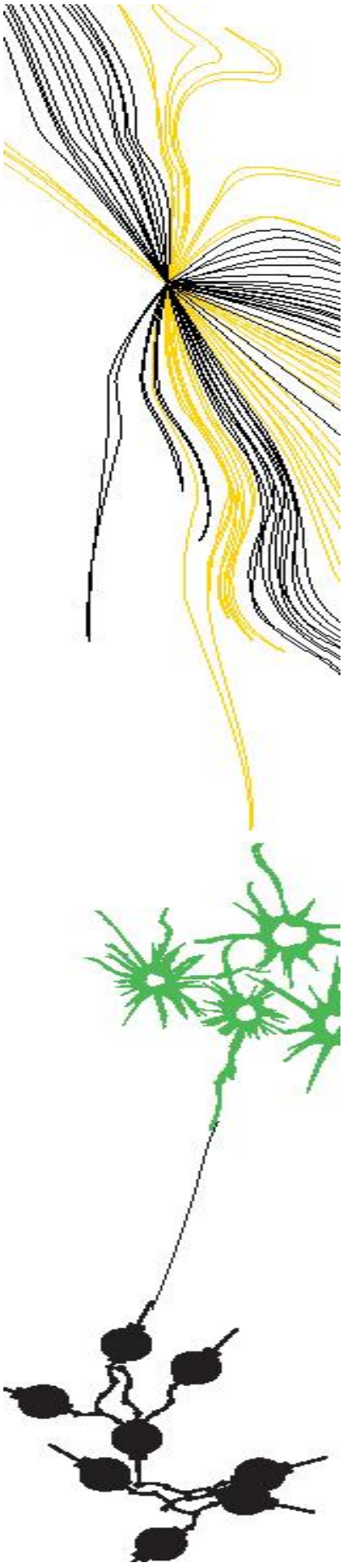

Enterprise 2.0: theoretical foundations of social media tools influence on knowledge sharing practices in organizations

Master Thesis
Business Information Technology

University of Twente
School of Management and Governance

July, 2010

Supervisors
Dr. R.M. Müller, University of Twente
Dr. Klaas Sikkel, University of Twente

Iryna Gordeyeva
0206482
Irina.Gordeyeva@gmail.com

Abstract

This research deals with a question whether new Enterprise 2.0 technologies, when adopted, can bring change to organizational communication, information and knowledge processes, and influence the barriers to knowledge sharing. A variety of opinions are expressed, discussions, studies and conferences are initiated in this field. However, as became clear from the initial overview, previous research is mostly focused on either problems of tools adoption or on the peculiarities of the use of certain technologies. The objective of this research is to construct a grounded theory that explains how adoption of Enterprise 2.0 tools (such as wikis, blogs, microblogs, social networks, tagging and social bookmarking) address the barriers to knowledge sharing.

To achieve the research objective several steps have been taken. Firstly, an extensive literature review has been done. It consists of two main parts: overview of the main theories of knowledge sharing and of the state-of-the-art research on Enterprise 2.0. Managing organizational knowledge is regarded as important for learning and innovation processes. Organizations put a lot of efforts into motivating their employees to share knowledge, as well as into supporting this process with all kinds of Information Technologies (IT). However, there are different obstacles to successful knowledge sharing. According to the existing research literature the most significant barriers are lack of interpersonal trust between organizational members, costs and complexities of sharing knowledge (described by social dilemma theory), and settings in organizational culture.

Second part of the literature review is devoted to the concepts of Enterprise 2.0 and the use of the tools in organizations. After structuring the concepts defined in literature we grouped the impacts of the use of Enterprise 2.0 tools in four groups: first, impact on communications patterns facilitating connections between members, interpersonal trust, and work awareness; second, impact on the knowledge creation process by making the process more collaborative; third, impact on organizational culture by focusing on participation, collaboration and knowledge sharing; fourth, impact on visibility of knowledge sharing activities and authors' reputation.

The theoretical research resulted in a set of three hypotheses that reflect how Enterprise 2.0 tools, when used in organizations address the barrier to knowledge sharing. The first hypothesis says that the use of social networking tools has positive impact on knowledge sharing by increasing the level of trust among group members. The second hypothesis claims that Enterprise 2.0 implementation has positive effect on the ease of knowledge sharing and knowledge creation process. And the third hypothesis says that Enterprise 2.0 reputation and visibility enabling tools introduction has positive influence on establishing knowledge sharing supporting culture and encourages knowledge sharing behavior. Besides, for every hypothesis the models of the working mechanisms are proposed.

The hypotheses were challenged by the empirical study done in the form of interviews with experts. The interviews gave enough evidence and arguments to support the main ideas of the hypotheses and to improve the models of the mechanisms of the influence of Enterprise 2.0 use on knowledge sharing. In addition, some insights shared by the interviewed experts were gathered, included into the improvements of the mechanisms and presented in the conclusions of the empirical study:

- The use of social networking functionality creates social presence, context for informal and semi-structured communication, and awareness of employees about the work of their colleagues and about the processes in an organization.

- In the collaborative content and knowledge creation people can take different roles and fulfill different parts of tasks, and this process is dependent on number of collaborators;
- Collaborative tools that create discussions and awareness are good at enabling innovation; however, Enterprise 2.0 tools still are not suitable for everybody, in spite of the fact that in general they are regarded as being easy to use.
- Building reputation and taking leadership independently from positions in hierarchies is becoming more important than the barrier of losing competitive advantage in case of sharing unique knowledge.
- Different kinds of rating and valuing systems can work for building personal reputation, which motivates people to show and share knowledge; while a tendency of organizational culture to become more open can be observed.

Keywords: *Knowledge Sharing, Social Media, Enterprise 2.0, Trust, Collaboration, Organizational Culture*

TABLE OF CONTENTS

List of Figures

List of Tables

1. Introduction

This introductory chapter unfolds the motivation for this research, the structure and logic of this report (sub-chapter 1.1) and the main objectives and research questions of the study (sub-chapter 1.2).

1.1. Research motivation

A lot is written about the importance of information and knowledge processes in organizations. The research in this field strives to increase efficiency and effectiveness of these processes and their management to support knowledge workers and continuous learning and innovating in companies (Boeije, Vries, Kolfschoten, & Veen, 2009). In today's information society more attention is devoted to organizational learning and knowledge as competitive advantage. The traditional perspective on knowledge management is often on codifying, storing, and transferring knowledge, which is done with the help of IT and with a focus on IT tools (Alavi & Leidner, 2001).

Recent appearance and dissemination of Web 2.0 technologies shifted the role of a user from consuming content and information to creating content and being social around information (O'Reilly, 2007). And the types of communication media which meet these social requirements have got the name of social media. Many interesting and unexpected phenomena happened in online world – success of Wikipedia and Facebook, Twitter and Foursquare, mobile and collaborative technologies. No wonder they gained significant attention from both science and business. Not only the phenomena, but the potential of social media in organizations became a very popular topic of scientific and business investigations, which aimed at seeing how companies can benefit from social web technologies for marketing, relations with customers, partners and employees.

In spring 2006 Andrew McAfee coined the phrase "Enterprise 2.0" in his article (McAfee, 2006) in Sloan Management Review to describe the use of Web 2.0 tools and approaches by businesses. Since then a lot has been said and written on business and scientific blogs, web sites, in journals, and at conferences about Enterprise 2.0. The adoption of the term and tools has become very popular. So can we talk about hype in this case? I could not help but asking a question whether we observe one more hype, similar to the treatment of ERP, groupware or wikis as solutions for all problems, or social media can bring some change and improvements in organizational communications, knowledge sharing and learning.

This study is devoted to defining the main areas of Enterprise 2.0 tool influence on organizations and the process of knowledge sharing in particular. The remainder of the report is structured as follows. The research model and the main research questions are introduces in the following Sub-chapter 1.2. Chapter 2 is devoted to the existing research literature review. The first part (Sub-chapter 2.1) deals with the main theories on knowledge sharing and defines organizational barriers to successful process of sharing knowledge; the second part (Sub-chapter 2.2) deals with concepts of Enterprise 2.0 and result in defining four conceptual areas of Enterprise 2.0 influence on organizations and knowledge sharing. These findings are then formed into three research hypotheses, which describe the mechanisms of Enterprise 2.0 impacts (Chapter 3). To challenge the hypotheses and theories by practical experiences we chose the qualitative research method of expert interviews that is described in Chapter 4. The results, arguments and conclusions from the empirical research phase (interviews) are presented in Chapter 5. Chapter 6 contains the discussion of the findings and proposes a unified framework of the mechanism of influence of Enterprise 2.0 tools use on knowledge sharing. General conclusion, limitations of the research, possible directions for future research and practical impact descriptions can be found in Chapter 7.

1.2. Research questions

The objective of this research is to construct a theory that explains how implementation and use of Enterprise 2.0 tools (such as wikis, (micro) blogs, social networks, folksonomies) address the barriers to knowledge sharing at individual, group and organizational levels.

Before the beginning of the research we come up with a research model which explains how the main objective will be reached. Verschuren & Doorewaard (2007) define research model as a schematic representation of the research objective and visualization of the steps that have to be taken in order to reach this objective. The Figure 1.1 presents the research model for this study. The vertical arrows represent the confrontation of two or more different ideas (theories, concepts or thoughts), and the horizontal arrows represent the results or conclusions made on the basis of the contrasting and discussion.

At the first stage analysis of the literature on knowledge sharing, and the influence of information technologies on knowledge sharing process is done. Then the theories and concepts from the fields of social media and Enterprise 2.0 are derived from the existing scientific literature. On the basis of literature review some hypotheses on how the Enterprise 2.0 tools use in organizations can deal with the obstacles to effective knowledge sharing, and expert interview structure are designed.

