Knowledge Sharing Social Structures within Organizations

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Abstract

Social structures are considered as an important channel for knowledge sharing within organizations. In recent years, knowledge management has begun to shift from focusing primarily on technology solutions toward exploring the social relationships through which knowledge is shared. Therefore, a wide variety of social structures have been recognized within the context of organizations. To utilize these social structures as an effective channel for knowledge sharing, necessity of a holistic view on their types and attributes seems crucial. An understanding of the different types and attributes of social structures in organizations will provide a lens through which to examine their dynamic nature in relation to knowledge-sharing activities. In this article, we elaborate on the result of a review on knowledge sharing social structures within organizations. The goal is to extract the different types and properties of social structures and their potential effect on knowledge sharing process within an organization.

Key Words: Social Structure, Organization, Knowledge Sharing.

Data Extraction

After reviewing the literature indexed in our pilot studies with regards to the data required to answer our research questions, we could achieve a model to present the data entities required for the purpose of this research. As shown in Figure 2, **Context** is the environment, setting, or situation surrounding the **Organizational Social Structure** (OSS). OSS located in this context has some Attributes which are characteristics or properties belonging to it. Each OSS **attribute** has a name and a value (e.g. size or lifespan). These attributes form some specific Types. Type can be considered as a label for a group of OSSs sharing a common set of attributes (e.g. Communities of Practice). Context itself has some [context] Attributes which are associated with it. Additionally, there are some Knowledge **Sharing Activities** which are done and affected by context and OSSs attributes. Furthermore, there are some **Aspects** considered in the context of OSSs which include both context and OSSs attributes and affect the knowledge related activities. Aspects determine an area of interest with respect to OSSs. Each aspect includes a set of attributes (OSS attributes or context attributes) that are used to discuss it (e.g. trust or diversity). Each aspect considers both attributes and their relationships regarding an area of interest.

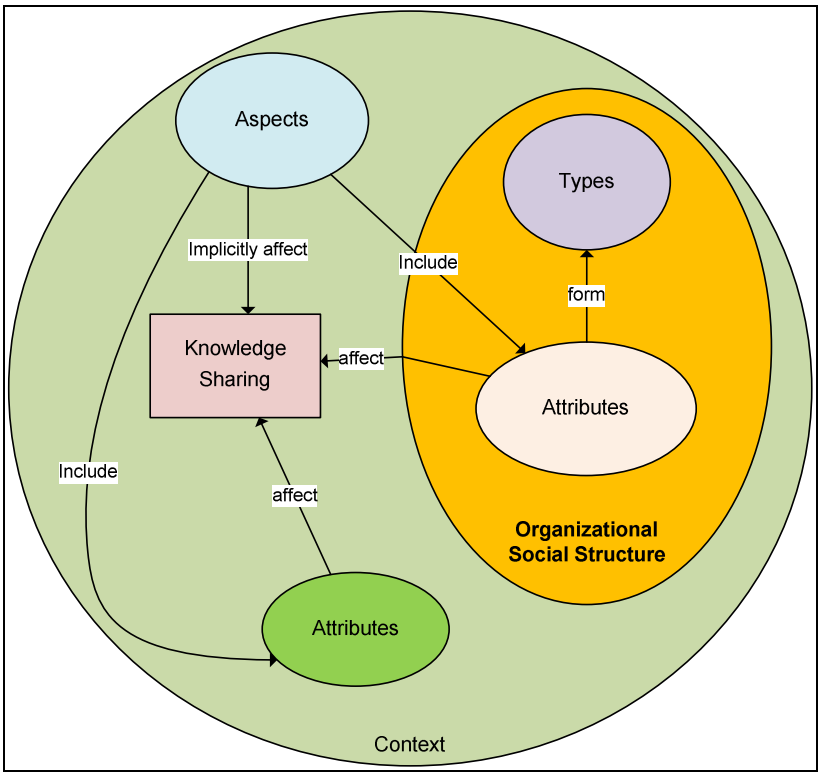

Figure 2. Context of Organizational Social Structures

Based on the proposed model, we created a data extraction form (Table 3).

