equipments, the black holes in the social network prevent the actors to take the advantage of the information system equally.

Figure-2: Weak Tie Domination in an Organizational Network



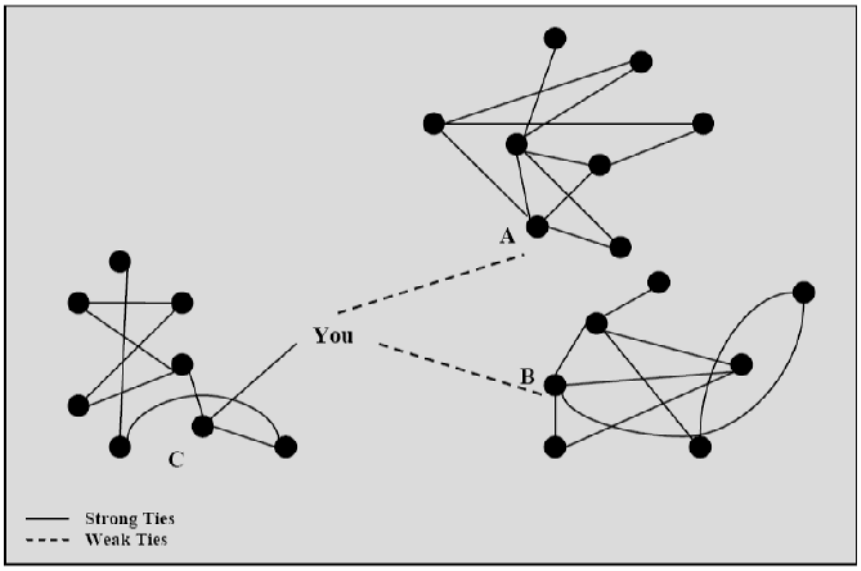
Weak tie domination in an organizational network helps creation of open social structures by carrying information and knowledge to the far parts of the network (Granovetter, 1983). Rationality based connections between nodes of the social networks, prevents close social relations and formation of close network sets. However, this type of social network structure does not give us tools to design the information systems according to social interaction patterns in the organizations. This structure is chaotic and hard to control because, the identity of the actors who control the information flow is uncertain.

The centrality of an actor inside an organizational network is an important parameter for network analysis. Employees in the organizations attempt to increase the number of their ties to the others and especially to the critical actors because, a central position in an organizational network gives them opportunity to control the flow. Burns and Wholey (1993) found that the actors who are in central positions in a network adapt to the innovations faster than the others do. Greenwood, Sudaby and Hinnings (2002) found that the responses, strategies and actions of the actors at the central positions are imitated by the others. However, the centrality of an actor does not mean an actor's total control over the flow in the network. Some actors who have less but effective ties with the others can have more chance to access and manipulate the flow. In summary, network centrality parameter does not provide us necessary theoretical approach to construct a model how to design a socially fit IT infrastructure.

3. STRUCTURAL HOLES THEORY: A PARADIGM TO MODEL SOCIALLY FIT & EFFECTIVE INFORMATION SYSTEMS

Structural holes theory emphasizes knowledge access and control advantages of the brokerage positions in a social network. Structural holes are the empty parts between unconnected actors in a social network and the actors who fill the structural holes by constructing bridges, gain advantages of being a broker (Burt, 2005: 18). There are three benefits of being a broker according to Burt (2005: 23); (1) access to alternative viewpoints and applications in the network, (2) early access to innovative ideas and thoughts, (3) ability to transmit the new ideas & thoughts if there is an advantage to be gained. Podolny (2001: 34) indicates that, the structural holes theory, which defines a focal actor's brokerage advantage by connecting the unconnected parts in a social network as the main principle explains the emergence of network ties. A rich social network in terms of structural holes creates lot of brokerage opportunities but it depends on perceptions of individuals to see these holes as a chance to gain advantage by constructing bridges between unconnected sides.

Figure-3: Structural Holes and Brokerage



Source: Burt, 1992: 27

There are two types of structural holes in the social network graph drawn above according to Burt (1992: 27):

a. The structural hole between set A and C.

b. The structural hole between set A and B.

c. The structural hole between set B and C.

The broker in the graph fills the structure hole by having connection with one member of each network group. The members of group C depend on the broker to receive information from and to connect with the member of other two groups. Group A and B also depend on the broker. Broker can control and manipulate the information flow between the members of three network groups for his or her own benefits. There are four levels of brokerage types an actor can create value according to Burt (2004: 355): (1) Simplest way of brokerage is to inform the sides about interesting issues and difficulties. (2)Transfer of best applications to both sides. The unconnected sides can receive information about activities of each other over the broker. (3) Transfer of information about strategic similarities and dissimilarities of the sides. (4) The opportunity of a broker to create a synthesis by gathering information about beliefs and behaviors of the other sides.

Burt (1992) focused on the chances and the advantages of brokerage roles to explain social dynamics in a network. Technically focused information system design in organizations where lots of structural hole exist may fail to distribute required information & knowledge needs because, unconnected nodes (employees) depend on possible brokers in the social network to communicate with the others. The brokers may also act as filters, manipulators and barriers during the transfer of tacit and embedded knowledge to the other parts of the organization.

Assumption: The information system was designed without considering the structure of the social network and the roles of employees inside the network.

H1: Many structural holes between employees and groups will negatively influence effectiveness of an organization's information system.

H1a: The brokers partially prevent the diffusion of information flow to the organization.

H1b: The brokers manipulate tacit and embedded knowledge while transferring them to the other parts of the organization.

Employees may prefer to transfer the information & knowledge socially, instead of using advanced ICT's in case of close physical settings like departments and units. The information flow control of the brokers will increase in case of interdepartmental relationships because this situation gives initiative to control the socially created information flow.

H2: The control of brokers over interdepartmental information flow will increase if there are structural holes between departments of an organization.

The social network analysis is required for an effective information system design in an organization. The number of structural holes and identity of brokers can only be determined by using social network methodology. The technical design of information flow should address the actors who are brokers in the social network. Several individuals in different positions (top managers, professionals, secretaries, clerks,..) may play brokerage roles in the organizations. It is very important to focus on the brokers and to use them by creating control mechanisms (appropriate database design, authorization system, and monitoring tools) for the effectiveness of information systems in organizations.

4. CONCLUSION

The purpose of this study is to show the possible influences of hidden dynamics inside the social systems on the flow of information in the organizations. Social networks are vitally important to design effective information systems. Different social interaction patterns in organizations may prevent, change, control and direct the diffusion of information and knowledge throughout organization. Some network theories (Granovetter, 1973; Bordieu, 1983; Coleman, 1988; Burt, 1992 and Podolny, 2001) were used to explain how different network structures create negative effects on the operation of information systems in organizations. Social network structure should be analyzed before the information system design in the organizations to find a match between natural and technical flow of information. Structural holes theory (Burt, 1992) gives us tools to design the information systems by focusing on the control initiatives of the brokers. In summary, the usage of theoretical and methodological approaches in social network analyses is a prerequisite for effective information system design in organizations.

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