The next stage is conducting the interviews. Interviews are one of the methods of qualitative research and help to gain analytical and practical insights into the Enterprise 2.0 implementation and adoption practices, as well as observed, perceived or expected by practitioners impact that social media may have on organizations and on knowledge sharing in particular. The theoretical literature review and expert interviews results are then analyzed, compared and confronted in order to support and improve a set of statements on how implementation of Web 2.0 technologies influences knowledge sharing processes in organizations.

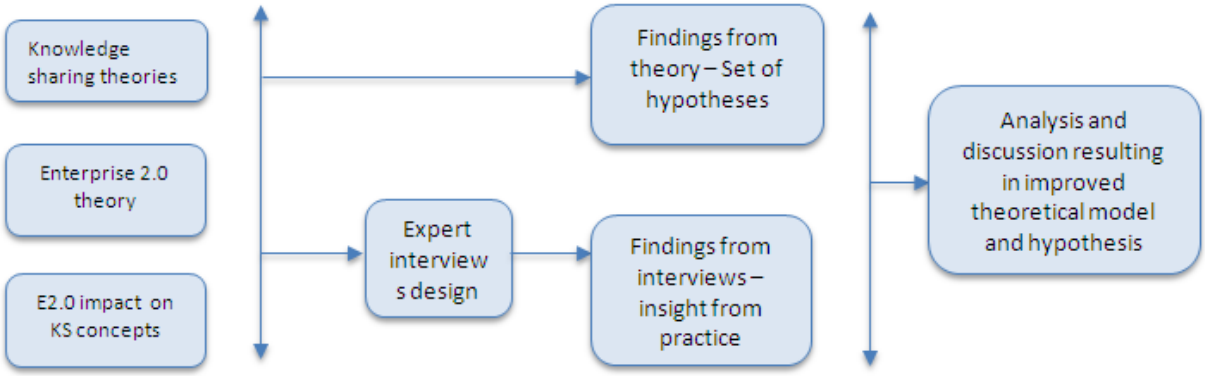

Figure 1.1 - Research model (based on the research model building guidelines by (Verschuren & Doorewaard, 2007))

The general research objective can be split into the research question and sub-questions, which are more detailed, structured and feasible to answer. The main research question can be formulated as follows:

What is the influence of the use of Enterprise 2.0 tools on the barriers to knowledge sharing and on the knowledge sharing process in organizations?

The main question can be supported by the following sub-questions:

1. What concepts and theories can be derived from existing literature in the field to understand the knowledge sharing process inside organizations?

Which can be further elaborated in the following questions:

What is knowledge in organizational context and what is the role of knowledge management?

What is the role of information technologies in general and social media technologies in particular in the knowledge process?

What are the main factors influencing the process of knowledge sharing in organizations?

What are implementation success factors of Knowledge Management Systems (KMS)? What are the factors influencing the contribution to KMS?

2. What concepts and theories can be derived from the existing literature to understand the Web 2.0 technologies, their principles and use in the organizational context?

Which can be further elaborated in the following questions:

What is social media, what are its principles and technologies?

What are the implications of Enterprise 2.0 for knowledge sharing?

What are the impacts of the Enterprise 2.0 on organizational knowledge sharing process?

What hypotheses can be formulated, which describe the impact of the use of Enterprise 2.0 on the barriers to knowledge sharing?

What are the models of the working mechanisms of the hypotheses?

3. What practical insight can be gained from the empirical study (interviews with expert and practitioners) that supports or confronts the theoretical findings?

Which can be further elaborated in the following questions:

What factors that influence knowledge sharing process can be derived from the empirical study?

What peculiarities and cases of the use of Enterprise 2.0 tools for knowledge sharing can be learnt from the expert interviews?

What types of impact of Enterprise 2.0 adoption on the barriers to knowledge sharing can be concluded from the empirical study?

How can be the models of the working mechanisms of the influence of Enterprise 2.0 adoption on knowledge sharing barriers improved?

2. Theoretical background

Every new piece of knowledge or theory is built on the background of previous knowledge. In the research process the part of gaining profound understanding of the domain is a crucial step. Literature review is done in order to frame the problem under scrutiny, to identify relevant concepts and facts, and position the ongoing study (Ghauri & Gronhaug, 2005). That is why for the further research of the Enterprise 2.0 technologies, their adoption and influence on knowledge sharing, it is important to make a prior overview of the theoretical background in the field of knowledge sharing. In this section we give a definition for knowledge, describe knowledge sharing process and deal with questions on the role of IT in knowledge sharing and problems that occur when introducing supporting IT systems for knowledge sharing.

2.1. Knowledge sharing theory

2.1.1. Knowledge in the organizational context

A number of meanings of the term *Knowledge* were proposed from the ancient to the modern times. Knowledge can be defined in different ways depending on the context and purpose of the definition. From the point of view of philosophy Knowledge is seen as "justified true belief" (Gettier, 1963) , while from the point of view of economic theory Knowledge is a "critical organizational resource that provides a sustainable competitive advantage in a competitive and dynamic economy" (Davenport & Prusak, 1998).

Often Knowledge is defined by distinguishing among knowledge, information and data (Alavi & Leidner, 2001). As commonly accepted, data is described as raw numbers and facts, information is processed data, and knowledge is authenticated information. However, the distinctions between information and knowledge are not obvious. The main aspects that help to distinguish knowledge and information are the following: knowledge is dynamic, it is created in the social interaction between individuals and organizations and knowledge is context specific. Without the social aspect and context knowledge become close to just information (Nonaka, Toyama, & Konno, 2000). Knowledge also can be understood as personalized information (which may or may not be new, unique, useful, or accurate) related to facts, procedures, concepts, interpretations, ideas, observations, and judgments ((Alavi & Leidner, 2001), (Nonaka, Toyama, & Konno, 2000)).

The main focus of this research is put into organizational context, so further knowledge will be discussed with regard to the organizational and management theory. (Nonaka & Takeuchi, 1995) developed the framework of organizational knowledge creation through the conversion of tacit and explicit knowledge. It is based on the ability of organizations not only to process information, but to interact with its environment, reshape the environment and themselves through the process of knowledge creation (Nonaka, Toyama, & Konno, 2000).

Two dimensions are explicated in the theory: tacit and explicit knowledge ((Nonaka, 1994)). Explicit knowledge can be expressed in formal and systematic language and shared in the form of data, scientific formulae, specifications, manuals and the like. It can be processed, transmitted and stored relatively easily. In contrast, tacit knowledge is highly personal and hard to formalize. Subjective insights, intuitions and hunches fall into this category of knowledge. Tacit knowledge is deeply rooted in action, procedures, routines, commitment, ideals, values and emotions (Nonaka, Toyama, & Konno, 2000).

The SECI model by Nonaka and Takeuci (1995) is one of the fundamental models in the field of studies about knowledge. Its idea is that organizations create knowledge through the interactions between explicit

knowledge and tacit knowledge. Through this interaction process organizational knowledge expands in both quality and quantity. There are four modes of knowledge conversion. They are: (1) Socialization (from tacit knowledge to tacit knowledge); (2) Externalization (from tacit knowledge to explicit knowledge); (3) Combination (from explicit knowledge to explicit knowledge); and (4) Internalization (from explicit knowledge to tacit knowledge). Figure 2.1 presents the SECI (Socialisation, Externalisation, Combination, Internalization) model.

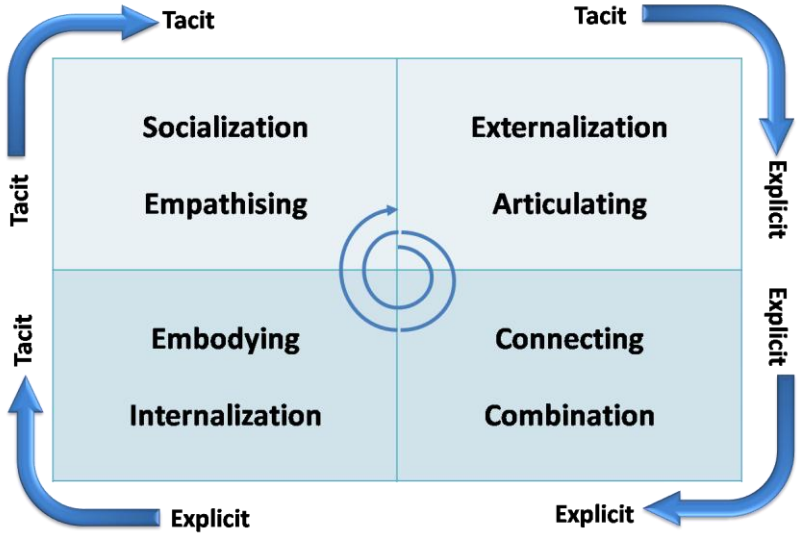

Figure 2.1 – SECI model of knowledge creation (Nonaka & Takeuchi, 1995).

Socialization is the process of creating new tacit knowledge through shared experiences. As far as tacit knowledge is usually difficult to articulate and context-specific, tacit knowledge can be proposed and acquired only through shared experience, such as spending time together, conversations, doing things together.

Externalization is the process of articulating tacit knowledge into explicit knowledge. Knowledge is crystallized, articulated and becomes ready to be codified (written down) thus it can be more easily shared by others, and it becomes the basis for further combination of new knowledge. The successful conversion of tacit knowledge into explicit knowledge depends on the sequential use of metaphors, analogies and models.

Combination is the process of creation of more complex and systematic sets of explicit knowledge. Explicit knowledge is collected from inside or outside of the organization and then combined, edited or processed to form new knowledge. The use of IT can facilitate this mode of knowledge conversion and later dissemination of new knowledge.