Table 3. Data Extraction Form

Data Item	Description
OSS Types	Types of OSSs discussed in the paper (e.g. Communities of Practice).
OSS Attributes	Different attributes of OSSs discussed in the paper (e.g. size or lifespan).
OSS Context	The context(s) in which the OSSs exist (e.g. A global organization or virtual community).
Context Attributes	Different attributes of OSSs context (e.g. Leadership or sponsorship).
Knowledge Sharing Activities	Knowledge sharing activities which are done using OSSs (e.g. Knowledge integration or innovation).
Aspects	Different aspects investigated for an OSS (e.g. Trust or reputation).

Results

Attributes of Organizational Social Structures

As listed in Table 4, we could identify 42 attributes in overall. From our conceptual model, we had distinguished between context (macrostructural) attributes and OSS (microstructural) attributes. OSSs dynamics are dependent upon both macrostructural and microstructural attributes. The macrostructural attributes are exogenous variables that are related to the environmental conditions under which the OSS is created and sustained and that influence OSS dynamics. The microstructural attributes consist of the individuals and relations between them that develop within the boundary of the OSS (Wasko et al. 2004). In Table 4, Attributes 33-42 are context attributes.

Further elaborating on OSS attributes resulted in the following new categories of attributes:

- **Relationship Attributes:** Attributes addressing the relationship between members of an OSS. “Strength of Relations”, "Cognitive Distance", "Persistence", "Degree of Perceived Competition" and "Type of trust" are observed attributes in this category (Attributes 18-22 in Table 4).
- **Network Attributes:** Attributes addressing the network of relations between members of an OSS. “Reciprocity”, “Size” and “Connectivity” are two observed attributes in this category (Attributes 6,16,17 in Table 4).
- **Knowledge related Attributes:** Attributes related to the knowledge shared in an OSS. "Type of knowledge shared", "Quality of knowledge created and shared", "Knowledge Activity", "Type of innovation created" and “Shared knowledge repository" are observed attributes in this category (Attributes 11-15 in Table 4).
- **Membership Attributes:** Attributes related to membership in an OSS. "Members’ selection process", "Members’ enrollment", "Members’ cohesion", "Members’ prior experience",

"Geographical dispersion", "Membership stability", "Members' ICT literacy", "Proficiency diversity", "Cultural diversity" and "Topics' relevance to members" are observed attributes in this category (Attributes 23-29 in Table 4).

Based on our observation, to enable and support OSSs, considering different stages of evolution of an OSS is crucial. This attribute has identified as "Level of Maturity". After deciding the current status of an OSS, new objectives and strategies for their improvement can be provided. (Lee et al. 2010) provides a holistic, systematic, and comprehensive framework with maturity stages for navigating CoPs that can be also used for other OSSs. It defines the following stages of development:

Building: At this stage, members come together and recognize their potential, discovering people who already network around the topic, the strength of those relationships, the problems, and the potential of the community for growth. And they develop a detailed plan of structure of community, and develop relationships and deliver values. Properties and activities at this stage include:

_ Determine the primary intent of the community (Cambridge et al., 2005; Wenger et al., 2002)
_ Define the domain and identify engaging issues (Wenger et al., 2002)
_ Deliver value (McDermott, 2000)
_ Interview potential members and thought leaders (Cambridge et al., 2005; McDermott, 2000)
_ Create a preliminary design for the community (McDermott, 2000; Wenger et al., 2002)
_ Build a case for action and membership (Wenger et al., 2002)
_ Build regular contacting (1–1 or in community events) (McDermott, 2000)
_ Engage senior managers (McDermott, 2000; Wenger et al., 2002)

Growth: At this stage, community is growing up in perspectives scale and internal quality. Community expands new ideas and perspectives and increases the exposure of members. Also, they try to discover community value, best practice, tacit knowledge, and new technologies in order to develop community influencing power. Properties and activities at this stage include:

_ Define the community's role in the organization (Wenger et al., 2002)
_ Redefine community boundaries (Wenger et al., 2002)
_ Routinize entry requirements and processes (McDermott, 2000; Wenger et al., 2002)
_ Measure the value of the community (Wenger et al., 2002)
_ Maintain a cutting-edge focus (Wenger et al., 2002)
_ Build and organize a knowledge repository (Wenger et al., 2002)
_ Create a mentorship program (McDermott, 2000)
_ Develop vetted practices (McDermott, 2000)
_ Execute lifecycle process for developing and managing knowledge (Gongla & Rizzuto, 2001)
_ Support tacit knowledge exchange (Gongla & Rizzuto, 2001)
_ Develop and disseminate communications (Gongla & Rizzuto, 2001)
_ Correct problems and adjust (Gongla & Rizzuto, 2001)

Adaptive: This stage is the most efficient and effective period. At this stage, Members knowledge and best practices are well shared, the knowledge are well adapted in real works, and moreover innovation based on the knowledge is made. Community capacity is enough to support other communities and relationships are widened to outside communities. Properties and activities at this stage include:

_ Hold a renewal workshop (Wenger et al., 2002)
_ Actively recruit new people to the core group (Wenger et al., 2002)
_ Develop new leadership (Wenger et al., 2002)

_ Seek relationships and benchmarks outside the organization (Wenger et al., 2002)
_ Hold joint meetings with other communities (McDermott, 2000)
_ Identify new technology (McDermott, 2000; Cambridge et al., 2005)
_ Sponsor new communities (Gongla & Rizzuto, 2001)
_ Develop advanced boundary processes (Gongla & Rizzuto, 2001)
_ Focus on innovation (Cambridge et al., 2005; Gongla & Rizzuto, 2001)

Close: Close stage has two tendencies. One is declining, the other is transforming. Declining means that community loses members or turns into a social club and finally the community becomes invalid. Transforming means that community is run successfully, it becomes an actual department, while community becomes too big to split into distinct communities. Properties and activities at this stage include:

_ Members no longer engage very intensely (Wenger, 1998)
_ The community no longer central (Wenger, 1998)
_ Lose members and energy (Wenger et al., 2002; McDermott, 2000)
_ Turn into a social club (Wenger et al., 2002; McDermott, 2000)
_ Focus slowly shifted from IT issues to organizational ones, and then to their personal lives (Wenger et al., 2002)
_ Split into distinct communities or merge with others (Wenger et al., 2002)
_ Become institutionalized or become actual departments in the organization (Wenger et al., 2002)

In our observations, we found “trust” and “reputation” as mostly discussed aspects. Reputation is what is generally said or believed about a person’s character, while trust reveals personal and subjective opinion. Social scientists have collectively identified three types of trust, which are:

- Interpersonal trust which is the trust one agent has in another agent directly. This trust is agent and context specific.
- System trust or impersonal trust refers to trust that is not based on any property or state of trustee but rather on the perceived properties or reliance on the system or institution within which that trust exists. For instance, inherited experiences of an organization.
- Dispositional trust, or Basic trust, describes the general trusting attitude of the truster. This is “a sense of basic trust, which is a pervasive attitude toward oneself and the world”.

Reputation is consisted of multiple parts:

- Position: employees often consider information that comes from a boss as being more reliable than that which comes from another employee in the same (or a lower) position as him/her.
- Expertise: people often trust in experts more than in novice employees. In addition, “individual” level knowledge is embedded in the skills and competencies of the researchers, experts, and professionals working in the organization
- Previous Experience: People have greater trust in those sources from which they have previously obtained more “valuable information”. Therefore, a factor that influences the increasing or decreasing reputation of a source is “previous experience” and this factor can help us to detect trustworthy sources or knowledge.

- Intuition: "indirect reputation or prior-derived reputation", When people do not have any previous experience they often use their "intuition" to decide whether or not they are going to trust something.