Internalization is the process of consumption of explicit knowledge and converting it into personal tacit knowledge. Through internalization, newly created and disseminated explicit knowledge is converted into tacit knowledge by individuals. Internalization is closely related to `learning by doing'. (Nonaka & Takeuchi, 1995)

As we see from the model description, the stages of externalization and combination involve the processes of knowledge dissemination which means bringing knowledge from one individual or group to another or many others. That is the part where Knowledge Management will play an important role in facilitating the process of knowledge sharing. Knowledge sharing is discussed in details in the next section.

2.1.2. Knowledge Sharing

The definition of Knowledge given by (Davenport & Prusak, 1998) as an organizational resource implies that this resource as any other is to be managed in the most optimal way to gain advantage of it. Thus, organizations exploit knowledge-based resources that exist within the organization ((Davenport & Prusak, 1998), (Damodaran & Olphert, 2000)) and acquire and create new knowledge. For this tasks Knowledge sharing is the central and critical activity, it is the means through which employees can contribute to knowledge creation, use, innovation, and so to the competitive advantage of the organization (Wang & Noe, 2009).

Knowledge sharing refers to the provision of information and know-how to help others and to collaborate with others to solve problems, develop new ideas, or implement policies or procedures (Wang & Noe, 2009). It is also understood as the exchange of knowledge between and among individuals, and within and among teams, organizational units, and organizations (King, 2006). Knowledge sharing, knowledge exchange and transfer are different terms; however, they can be sometimes used interchangeably. Knowledge sharing consists of sharing of knowledge by the knowledge source and acquisition and application of knowledge by the recipient (King, 2006). "Knowledge transfer" is used to indicate the flow of knowledge between different units, divisions, or organizations rather than individuals (Szulanski, Cappetta, & Jensen, 2004). Besides, transfer implies a clear objective, and direction, while knowledge may be shared in unintended ways multiple directionally without a specific objective (King, 2006).

The sharing of information and knowledge is central in the efforts in knowledge management ((Hall, 2001), (Yang & Chen, 2007), (Hendriks, 1999) and others)). In general, knowledge management is aimed at identifying and leveraging the collective and personal knowledge, know-how, experiences, judgments inside and outside organizations to bring additional value to organizations and help them compete ((Alavi & Leidner, 2001), (Quaddus & Xu, 2005)). This definition shows that knowledge management is focused on both explicit (such as know-how) and tacit (such as experiences and judgments) of aspects of knowledge. And so, most managerial practices and efforts are devoted to facilitating sharing of these both types of knowledge (Quaddus & Xu, 2005).

Knowledge management efforts are usually started with the aim to reach a situation when organizational knowledge and knowledge of its employees bring maximum value to the organization. The main directions of efforts are considered to be the following: a) making knowledge visible and showing the role of knowledge in organizations, b) developing knowledge-intensive and knowledge sharing culture in order to free employees from fear of losing their advantages when sharing their unique knowledge, c) building a knowledge infrastructure, not only technical system, but also connections among people given space, time, tools and encouragement to interact and collaborate, d) be liberated from the fear of losing important intellectual assets, if valued colleagues leave the firm ((Alavi & Leidner, 2001), (Hall, 2001), (Davenport & Prusak, 1998), (Yang & Chen, 2007) and others).

The knowledge processes in organizations are quite diverse: knowledge creation, storage, and transfer between individuals, groups and across the organizational boundaries. And the performance of these processes depends on a number of factors and mainly individuals, because knowledge as a resource is embedded in individuals (Christensen, 2007). Similar to the performance of individuals, performance of knowledge management depends on ability, motivation and opportunity. Organizational settings in the field of knowledge management can impact an individual's ability to create, retain and share knowledge, as well as provide motives and opportunities or tools to do this (Argote, McEvily, & Ray Reagans, 2003).

Most knowledge management initiatives rely on IT as an important enabler (Alavi & Leidner, 2001), however, this cannot be applied to all of the issues in knowledge management. There is a view of knowledge management "as a socio-technical phenomenon where the basic social constructs such as person, team and organization require support from Information and Communication Technology applications". IT provides tools and so opportunities for creating, storing and sharing pieces of information and personal insights, but it cannot motivate people to share their personal knowledge, or teach them to express their deep implicit skills and judgments. This is where the management part gains its vital importance to the success of projects in the field of organizational knowledge management and sharing in particular.

Knowledge sharing process is a troublesome issue. Existing research literature defines a number of factors that makes sharing and transferring knowledge between people in organizations a difficult task. As far as knowledge is related to an individual who possesses it and on the other side, wants to consume it, directing and controlling the behavior of knowledge is a challenge of directing and controlling the behavior of the possessor of knowledge (Christensen, 2007). The theory of knowledge sharing in combination with organizational theory defines important issues influencing knowledge sharing behavior, such as organizational context and culture, interpersonal and team characteristics, individual characteristics, motivations and incentives (Wang & Noe, 2009). In the following sections these factors are discussed in more details.

2.1.3. The role of Information Technologies in Knowledge Sharing

As far as the important role of organizational knowledge is recognized for the competitive advantage and success, companies recently have started to pursue knowledge management initiatives by making considerable investments in implementing Knowledge Management Systems (KMSs) (Hahn & Wang, 2009). Different IT systems are used to support and enhance the organizational processes of knowledge creation, storage, sharing, and application (Alavi & Leidner, 2001). This class of information systems is referred to as Knowledge Management Systems. KMSs can be primary enablers of knowledge sharing in an organization (King, 2006).

The roles of IT in knowledge management can be quite diverse, as well as the technologies comprising KMSs. The examples of the knowledge management tasks to be performed with the help of IT include finding an expert or a recorded source of knowledge using online directories and searching databases; sharing knowledge and collaborating in virtual teams; access to information on past projects; and learning about customer needs and behavior by analyzing transaction data ((Alavi & Leidner, 2001), (Hahn & Wang, 2009)). Taking into account such a variety of tasks one system cannot perform all of them properly.

Besides, organizations have different contexts and needs in knowledge management. The selection of the appropriate knowledge sharing process within an organization may depends on such factors as the type of knowledge (explicit or tacit), the routine and frequency of the sharing process, and the knowledge receiver (individual, group or the whole organization) (Riege, 2005). Alavi & Leidner (2001) state that the type of KMS to be chosen depends on the perspective on knowledge in an organization, either as an object to be stores, or as a process of applying expertise, or as condition of access to information. Related to these views two major models of KMS have been identified in the information systems literature: the repository model and the network model (Kankanhalli, Tan, & Wei, 2005).

The repository model is focused on storage of knowledge allowing knowledge reuse through access to the codified expertise. The KMS which support this approach are electronic knowledge repositories (EKRs). The

network model emphasizes linkage among people for the purpose of knowledge exchange. The technologies which support this approach are knowledge directories and networks of people, electronic forums, discussion boards that allow people interact within communities of practice (Kankanhalli, Tan, & Wei, 2005).

Both approaches are important to the process of knowledge sharing and many researchers agree that technology can be a facilitator to encourage and support knowledge sharing process by making knowledge sharing easier and more effective. Yet, this can be reached in case of choosing and implementing a suitable technology that fits people and organization (Riege, 2005). Systems that work effectively in some organizations may not suite the context of other organizations.

Implementing a KMS is not the end of a journey, but rather the beginning. Clearly the biggest challenge for most knowledge management initiatives is the willingness of people to share knowledge with others in their groups and across groups (Hsu, Ju, Yen, & Chang, 2007). "Build it and they will come" is defined as one of the myths of knowledge sharing by Dixon (2000). The key elements in knowledge sharing are not only the hardware and software, but also the ability and willingness of team members to actively participate in the knowledge sharing process (Rosen, Furst, & Blackburn, 2007). And this is true for both repository and network approaches to KMS.

Numerous research has been done recently in the field of discovering the barriers to knowledge sharing, factors influencing the sharing behavior and the means to facilitate it, through the adoption of information systems in particular ((Rosen, Furst, & Blackburn, 2007), (Ardichvili, Page, & Wentling, 2003), (Barson et al., 2000), (Cabrera & Cabrera, 2002), (Damodaran & Olphert, 2000), (Hendriks, 1999), (Kankanhalli, Tan, & Wei, 2005), (He, Qiao, & Wei, 2009) and others). Among the most often mentioned factors that affect knowledge sharing behavior are the characteristics of organization and its cultural and sharing norms, characteristics of individuals and their willingness to share knowledge, management support for knowledge sharing and motivation. The general model of knowledge sharing process is shown on the Figure 2.2.

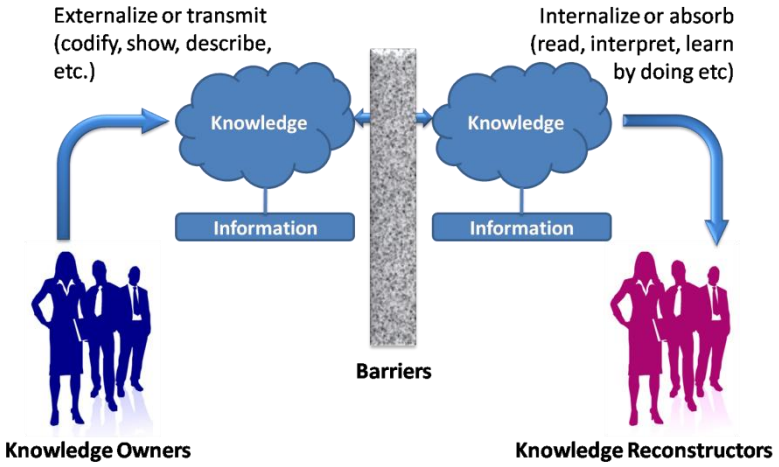

Figure 2.2 – General model of knowledge sharing (Hendriks, 1999).