Table 4. Attributes of OSSs

#	Attribute	Definition
1	Orientation	Purposes of OSS. Ranging from operational to strategic. Strategic OSSs address issues pertinent to the organizational mission and its big picture, whereas operational OSSs discuss mundane practices.
2	Creation Process	Describes the process of cultivating OSSs. Either grassroots (voluntarily) or top-down (intentional).
3	Visibility	How visible an OSS is? Visible or invisible.
4	Embeddedness	The degree to which an OSS is integrated with the existing organization structure.
5	Contract value	The degree to which the OSS has to deliver concrete results.
6	Size	The number of members.
7	Lifespan	Approximate length of time at the moment of its creation that the founders intend the OSS to last. Can vary between discrete (e.g., created to solve a specific problem) and continuous (e.g., formed to connect individuals to outside partners).
8	Age	Refers to how long an OSS exists. Ranging from young, established, and old. An OSS is 'young' when it is less than a year old; when it is more than 1 year old but less than 10 years old, it is 'established'; and when an OSS is more than 10 years old, it is 'old'.
9	Participation	The extent to which individual participation is determined. From the periphery to a position of full participation. It can be determined individually or jointly.
10	Level of maturity	Determine how mature individual OSSs are.
11	Type of knowledge shared	Type of knowledge which is shared between participants of an OSS. Ranging from tacit to explicit.
12	Quality of knowledge created and shared	Quality of knowledge which is created and shared within an OSS. From poor quality to rich.
13	Knowledge Activity	It can be sharing, nurturing or both of them.
14	Type of innovation created	The kind of innovation undertaken. For instance Incremental or radical.
15	Shared knowledge repository	Whether an OSS has a shared knowledge repository (the intersection of individual knowledge sets) or not. Consists of shared background knowledge and transactive memory (knowing who knows what)
16	Reciprocity	Degree to which members interact mutually. It can be in form of one way, dyadic or generalized (occurs when one's giving is not reciprocated by the recipient, but by a third party).
17	Connectivity	The ratio of actual ties (relationships) to the number of possible ties in a network. Also called as Network density.
18	Type of trust	Defined as nature of social ties. Ranging from interpersonal, institutional, or reputational.
19	Cognitive Distance	Cognitive closeness and similarity between members of OSS.
20	Degree of Perceived Competition	Competitive nature between members. Ranging from non-competitive: never compete, competitive: frequently compete.
21	Persistence	Determine whether interactions between members are continuous or not. How frequently do people in OSS interact?
22	Strength of Relations	Refers to the nature and the quality of relations between the members. How close is the relationship between members? Also called as "Strength of ties"

23	Members' selection process	How members are selected. It varies from closed to open. Open member selection means that anyone who is interested can join.
24	Members' enrollment	How members decide whether to enroll in a social structure. Range is from voluntary to compulsory.
25	Members' cohesion	Indicates what holds the members together, the glue between members.
26	Members' prior experience	Whether members have an experience as a same group in the past or not. Defined the range as spanning from extensive to none.
27	Geographical dispersion	How members are scattered geographically.
28	Membership stability	Openness degree of the social structure to new members. Degree to which membership can be changed. ranging from stable to fluid.
29	Members' ICT literacy	The number of members who are comfortable with ICTs. Ranging from high to low.
30	Proficiency diversity	Determines member's level of competence in an OSS. Whether the social structure consists of only experts or both experts and newcomers
31	Cultural diversity	Determine levels of cultural influence on members.
32	Topics' relevance to members	Relevancy of the OSS discussion topics to its members.
33	Scope	Determines if OSS is globally or locally distributed.
34	Profession Boundary Crossing	The extent to which OSS crosses profession boundaries.
35	Organization Boundary Crossing	The extent to which OSS crosses organization boundaries.
36	Knowledge sharing culture	Examines how the culture values knowledge sharing. The OSS may acknowledge the differential expertise of its members explicitly, and treat different grades, whether formally or informally recognized, differently.
37	Organizational sponsorship	Identifies whether any organization sponsors OSS.
38	Organizational structure	Identifies the type of organization from structural point of view: it can be hierarchical structures, matrix or network structures.
39	Organizational slack	The resource surplus that an organization can use. When the slack is large, the organization can provide more resources to support a particular OSS. it is not relevant when no organizational sponsorship exists
40	Degree of formalization	Questions the extent to which an OSS is formalized by the organization.
41	Communication Media	Virtual world or real space (face to face) or both.
42	Leadership	Determines how organization steers an OSS.

Types of Organizational Social Structures

As listed in Table 5, we could identify 16 types of OSSs in overall. Based on our observation, "Community of Practice" (CoP) is the most frequently discussed type in the literature. The term has been applied extensively across multiple social science disciplines and professional fields and has become a widely utilized theoretical construct since it was first introduced by Jean Lave and Etienne Wenger in 1991. CoP theory lies at the intersection of learning processes and knowledge transfer and has been used to link the organizational learning and knowledge management fields. CoPs operate as 'social learning systems' where practitioners connect to solve problems, share ideas, set standards, build tools, and develop relationships with peer and stakeholders (Koliba & Gajda 2009).

Based on our observation, we can see a gap between theory and practice of CoPs, or, in other words, between discourse and implementation. There are few empirical studies of communities of practice in the

software engineering field. In software engineering, most research has been on supporting the codification strategy for large companies through technology. A community of practice is a good mechanism to capture and transfer tacit knowledge.
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Table 5. Types of OSSs

#	Type	Definition
1	Communities of Practice (CoP)	Groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.
2	Virtual Communities of Practice	Similar to a CoP but communication is usually by electronic means.
3	Knowledge Community	Groups of people with a shared passion to create, use, and share new knowledge for tangible business purposes. The main difference with communities of practice is in the formalisation of knowledge communities and in the link to business goals
4	Communities of Commitment	CoPs with high contract value. Resemble to quite an extent project teams, they are sponsored and resourced by the company, often held performance contracts or expectations, have defined membership, and a formal program of meetings with objectives and deliverables.
5	Strategic Community	Formalized structures that consist usually of a limited number of experts within the organization who share a common, workrelated interest. These communities are intentionally created by the organization to achieve certain business goals.
6	Epistemic Communities	Groups or networks of people who perform exploratory learning. They engage in transdisciplinary and/or transfunctional activities, at the interstices between the various disciplines. In contrast with communities of practice, they are not organized around a common discipline or practice but around a common topic or problem.
7	Net of Experts	Individuals dynamically form a net with people from different communities across their standard teams to solve a problem. Bridge between project teams and CoPs
8	Daily Practice Communities	Consists of employees from different organizational units, in near physical proximity, coming together regularly and face to face to discuss issues of common interest.
9	Interest Groups	Groups of people who have no other interest than to hear and learn individually about a certain topic. These groups have very low formality, members come in and leave easily, there are no clear boundaries and also limited interaction and identity.
10	Informal Community	Groups of employees with a common area of interest, often closely related to their work (practice), with substantial interaction, a common history and 'culture' (shared concepts, ideas, stories etc.). Their main purpose is to learn from each other; transfer of this common knowledge to the company is of less importance.
11	Work Group	Groups of individuals in an organization who work together on a regular basis to attain common goals.
12	Project Team	Project teams are made up of members with complementary skills who work together to achieve a common purpose for which they are accountable.
13	Learning Community	Structures that provide space for learning and sharing knowledge. In education literature, this structure is referred to as professional learning community (PLC): "group of people sharing and critically interrogating their practice in an ongoing, reflective, collaborative, inclusive, learning-oriented and growth-promoting way".
14	Informal Network	Networks emerge based on the relationships that individuals form with others. They are often the basis from which other social structures may emerge.
15	Problem Solving Community	Consists generally of a large number of geographically and organizationally dispersed employees of the same discipline.
16	Network of Practice (NoP)	Consists of members from various organizations and have a much larger size, but with less 'reciprocity', than CoPs . NoPs work on a similar domain, but may never meet, don't take action and produce little (creative) knowledge.(some definitions consider distributed CoPs as NoP)