2.1.4. Barriers to Knowledge sharing and KMS adoption

2.1.4.1. KMS adoption

The introduction of any KMS to an organization is similar to implementation of other kinds of information systems or innovations, but has its peculiarities. It goes through the diffusion process and is influenced by a number of factors. The process of diffusion is defined by Rogers as 'the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1983). In application to the KMS, the innovation is KMS, and the social system is the group of prospective users of KMS in an organization (Quaddus & Xu, 2005).

Rogers (1983) defined five general attributes of an innovation that influence the process of its adoption, such as

- Relative advantage over the previous technology
- Compatibility with the existing needs, values and experiences of potential adopters;
- Complexity of understanding and use;
- Observability of the results of innovation use to others;
- Trialability of innovation before full adoption.

In the information systems research field these characteristics were used by Moore & Benbasat (1991) in their work on the development of an instrument to measure the perception by users of the adoption of new Information Technologies in organizations and their diffusion. The authors emphasize that more important than the attributes of innovation itself, is their perception by potential users, and they include the constructs of innovation perception from (Davis, 1989). The perception of innovation adoption was researched by Davis (1989) resulting in the development of the Technology Acceptance Model. The model included two elements – perceived usefulness, i.e. the degree to which an individual believes that using a particular system will increase their job performance; and perceived ease of use, i.e. the degree to which an individual believes that using a particular system would be free of physical and mental effort. At the same time perception of an innovative technology is influenced by some external factors. Thus, (Quaddus & Xu, 2005) made a conclusion that the generic model for a diffusion process of information systems is the following: external factors affect the perceptions about an innovation, which in turn impact the diffusion of the innovation.

However, in addition to the similar to other information systems factors influencing the success of its adoption, use and in the end value to the organization, knowledge management systems introduction process has its peculiarities. First, knowledge sharing activities are usually not central or obligatory to employees, so the use of KMS and sharing knowledge is dependent on the voluntariness of the employees. Second, KMS are dependent on the number of users; this means that in the process of KMS adoption the network effects arise. The more members contribute to a system, the more useful it becomes to all the member and the more other members become willing to contribute.

Quaddus & Xu (2005) in their research of companies, who implemented IT for knowledge sharing support, have defined the four primary factors which are significant for KMS adoption and diffusion. Those factors are Organizational culture; Top management support; Benefits to individuals, and Dream of KMS. Organizational culture is a significant variable affecting IT implementation, that can be successful in case of perfect 'fit' of culture and the system to be introduced ((Quaddus & Xu, 2005), (Katz & Townsend, 2000)). Success of KMS diffusion depends on top management taking initiatives and supporting the diffusion stage all the way through. Also, the clear understanding of benefits to individuals is important for the success of

KMS diffusion. 'What's in it for me?' is always a popular comment by individuals when any new venture is initiated in an organization (Quaddus & Xu, 2005). By the 'Dream of KMS' the authors meant thinking about KMS all over organization before introduction, i.e. the internally 'pulled' type KMS diffusion is likely to be more successful, opposed to externally 'push" type diffusion.

The adoption of KMS is very closely connected and dependent on the knowledge sharing activities in organization. And as far as today almost all knowledge sharing initiatives are realized with the help of IT, it is difficult to distinguish between the factors influencing KMS adoption and knowledge sharing behavior in general. KMSs are characterized by duality of critical relationships: user-to-IT and user-to-user (He, Qiao, & Wei, 2009). Clearly, when people are not willing to share knowledge, the implementation of KMS fails, no matter what characteristics it possesses. So the adoption of KMS could not be researched separately from the factors influencing knowledge sharing behavior and the ways of overcoming the barriers to knowledge sharing, contributing to common storages and collaboration on creating pieces of knowledge.

2.1.4.2. Factors influencing knowledge sharing behavior in organizations

Prior research has proved that various factors affect individual's willingness to share knowledge, such as costs and benefits of sharing (social dilemma), organization climate and culture, and management championship, interpersonal trust and incentive systems, extrinsic and intrinsic motivation ((Bock, Zmud, Kim, & Lee, 2005), (Kankanhalli, Tan, & Wei, 2005), (Wasko & Faraj, 2000), (Cabrera & Cabrera, 2002) and others). In their extensive research literature study Wang & Noe (2009) grouped the knowledge sharing issues into the area related to organizational context, interpersonal or team characteristics, cultural settings and individual personal characteristics. WhileHsu, Ju, Yen, & Chang (2007) concluded that individuals' behavior for knowledge sharing will be guided by personal characteristics and the environment they are in. Thus, we describe the factors that have impact on the perception of sharing, intention to share and resulting behavior in three groups: organizational context, interpersonal characteristics and individual characteristics.

Organizational context

The effect of organizational context on knowledge sharing was examined by a number of authors ((King, 2006), (Kankanhalli, Tan, & Wei, 2005), (Bock & Kim, 2002), (Hsu, Ju, Yen, & Chang, 2007) and others). Those studies identify different cultural dimensions that are likely to influence knowledge sharing, such as organizational values, norms and practices (De Long & Fahey, 2000), organizational climate of competition or cooperation ((Willem & Scarbrough, 2006), (Wang & Noe, 2009)), and trust. According to (De Long & Fahey, 2000) culture has a significant influence on sharing behavior:

a) It influences what is considered useful and important knowledge in an organization;
b) It defines what knowledge should belong to an organization and what can be under control of an individual;
c) It creates a context for communication, such as rules for discussing particular topics or approaching seniors in hierarchies, as well communication and collaboration among peers;
d) It defines how new knowledge is consumed, how knowledge from external sources is perceived.

Besides, management support of knowledge sharing initiatives is considered to have positive impact on the sharing intention (Connelly & Kelloway, 2003). In addition King (2006) concluded that supervisory control appears to be more important than perceived organizational support for both the frequency of submissions and the perceived effort expended in contributing to a KMS. Related to management support, introduction of

different incentives and rewards systems in organizations has been suggested to motivate the sharing behavior ((Hansen, Nohria, & Tierney, 1999), (Wang & Noe, 2009) and others). Different ways of motivation were investigated – extrinsic (higher salaries, bonuses, etc) and intrinsic (recognition, respect, etc), which in general showed the positive effect of reward systems on sharing behavior and contributions to KMSs (Kankanhalli, Tan, & Wei, 2005), but Bock & Kim (2002) also found that anticipated extrinsic rewards had a negative effect on attitudes toward knowledge sharing. This exemplifies the need to balance the types of motivations and use management influence carefully, because in any case sharing their personal knowledge is a voluntary action of every person.

Finally, less centralized organizational structure may help facilitate the knowledge flows, as well as the open space working environments ((Hansen, Nohria, & Tierney, 1999), (Yang & Chen, 2007), (Argote, McEvily, & Ray Reagans, 2003)). The results of studies suggest that organizations should create opportunities for employee interactions to occur and employees' rank, position in the organizational hierarchy, and seniority should be deemphasized to facilitate knowledge sharing. So, properties of an organization's internal social networks, as well as its connections to other firms affect learning and knowledge transfer (Argote, McEvily, & Ray Reagans, 2003) .

Interpersonal relationships

The interpersonal and group relationships have several aspects that concern knowledge sharing behavior of group members (Wang & Noe, 2009). Knowledge sharing is more likely to occur in established teams with high level of team cohesiveness (Bakker, Leenders, Gabbay, Kratzer, & Engelen, 2006). Minority status or diversity of team members also relates to the intention for knowledge sharing. Several studies show that socially isolated members or sub-groups are more likely to disagree with others and contribute their unique knowledge within a heterogeneous team (Wang & Noe, 2009). This leads to the understanding that the ties among individuals within social networks, both organization-wide and team networks, can facilitate knowledge transfer and enhance the quality of information received (e.g. (Hansen, Nohria, & Tierney, 1999), (Wang & Noe, 2009)). Asking for information and sharing information with teammates can be risky (Rosen, Furst, & Blackburn, 2007), that is why social relations and mostly trust among team members are considered to be the major factors influencing knowledge sharing ((Nonaka, 1994), (Hsu, Ju, Yen, & Chang, 2007), (Levin & Cross, 2004) an others).

Trust is an implicit set of beliefs that the other party will behave in a dependent manner and will not take advantage of the situation (Hsu, Ju, Yen, & Chang, 2007). On the one hand trust is developed through repeated interactions with time or through social network that people established, so it is the characteristic of interpersonal relationships. On the other hand trust is dependent on so many factors that it could be considered a feature of environment (Hsu, Ju, Yen, & Chang, 2007).

For knowledge sharing mutual trust between people is a mechanism to success. In personal relationship trust is established with face-to-face interactions, mutual experiences, time working together, etc. As a result the risks of knowledge sharing with other members of organizations can be perceived as lower, which results in willingness to share and contribute knowledge to KMS. But the case is different for the computer-mediated interaction and collaboration ((Rosen, Furst, & Blackburn, 2007), (He, Fang, & Wei, 2009), (Fang & Chiu, 2010)).

Similar to personal communication, in virtual team environment, the quantity and quality of knowledge sharing is influenced by the levels of trust among team members. Yet, without the ability to observe reactions

on their requests or answers team members may fear that requests might be seen as indicators of incompetence, or shared information is not valued, overloads teammates with unwanted information (Rosen, Furst, & Blackburn, 2007). So for virtual collaboration and knowledge exchange trust is a crucial element. IT improves the quality of dialogue and discussion, which in turn enhances knowledge-sharing and strengthens committed relationships, as is the case of knowledge exchange in the virtual communities (Fang & Chiu, 2010).

Individual characteristics

All people are different and so are predisposed to different thinking and behavior. There are studies which investigate how individuals' beliefs, perceptions and motivators relate to the knowledge sharing behavior. Personality traits, openness and trust to others, communication skills, social networks, attitude towards general sharing actions, etc are the characteristics that form the perception and intention to share knowledge ((Riege, 2005), (Cabrera, Collins, & Salgado, 2006)). Among the most influential beliefs and motivators are the loss of power with knowledge sharing and the cost and benefits of sharing ((Wang & Noe, 2009), or the notion of community and altruism (Chua, 2003).

In the first case knowledge sharing is perceived as an economic exchange situation which should bring sharers a worthwhile return on the scare resource they propose. In this situation knowledge sharing possesses the elements of a strategic game where decision making on sharing behavior is defined by the perceived payoff (Chua, 2003). From this point of view the problems of knowledge sharing most often are considered to originate from the issues explained by game theory and in more general understanding by social dilemmas ((Cabrera & Cabrera, 2002), (Osterloh & Frey, 2000), (Christensen, 2007)). Social dilemmas describe paradoxical situations in which individual rationality, the desire to maximize individual payoff, leads to collective irrationality, loss or costs (Cabrera & Cabrera, 2002). In terms of knowledge sharing this means that not sharing knowledge is rational for an individual, and then their team or organization suffers from the lack of knowledge, double work to be done, etc. For an individual employee it is irrational to share their knowledge, because it is believed to result in the loss of unique knowledge and so advantage over other employee, power and job security.

However, organizations want their members to share their knowledge and to contribute to knowledge systems for collective good; and this should be possible only when perceived benefits (some extrinsic motivation solutions, such as bonuses, presents, etc) are higher than perceived costs of sharing (e.g. time and efforts for contributing knowledge). And one of the immediate ways to reduce perceived costs is to make it easier for people who share their knowledge to do this, also with the help of IT, as well as make knowledge sharing secure from the point of view of the loss of jobs or advantages (Cabrera & Cabrera, 2002).

The perspective of sharing knowledge in a community is focused on personal connections and commitment to common success. The relations between individuals are based on trust and the motivation to share knowledge is inspired by desire to do good and to contribute to the shared success of a group (Chua, 2003). This situation can be made closer to the real life by developing knowledge sharing culture, introduction intrinsic solutions for motivation ((Davenport & Prusak, 1998), (Dixon, 2000), (Christensen, 2007)).

In addition to the personal perceptions of costs and benefits of sharing knowledge, the ability to express and so transfer knowledge is an important factor in the individuals' intentions and behavior. A number of researchers and practitioners state that the ability to share knowledge depends much on their communications skills (Riege, 2005). Effective communication, both verbal (common for transferring tacit knowledge), and

written, is fundamental to effective knowledge sharing ((Riege, 2005), (Hendriks, 1999) and others). Riege (2005) also concluded from previous studies that there is correlations between employees' social networks, their direct personal contacts within and outside a company, their personality (introverted or extraverted), and their ability to interact with other and articulate knowledge effectively.

All the factors discussed above separately are interrelated, sometimes overlapping and influencing each other and skills to express knowledge. Organizational culture defines communication patterns between employees and so influences relationships and trust development, which is also dependent on the personal characteristics of every individual. In addition to those factors introduction of IT to support knowledge sharing brings new rules and factors that effect knowledge sharing behavior. For example, the use of new technology can become a barrier to contributing knowledge to a repository or collaborative project; working with people in virtual environment makes it more difficult to establish trustful relationships and good understanding; for many people it is more time and effort consuming to share knowledge in writing than in verbal face-to-face communication; and when some piece of unique personal knowledge is written down and is available to others to reuse, the loss of some unique benefits and power of possessing knowledge may be perceived high as well. That is why the use of IT support for knowledge sharing initiatives is such a complex and prone to a lot of risks task. It is proved by the previous research that knowledge management projects' success is dependent on the fitting an information system into the organizational culture. But it is also possible to bring changes into culture with the help of IT, make it more collaborative and knowledge sharing oriented. That is why in the following chapter we look at the technologies for facilitation collaboration, communication and knowledge sharing in organizations, which are based on the web technologies and possess the attributes and work with the principles of the Web 2.0.

2.2. Concept of Enterprise 2.0

2.2.1. Introduction to the Enterprise 2.0

The term *Enterprise 2.0* means introduction of the Web 2.0 infrastructure and tools by organizations (Levy, 2009). The starting point of this topic is the paper by A.P. McAfee (McAfee, 2006) in which he claims that the conventional systems for knowledge management are not enough or not suitable enough for successful knowledge sharing and knowledge creation process. He states that the newly emerged technologies, such as blogs, wikis, instant messengers, social network tools, and folksonomies may be more effective for knowledge management tasks, and calls a set of these technologies Enterprise 2.0.

There is no commonly accepted definition of the term Enterprise 2.0. In general, the Enterprise 2.0 describes the use of social software tools to improve knowledge sharing and collaborate within and between firms, their customers and partners. (Johnston, 2004). According to (McAfee, 2006) the term Enterprise 2.0 can be applicable to those platforms that companies can buy or build in order to make visible the practices and outputs of their knowledge workers. And such platforms should possess the following characteristics: content should be searchable; users should have the ability to build links, that reveal importance and structure for navigation; authorship and changes should be traceable; content classification should be based on Tags (e.g. user-created folksonomies); there should be possible extensions based on user preferences and there should be change alerts. Sure, with the time passing the characteristics and requirement to the social media tools change, but the main principles remain.

Among the practitioners in the fields of knowledge management, marketing, customer relationships the idea of introduction of Web 2.0 technologies and principles to the organizational context is quite popular. But the

WWW open environment and organizational business environment are very different in their settings, cultures, rules, goals, etc. Although, a number of organizations are already involved in using wiki's, in some cases blogs, social networking tools and some other Web 2.0 tools, the principles of social media still should be researched in regard to organizational readiness to shift to them and effectively use in different spheres of business and knowledge sharing processes specifically. Thus, the given research project focuses on the Enterprise 2.0 use and its impact on organizations.

What is Web 2.0?

Web 2.0 is a phenomenon representing a second-generation approach to the World Wide Web (WWW) which is different from the previous way of passive content consumption by the users. The term was first introduced by Tim O'Reilly and comprises a "business revolution in the computer industry caused by the move to the internet as platform" (O'Reilly, 2007). So Web 2.0 represents a shifted focus from working locally to working in a networked setting. Internet content of Web 2.0 is not just to be read, listened to or observed. In addition, there is a shift to the end-user empowerment; Web-based frameworks allow users to self-organize as they create, control and share content using the Web as the medium for communication (Lazar, 2007).

New tools allow users to participate in the creation and sharing content, collaborate and communicate. The Web 2.0 tools are web-based applications afforded by upcoming so called Web 2.0 technologies, which can be also called social software, meaning software systems that support human communication, interaction and collaboration in networks. Among those tools are blogs, wikis, social tagging and social networking systems, which visualize relationships, persons and information (Blinn, Lindermann, & Nüttgens, 2009). Thereby Web 2.0 centers IT facilities around collaboration, communications, network infrastructure and applications (Lazar, 2007).

Implications of Web 2.0 technologies in the organizational context

Enterprise 2.0 technologies use in organizations can be globally classifies according their internal of external purpose of use. First, internal business applications that are related to internal activities focus on improving business processes by improvements in internal collaborations; e.g. through wikis and blogs, internal knowledge management and knowledge retrievals using tagging and folksonomy. Second, Enterprise 2.0 technologies can have external business applications and be used to involve a business and its partners such as customers, suppliers, distributors, and the general public into constant communication, collaboration, value co-creation (Kim, Hall, Yue, & Gates, 2009).

In her paper Levy (2009) analyses the use of Enterprise 2.0 technologies in organizations according to two dimensions, namely technology adoption type (either adoption of underlying technologies, such as SOA, AJAX, or adoption of end-user applications such as wiki's, applications with social networking, tagging, blogging and other functionalities) and user orientation (either use by and for organizational members, or together or for partners, customers, etc). The criterion of the user orientation is related to the distinctions made by Kim et al. (2009). Figure 1 presents the segmentation of Enterprise 2.0 adoption modes.

It is not easy to distinct boundaries between the proposed segments, but such visualized classification can be helpful to define the scope of the research to be done. The main focus is defined as the application use inside an organization, i.e. the adoption and use of Enterprise 2.0 tools for knowledge sharing practices.

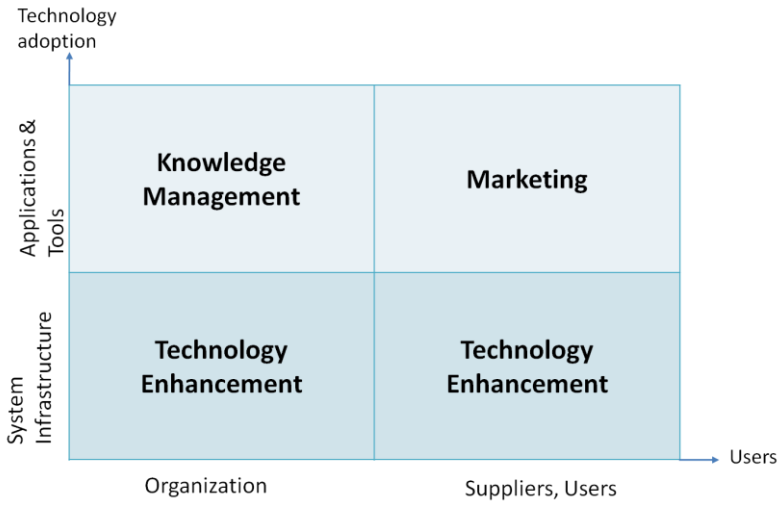

Figure 2.3 - Enterprise 2.0 use segmentation (Levy, 2009).