Effects of different attributes on the process of Knowledge Sharing

Knowledge transfer within and between organizations is not a one-way activity, but a process of trial and error, feedback, and mutual adjustment of both the source and the recipient of knowledge. This mutuality

in the knowledge transfer suggests that the process can be construed as a sequence of collective action in which the source and the recipient are involved. For this reason we will use the term *knowledge sharing*, instead of diffusion and transfer, as it succinctly refers to the social processes that are involved. Furthermore, scholars who adopt an embedded view of knowledge often speak of knowledge management in terms of knowledge sharing. The embedded view of knowledge suggests that knowledge is embedded in individual's minds, embedded in the relationships between individuals, and embedded in the relationships between individuals and information systems (Kane 2006).

Knowledge sharing in OSSs appears to serve several functions. These functions can be arranged on a dimension of individual versus organization orientation (Erik Andriessen 2005)

1. Solving immediate individual problems, e.g. through sending of and responding to ‘who can help me on this problem’-emails in networks of professional.

2. Exchanging experiences, individual learning and building a wider perspective on the practice the group is working in.

3. Developing best practices, manuals, guidelines for the organization.

4. Developing innovative solutions for the organization.

Figure 5 shows the attributes that directly affect knowledge sharing within organizations. There were 7 papers ((Correia et al. 2010)(Cummings 2004)(Hansen et al. 2005)(Hustad 2007)(Kane 2006)(van Baalen et al. 2005)(Wasko et al. 2004)) in which the main goal was investigating the effects of different attributes on knowledge sharing. In addition, there were two papers ((Bernini & Klobas 2008)(Koliba & Gajda 2009)) that were not mainly about relationship between attributes and knowledge sharing but had mentioned some effects within their text which came from their literature review.