Traditionally organizations establish intranets, data warehouses, or other static repositories, which allows the storage and retrieval of information in the form of reports, presentations, best practices (Boeije, Vries, Kolfschoten, & Veen, 2009). However such solutions often fail to provide information accompanied with the line of reasoning, background or usage guidelines. In other words explicit knowledge is stored as end-products, such as reports, etc, but the tacit knowledge dimension is lacking (Tuten, 2003). Tacit aspect of knowledge as important as explicit for the quality of knowledge sharing and acquisition processes (Jakubik, 2007). Some recent studies ((McAfee, 2006), (Boeije, Vries, Kolfschoten, & Veen, 2009)) consider that social software used for knowledge sharing can help overcome the disadvantages of the current IT systems for knowledge work and to support knowledge sharing and use. Social software is found to support network formation and information exchange processes, as well as enable communication, creating content collaboratively, structuring and prioritizing information together (Boeije, Vries, Kolfschoten, & Veen, 2009). These are important tasks for successful knowledge sharing process.

As far as the adoption of Enterprise 2.0 tools in organizations has its peculiarities in terms of selection of tools, purpose of use, and management, in the upcoming sub-sections we describe the main tools from the Web 2.0 domain used in companies for knowledge management practices and the principles of Web 2.0 which make those tools different form traditional KMS.

2.2.2. Key Enterprise 2.0 tools

The key characteristic of Web 2.0 is leveraging social networks for problem-solving and information management, from which organizational knowledge sharing practices can benefit. So such tools as wikis, weblogs and microblogs, social tagging tools, RSS and social networks are introduced to the enterprise context. Here we give some more details on each of these conceptual tools.

Wikis are sets of user-editable Web pages, together with the software that manages the web pages, which offer anyone the ability to easily create and edit pieces of collaborative content ((Wagner, 2004), (Lazar, 2007), (Levy, 2009)). This tool came to wide popularity through global sites such as Wikipedia. The ability to easily create links between wiki pages enhances the knowledge sharing dimensions (Levy, 2009). Wikis are designed according to the eleven principles, summarized by Wagner (2004). Wiki pages are designed to be:

- Open – any reader can edit any page;
- Incremental – cross citations, also to not yet written pages;
- Organic – structure and content are open to editing;
- Mundane - a small number of (irregular) text conventions will provide access to the most useful (but limited) page markup;
- With universal mechanism of editing and organizing pages;
- Overt - The formatted (and printed) output will suggest the input required to reproduce it. (E.g., location of the page.)
- Unified – names of web pages are self-sufficient for understanding;
- Precise page names that cannot be mixed;
- Tolerant - Interpretable (even if undesirable) behavior is preferred to error messages;
- Observable activities on the site;
- Convergence of duplications is possible by finding and citing similar or related content.

Weblogs (or blogs) are personal user pages written in the form of a diary. The peculiarities of blogs that distinguish them from the personal pages, which were popular some years ago, are that blogs are written continually in one page with different posts in chronological order. Weblogs and their authors are united in communities (blogosphere) forming social networks. Blog entries can be commented by other authors and readers, and can be followed with the help alerts, RSS technologies (Levy, 2009).

Recently microblogs became widely popular primarily through the success of Twitter (www.twitter.com). Microblog is a smaller version of a blog; authors are limited in the volume of each entry (for example, in Twitter each entry is limited to 140 symbols). Microblogs, similar to blogs are featured for social networking activities, but with a strong focus on mobility (Böhringer & Richter, 2009). Microblogging has also found its place in the enterprise environment; the most popular enterprise microblogging tool is (www.yammer.com). Its main focus is on inspiring people to share information on "What are you working on", compared to the focus of Twitter on "What are you doing?". Böhringer & Richter (2009) on the basis of a case study concluded that microblogging helps to create awareness in a company to support collaboration, communication and coordination.

Tagging can be explained as a process of attaching keywords to the pieces of content or media stored on content management websites. Those keywords are called Tags and provide semantics to content ((Tapiador, Fumero, Salvachua, & Aguirre, 2006), (Lazar, 2007), (Levy, 2009)). Tagging is widely used in bookmarking to let users quickly mark and find later items of interest based on personal and others' categorization of content. Tags build personal user categorization systems called folksonomies, opposite to well-known taxonomies defined by organizations ((Tapiador, Fumero, Salvachua, & Aguirre, 2006), (Levy, 2009)). Tagging has become a standard element of many blogs, wikis and websites (Boeije, Vries, Kolfschoten, & Veen, 2009).

Social Networking in fact is a property and feature of every tool described above. It is based on the ability of users to create personal profiles on the web, unique for particular websites or common (for example, through the techniques such as OpenID). So the interactions such as collaborative contributing to wikis, social tagging, commenting in blogosphere, create relationships between people (Tapiador, Fumero, Salvachua, & Aguirre, 2006). In addition, the term Social network refers to applications that are targeted to enabling the creation and enlargement of the social networking (Levy, 2009).

Barnes (1954) defined social network as a social structure comprised of nodes (individuals or organizations) that are connected by one or more specific types of relations. In general, social networks and their analysis are important for determining the ways groups operate, how problems are solved and the extent to which people success in attaining goals (Lai & Turban, 2008). So being already very popular in the global internet environment, social networking tools are introduced in organizations. Profiling systems for employees, ability to author and comment documents and pieces of knowledge in knowledge systems creates relationships between people (Boeije, Vries, Kolfschoten, & Veen, 2009).

Table 2.1 summarizes the characteristics of the Enterprise 2.0 tools described above and point the main functions of each of them. Those functions were defined by Blinn et al. (2009) as Authoring, Sharing, Collaboration , Scoring and Networking, which are related to the general principles of Enterprise 2.0 defined by McAfee ((2006) and others).

Table 2.1 Enterprise 2.0 tools (adopted from (Blinn, Lindermann, & Nüttgens, 2009)).

Enterprise 2.0 Tool	Description	Function
Weblog, Microblog	Web-based communication medium, that is determined by the following characteristics: chronology (of posts), actuality (of event described or opinions), interaction (comment function); relations (links to other blogs, people)	Authoring, Sharing, partially Networking
Wiki	Collection of websites, that can be edited by every user	Authoring, Sharing, Collaboration
Tagging	Collective indexing or tagging of existing context to ease the indexing of content	Sharing, Scoring
Social Networking	Maintenance and building of contacts	Networking

The described tools combine communication and personal information management, collaboration in creating new content and authoring specific pieces of information, they make knowledge and contributions more visible. These benefits of new social software are to be able to support different knowledge work processes (Kosonen & Kianto, 2009).

2.2.3. Key Enterprise 2.0 principles

As was mentioned above, the Enterprise 2.0 tools being quite different in their features and purposes of use, possess some similarities of social software. In this study for further understanding of Enterprise 2.0 tools use for knowledge sharing it is important to define the main social media principles, which are their main characteristics ((McAfee, 2006), (Kim, Hall, Yue, & Gates, 2009), (O'Reilly, 2007), (Levy, 2009) and others). They are the mechanisms that allow the tools to perform their tasks and reach the goals for which they are implemented.

The synthesis of the ideas on social software is presented by (Kim, Hall, Yue, & Gates, 2009); they propose a layered conceptual Web 2.0 framework. As far as Enterprise 2.0 tools are in essence the Web 2.0

technologies introduced to the organizational context, it is possible to have the Web 2.0 framework as a starting point. The authors structure the knowledge about Web 2.0 in four layers. They are Technology Layer, Principle Layer, Application Layer and Use/Market Driver Layer. Web 2.0 Technology layer consists of the enabling technological concepts to realize Web 2.0 principles. Web 2.0 Principle layer refers to common fundamental characteristics of Web 2.0 applications. Web 2.0 Application layer is about actual Web 2.0 Rich Internet Applications that implement the lower layer principles using the enabling technologies in the technology layer. Web 2.0 Driver layer refers to the market/social/user driving forces that pull the fundamental shifts in technology (Kim, Hall, Yue, & Gates, 2009). Table 2.2 presents the layered Web 2.0 framework and gives examples for each layer.

Table 2.2 Conceptual Framework for Web 2.0 (adopted from (Kim, Hall, Yue, & Gates, 2009)).

(User/Market) Driver Layer
User/Market demand, Needs of Social Networks, Network Effects from User Participation, Content Sharing Needs
Application Layer
Social Network Service (e.g., Facebook, MySpace), Sharing (e.g., YouTube, Flickr, Bit Torrent), (Micro)Blogs (e.g. Twitter, Yammer), RSS, Mashups, Tagging and bookmarking (e.g., del.icio.us), Collaborating (e.g., Wiki's), Rating and Recommendation systems, Others (e.g., Window Live, Google Adsense, Skype, Web widgets), and others
Principle Layer
Harnessing Collective Intelligence, Network externality, Peer production, Authorship, Participation, Collaboration, Social Networking, Rich User Experience, Open technology, and others.
Technology Layer
Semantic Web, Interactivity Responsiveness, Web Services, lightweight programming, AJAX, XML, Rich Internet Application (RIA) tools, Flash, Google Gears, Growth in Computing Power (h/w, s/w, networking, etc), and others.

The profound description and analysis of different components of layers of the framework is not in the scope of the given research. What is important is that Enterprise 2.0 means the introduction of the social media (Web 2.0) technologies in organizations. So implementation of any particular application (e.g. wiki, Social Network service) or piece of functionality (e.g. user folksonomies, ratings) for the internal use leads to and depends on the introduction of the social media principles in organizations.