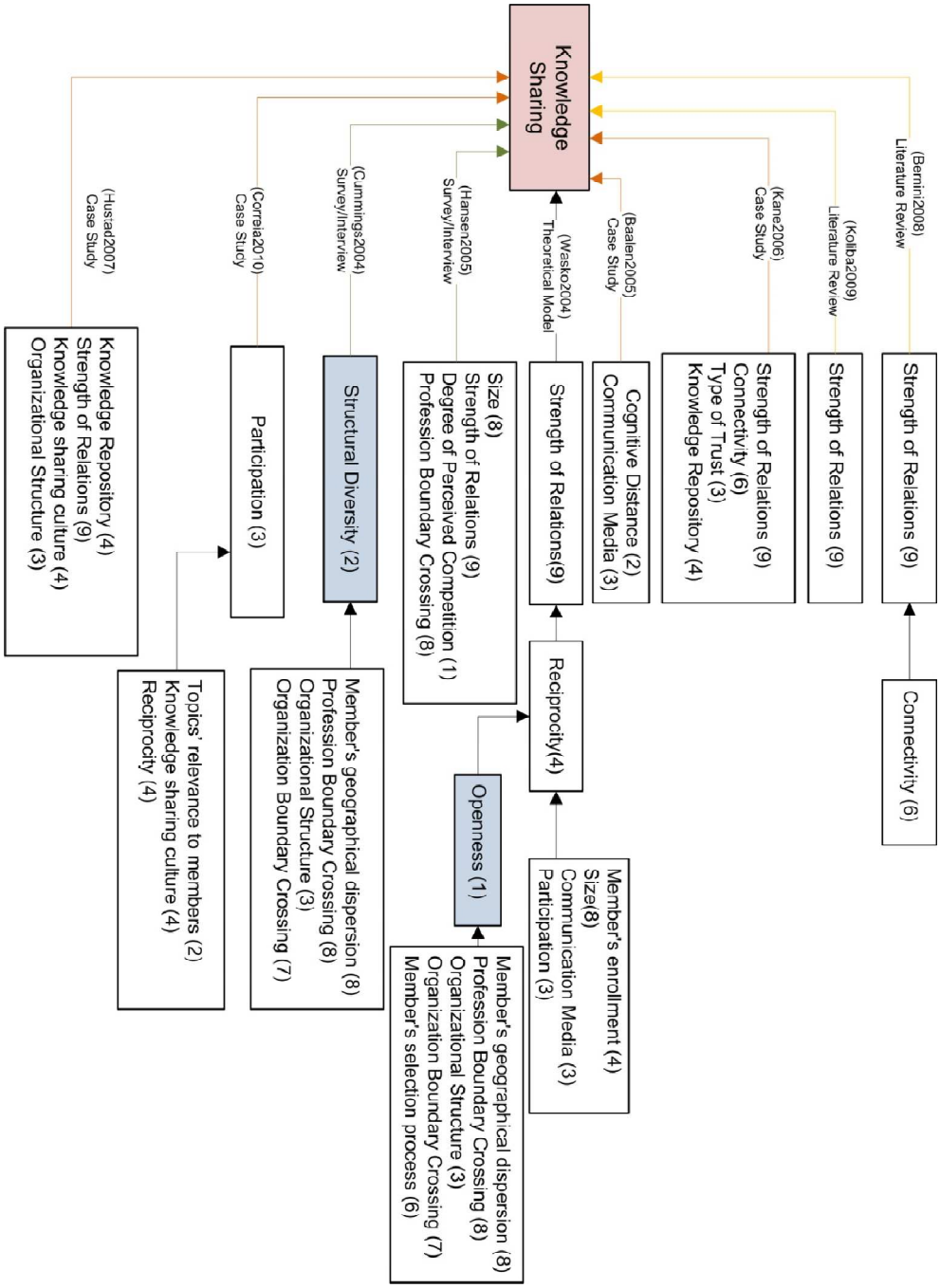

Figure 5. Effects of different attributes on Knowledge Sharing

Types of evidences observed in the aforementioned papers include:

- **Case Study**: in (Hustad 2007), two distributed networks of practice working in the marine insurance industry are presented to evaluate the proposed conceptual framework. In (Correia et al. 2010), three multinationals organizations of the IT sector, operating in Portugal are analyzed to identify both the motivations and the constraints that members of an organization experience

when taking part in the knowledge creating processes of VCoPs. (van Baalen et al. 2005) uses a case study of a knowledge portal for agro-logistic innovation projects in the Netherlands. (Kane 2006) is based on a year-long case-study of 6 primary care teams at a regional division of HealthProviders, a large, national health maintenance organization (HMO).

- **Survey/Interview**: in (Cummings 2004), a sample of 182 work groups in telecommunications firm consisting data of (1) corporate database records, (2) 20 group interviews, (3) 182 surveys of group leaders, (4) 957 surveys of group members, and (5) senior executives' ratings of group performance, is used to test the hypotheses. In (Hansen et al. 2005), data set of 121 new-product development teams and 41 subsidiaries of a large high-technology company are used to test the hypotheses. Data gathering was done by conducting open-ended interviews and three different surveys.
- **Theoretical Model**: in (Wasko et al. 2004), a theoretical model is proposed based on the theories of social networks and collective action.
- **Literature Review**: (Bernini & Klobas 2008) and (Koliba & Gajda 2009) mention the effects of some attributes on knowledge sharing based on their literature review.

Considering the frequency of attributes addressed in all the studies have been read so far, "Strength of Relations", "Creation Process" and "Degree of formalization" are the most frequent attributes discussed in the papers.

"Strength of Relations" refers to the nature and quality of relations between the members of an OSS (Organizational Social Structure). It is also called as “Strength of ties “which determines how close the relationships between members are. This is also the most discussed attribute in studies which focus on the knowledge sharing factors within OSSs (as shown in the Figure 5). It seems that this attribute has a direct effect in the process of knowledge sharing.

"Creation Process" and "Degree of formalization" are two attributes which reflect the role of organization in creating and supporting an OSS. "Creation Process" describes the process of cultivating an OSS. It can be either grassroots (voluntarily) or top-down (intentional). "Degree of formalization" questions the extent to which an OSS is formalized by the organization. It can be fully formalized, semi-formalized or informal.

“Size” and “Geographical dispersion” are other frequently discussed attributes. These attributes indicate the number of members in an OSS as well as how members are scattered geographically. Attributes related to boundary-crossing (such as “organization boundary crossing” or “profession boundary crossing”) and “proficiency diversity” are also considered in many studies. Boundary-crossing attributes determine the extent to which an OSS crosses profession or organization boundaries. “Proficiency diversity” determines member's level of competence in an OSS and indicates whether the OSS consists of only experts or both experts and newcomers.

During our observations, we found some “Aspects" which are defined to consider a set of attributes regarding an area of interest. Two aspects which are shown in Figure 6 are “Structural Diversity” and “Openness”.

- “Structural Diversity” Indicates the diversity in geographic locations, functional assignments, reporting managers and business units of an OSS. So, it is considering “Geographical dispersion”,

”Organization Boundary Crossing”, “Profession Boundary Crossing” and “Organizational Structure” attributes. This aspect is defined to investigate how diversity can affect knowledge sharing within organizations.

- “Openness” indicates the extent to which access to an OSS is restricted. It considers “Geographical dispersion”, ”Organization Boundary Crossing”, “Profession Boundary Crossing”, “Organizational Structure” and “Members’ selection process” attributes. This aspect is defined to investigate how openness can affect the degree to which members of an OSS interact mutually (i.e. “Reciprocity”).

Another observation which was observed from Figure 5 was different effects that different category of attributes can have on knowledge sharing. Relationship attributes have direct effect on knowledge sharing. Network attributes affect Relationship attributes. Membership attributes affect Network attributes and finally Context attributes affect all the other attributes. Figure 6 shows these nested effects.

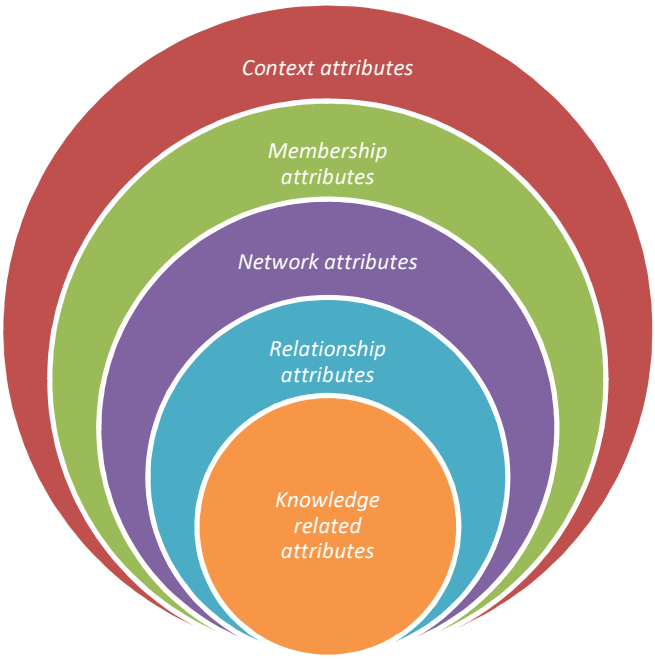

Figure 6. Effects of different category of attributes on each other

Conclusion

This report reflected the partial results of a literature review on knowledge sharing social structures within organizations. Results demonstrate different types and attribute of organizational social structures (OSS) as well their effects on knowledge sharing. From the results we can conclude that there is no “one-best-way” approach to OSS formation and support, and a poorly reflected solution may not produce valuable outcomes. To fully employ this new organizational solution, there is still need to achieve the profound understanding of all the intertwined elements that influence the generation and sharing of knowledge within such structures.

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