Enterprise 2.0 inherits, but does not have the same principles of social software. As first proposed by (McAfee, 2006) and later contributed by other researchers ((Bonabeau, 2009), (Levy, 2009), (Shimazu & Koike, 2007) and others) the main principles of Enterprise 2.0 are the following:

- Harnessing collective intelligence implies benefiting from the cumulative expertise of a group, rather than an individual, to make decisions (Lykourentzou, Papadaki, Vergados, Polemi, & Loumos, 2010).
- Authoring is important to elicit the contribution of every person to collaborative efforts or products, and the contribution of any kind, whether it is knowledge, insight, experience, a comment, a fact, an edit, a link, and so on, is important (McAfee, 2006).
- Folksonomies are user generated classifications enabled by tagging. They reflect the information structures and relationships that people use, not the ones that were planned. Besides, user tags reflect the popularity of subjects, identify most used by employees knowledge pieces. But generated without control and planning they can be redundant, and are flat (one level classification) (McAfee, 2006).

- Reputation (McAfee (2006) calls this principle Links, by analogy with Google PageRank system) of an author or an object (a wiki article, blog, etc) is defined not by some set of characteristics, but by the number of links directing to the object or number of followers. In order to make this principle work many people have to be given the ability to build links. So this principle is dependent on the number of participants in a network.
- Extensions (recommendations) are used to propose to users the items most relevant to their interests based on the previous behavior (McAfee, 2006).
- Signals (RSS, notifications) notify users when new content of interest, comment, new post, reply appears.
- "Wisdom of crowds" effect implies that large number of people making small contributions can create a quality product (Kittur & Kraut, 2008).
- Network Externalities or network effect in this case means that the more users a system has the more valuable it becomes for every single user (Kim, Hall, Yue, & Gates, 2009). It is true for the principles of creating classifications by tagging, defining most interesting objects by the number of links to them, for creating good recommendations based on the history of all users' behavior.

Thus, Enterprise 2.0 tools give organizations an opportunity to benefit from the main social media principles. They help to overcome the disadvantages and difficulties in use of traditional knowledge information systems for supporting knowledge sharing and application (Boeije, Vries, Kolfschoten, & Veen, 2009). Harnessing collective intelligence and "wisdom of crowds" effect facilitates valuable content creation with small and not time and effort consuming contributions from users. Authoring, reputation systems and alerts on new contributions make knowledge contributions visible to others, as well as make experts in particular knowledge domains known. Introduction of tagging functionalities to information and knowledge repository can create a natural, user-friendly content structuring and make search and knowledge discovery easier. Extensions functionalities also make knowledge discovery more effective.

However, all described above effects are still proven to be true only for the open internet environment which is different from the organizational settings and intranet rules. It is free of risks of work evaluations, job security, it is the platform for many million collaborators where everybody can contribute to the field of their personal interest and not what is necessary for the organizational development and learning. As mentioned by McAfee (2009) and is supported by statistical data that only a very small percentage of Web 2.0 users write content and make minor contributions, such as adding tags, comments, voting, etc ('in most online communities, 90% of users are lurkers who never contribute, 9% of users contribute a little, and 1% of users account for almost all the action'). This becomes obvious from the statistical data of Wikipedia contributions ((Rafaeli & Ariel, 2008), (Adler, Alfaro, Pye, & Raman, 2008)). So in the organizational context Enterprise 2.0 collaboration and communication tools adoption is different from the Web 2.0 tools. In the next section we summarize the previous research outcomes in the area of Enterprise 2.0 implementation and its implications for knowledge sharing.

2.2.4. Implications of Enterprise 2.0 tools for Knowledge Sharing – Structured Literature Review

Search Engines

The literature search and review was aimed at defining the existing theories and studies specifically in the scope of the impact of social media implementation on organizations. Search engines used are Scopus and Web of Science, as far as these databases cover most of the top IS journals (Rainer & Miller, 2005),

(Schwartz & Russo, 2004). But there were not so many results found for the chosen keyword combinations; that is why the results from all journals and conference proceedings were included into the next step analysis of the literature review. This seems reasonable, because the topic of Enterprise 2.0 is quite new and may not have wide coverage in highly ranked academic journals yet. At the same time descriptions of case studies, statistical data and research in this field is already in discussion at conferences.

Keywords selection

Keywords for the search process are derived from the initial article and are summarized in the Table 2.3

Table 2.3 Keywords Selection.

Initial Keyword	Related Keywords	Actual Used Keywords
Enterprise 2.0	Web 2.0, social media, enterprise social media	2.0, social media, enterprise
Knowledge sharing	Knowledge Management Strategy; Knowledge Sharing, Knowledge Distribution;	Knowledge Management; Sharing
Enterprise 2.0 implementation	Blog; Wiki; MicroBlog; Social Network; messaging	Blog; Wiki; MicroBlog; Social Network;
Influence	Impact; Result; Success; Performance Metric	Impact;

The article that influenced the field of social media for the enterprise use was written by McAfee in 2006 for MIT Sloan review. As far as this paper is considered to be one of the most influential in the field of Enterprise social technologies, the literature review started with analysis of the relevant papers, which cited by the initial one. According to Scopus database the article published in *MIT Sloan Management Review* was cited 59 times, and the article with the same name published in *IEEE Engineering Management Review* was cited 3 times. After first selection (title-based relevance) 29 papers were selected for further review and 33 are excluded from further analysis. Abstract based review and quick scan of the papers comprise the second phase of the selection process. After the second phase 7 papers were included into the final set of papers for the analysis. For other papers found in the databases by defined earlier keywords the selection algorithm was the same.

Synthesis of papers

The synthesis of the concepts from the selected papers is presented in the Concept Matrix in the Table 2.4.

The main concepts extracted from the chosen papers are:

A – Enterprise 2.0 technologies use has impact on communications patterns facilitating connections between members, interpersonal trust, and work awareness.

B- Enterprise 2.0 technologies use has impact on the knowledge creation process by making it more collaborative.

C - Enterprise 2.0 technologies use has impact on organizational culture by focusing on participation, collaboration and knowledge sharing.

D - Enterprise 2.0 technologies implementation has impact on visibility of knowledge sharing activities and authors' reputation which enhances the importance of intrinsic motivation of employees for knowledge sharing.

Table 2.4 Concept Matrix.

Article	**Concepts**			
	A	B	C	D
(He, Xu, Means, & Wnag, 2009) –			x	
(Angehrn, Luccini, & Maxwell, 2009)	x	x		
(Böhringer & Richter, 2009)	x		x	
(Boeije, Vries, Kolfschoten, & Veen, 2009)	x		x	
(Costa et al., 2009)			x	x
(Levy, 2009)			x	
(Kosonen & Kianto, 2009)	x			
(Jing & Fan, 2008)			x	
(Shaohua & Fan, 2008)			x	x
(Wan & Zhao, 2007)		x		
(King, 2007)				x
(Li, 2007)	x	x		
(Böhringer, Gluchowski, Kurze, & Schieder, 2009)			x	x
(Blinn, Lindermann, & Nüttgens, 2009)	x			x
(Marfleet, 2008)	x		x	
(Cress & Kimmerle, 2008)		x		
(Müller, Meuthrath, & Baumgraß, 2008)			x	x
(Dave & Koskela, 2009)	x			
(John & Seligmann, 2006)	x			x
(Lykourentzou, Papadaki, Vergados, Polemi, & Loumos, 2010)		x		
(Yu, Lu, & Liu, 2010)			x	
(Chatti, Klamma, Jarke, & Naeve, 2007)		x		
(Bothos, Apostolou, & Mentzas, 2009)		x		
(Zhang, Vogel, Chen, Tian, & Guo, 2009)				x

From the literature overview we see that recently it has become a common opinion that Enterprise 2.0 tools, such as wikis, blogs, microblogs, social network tools, etc and their adoption in organizations influence knowledge management practices and strategies. We defined four most widely mentioned and researched aspects of Enterprise 2.0 and knowledge sharing interaction: communication patterns, when improved, lead to increasing awareness of work and trust among organization members (Concept A); knowledge contributions

become collaborative products supported by the power of collective intelligence (Concept B); there should be a fit between organizational knowledge sharing culture and supporting information system (Concept C); and motivation for sharing knowledge through the Enterprise 2.0 systems is mostly intrinsic, based on the increased visibility of knowledge contribution of authors and the increased importance of reputation systems.

Communication is one of the most important elements of knowledge work and indispensable for successful knowledge sharing. It helps to build relationships between people, establish trust among organizational members; create awareness of the importance of tasks colleagues work on ((Böhringer & Richter, 2009), (Boeije, Vries, Kolfschoten, & Veen, 2009), (Angehrn, Luccini, & Maxwell, 2009), (Li, 2007)). And social software is considered to be able to trigger sociality and communication. Social networking tools give opportunities for building identities and provide information about interests and areas of expertise. User contributions in wikis, blog posts and comments, tagging and bookmarks become a starting point for discussions and relationships and communities establishment ((Angehrn, Luccini, & Maxwell, 2009), (Kosonen & Kianto, 2009), (Li, 2007), (Dave & Koskela, 2009)). The availability of profiling systems and the principle of authorship facilitate identification of expertise communities, credible sources of information and connection to experts ((Marfleet, 2008), (John & Seligmann, 2006)).

Many authors agree that Web2.0 concepts and tools can have a positive impact on innovation in general, and in particular on new idea generation and knowledge creation ((Angehrn, Luccini, & Maxwell, 2009), (Li, 2007), (Cress & Kimmerle, 2008) and others). Software provides collaborative field for innovation-related ideas and their inceptors, as well as a brainstorming arena which includes commenting, discussions, rating, network visualization and navigation ((Dave & Koskela, 2009), (Angehrn, Luccini, & Maxwell, 2009)). Those activities are aimed at benefitting from the effect of collective intelligence, which means drawing out relevant information from each individual and combining it in a way that makes it useful ((Bothos, Apostolou, & Mentzas, 2009), (Lykourentzou, Papadaki, Vergados, Polemi, & Loumos, 2010). Wikis, content recommendations, collaborative tagging and folksonomies, social networks are the mechanisms that bring collective intelligence into action.

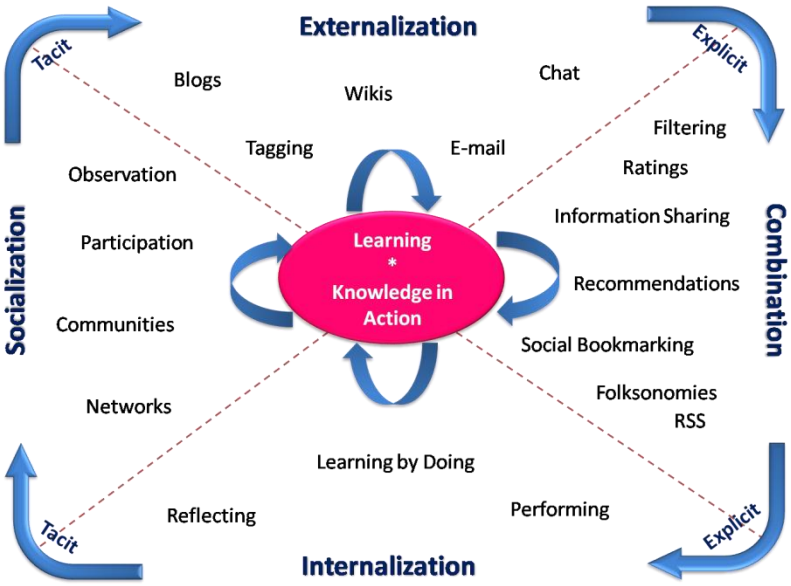

Figure 2.4 – SECI model with mapping of Web 2.0 tools (Chatti, Klamma, Jarke, & Naeve, 2007).

In addition, some authors see the fit between the SECI model of knowledge creation cycle and Enterprise 2.0 technologies ((Chatti, Klamma, Jarke, & Naeve, 2007), (Wan & Zhao, 2007), (Costa et al., 2009) and others). Figure 2.2 shows the SECI model with suitable supporting tools for each knowledge transformation phase. In the process of socialization groupware, expert location system and communities are suitable to transfer implicit knowledge from one person to another. In the process of externalization wikis, blogs, forums and news groups help translate implicit knowledge into explicit knowledge. In the process of combination bookmarking, tagging and recommendation features are helpful to combine different pieces of already written explicit knowledge to create new explicit knowledge. In the process of internalization online training, games, feedback possibilities help people to reflect on new knowledge and gain new tacit knowledge from already existing explicit knowledge and practices.

One of the most critical barriers to successful knowledge sharing is organizational culture that does not support free communication, sharing, help between members. Many authors agree that for successful knowledge sharing process in organizations there should be a correspondence between cultural settings, collaborative and knowledge sharing tasks and tools to support the tasks ((Yu, Lu, & Liu, 2010), (Levy, 2009), (Shaohua & Fan, 2008)). He, Xu, et al. (2009) concluded that deploying social media tools facilitates and encourages a culture of participation and collaboration, as well as enables a knowledge community of users to share their own views. Researchers define different aspects of organizational culture that should suit collaboration and knowledge sharing tasks, such as creating awareness of work, developing connections and socialization, giving more power to employees in their knowledge work, focus relationships on partnerships instead of hierarchies, promoting understanding of sharing, positive values and sharing choice ((Boeije, Vries, Kolfschoten, & Veen, 2009), (Costa et al., 2009), (Jing & Fan, 2008), (Shaohua & Fan, 2008), (Müller, Meuthrath, & Baumgraß, 2008), (Marfleet, 2008)). However, in spite of the fact that social media principles are very close to knowledge management ones, cultural norms of Web 2.0 cannot be brought to enterprise context as they are. Mainly the centralization, controlled attitude of knowledge management confronts with the uncontrolled, decentralized Web 2.0, so the Enterprise 2.0 introduction can positively influence the knowledge sharing, but should be adjusted for more controlled environment (Levy, 2009).

The previous research has shown that visibility of knowledge sharing activities and the contributions of every individual encourages the intention to share knowledge (Zhang, Vogel, Chen, Tian, & Guo, 2009). Enterprise 2.0 tools have more functionalities to increase the visibility of knowledge sharing compared to traditional KMS ((Kosonen & Kianto, 2009), (Costa et al., 2009), (Shaohua & Fan, 2008), (John & Seligmann, 2006)). The results of this can be considered from different points of view. First, visibility of knowledge contributions is improved with the introduction of authors' profiling systems, and in addition rating and scoring functionalities, allows to easily know the authors of pieces of knowledge, rate the contributions and so appreciate the authors' work. It is argued that such a reputation system can become a strong motivator for sharing knowledge ((Zhang, Vogel, Chen, Tian, & Guo, 2009), (King, 2007), (Shaohua & Fan, 2008)). Other aspects of increased visibility include making experts in particular knowledge domains better known (for example, by authoring a blog or wiki article, giving comment or tagging) and making the organizational knowledge gaps obvious (for example, in the wiki articles structure some pages are missing that shows the lack of knowledge or experts in this area) ((Müller, Meuthrath, & Baumgraß, 2008), (Costa et al., 2009), (John & Seligmann, 2006)).

This overview of existing research was done in the field of Enterprise 2.0 technologies implications in knowledge management and their influence on knowledge sharing process in particular. This overview was summarized in four statements that express the main ideas on how social media tools (blogs, wikis, social networks, social tagging etc) can be beneficial in addressing the organizational barriers to effective

knowledge sharing. The following chapter comes up with a set of hypothesis for further empirical evaluation based on this research literature review.

3. Theory Development

In the Chapter 2 the following barriers were identified that are considered to be the most influential based on the previous research:

- lack of interpersonal trust between group members (Chapter 3.1);
- personal characteristics such as individual understanding and ability to express insights in combination with the task complexity of sharing complex and tacit knowledge (Chapter 3.2);
- centralized and insecure organizational culture that does not support the values and norms of sharing or does not address the perceived risks of losing power and job security after sharing unique valuable knowledge by employees (Chapter 3.3).

It is possible to say that all the factors mentioned above are interconnected, and are quite difficult to distinguish in terms of their influence and outcomes. For example, trust and the feeling of safety between organizational members are parts of organizational cultural settings, as well as such individual characteristic as being a good communicator effects the ability of organizational members to build broad social networks, strong connections with others and in the end trustful relationships. Some researchers address trust as a personal ability of every individual, others as an interpersonal relationship and general environment characteristic. Here we propose a set of hypotheses that show how the barriers to sharing knowledge between people identified in the previous chapter on the basis of existing literature review, are addressed by the main characteristics and features of Enterprise 2.0 tools. The following subchapters are organized as explanations of the theoretical background for a hypotheses, visualization of the mechanism of the Enterprise 2.0 tools usage influence on knowledge sharing and the resulting hypotheses. The references like (A1.1) in the text make explicit the link between an argument in the explanation and a particular part of the mechanism on the corresponding figures.

3.1. Lack of Interpersonal Trust

From the literature review done in the previous chapter we derive the statements that are proved to be true. The following axioms are used for further explanations and support the proposed hypothesis:

- Trust between organizational members has positive effect on knowledge sharing intentions (among others ((Nonaka, 1994), (Abrams, Cross, Lesser, & Levin, 2003), (Rosen, Furst, & Blackburn, 2007), (He, Fang, & Wei, 2009), (Fang & Chiu, 2010)).
- Closer and more frequent communication has positive effect on establishing trust (Cheng, Hailin, & Hongming, 2008).
- More information available about colleagues helps establishing trust (Dignum & Eijk, 2005), (Argote, McEvily, & Ray Reagans, 2003).
- Social networking tools provide more information about members of organizations (Angehrn, Luccini, & Maxwell, 2009), (Kosonen & Kianto, 2009), (Li, 2007), (Dave & Koskela, 2009)).
- Enterprise 2.0 tools provide facilities for communication between organizational members ((Böhringer & Richter, 2009), (Boeije, Vries, Kolfschoten, & Veen, 2009), (Angehrn, Luccini, & Maxwell, 2009), (Kosonen & Kianto, 2009), (Li, 2007), (Dave & Koskela, 2009), (O'Reilly, 2007)).

From the statement above and related theories we derive the main constructs to be uses for the hypothesis development. The following paragraph presents the list of constructs and their definitions:

- *Social networking* - is a phenomenon that exemplifies Web 2.0, an important form of user participation in which the goals are to build and maintain social connections for satisfying social, career and personal needs (Kim, Hall, Yue, & Gates, 2009).
- *Communication* is sign-mediated interactions between at least two agents for transferring information from one entity to another. Communication is commonly defined as "the imparting or interchange of thoughts, opinions, or information by speech, writing, or signs".
- *Social presence* can be understood as the degree to which the medium facilitates the awareness of other people and the development of interpersonal relationships ((Short, Williams, & Christie, 1976) (Bente, Rüggenberg, Krämer, & Eschenburg, 2008). Communication media differ in their degree of social presence.
- *Awareness* means an understanding of the activities of others which provides a context for your own activity (Böhringer & Richter, 2009).
- *Trust* is the result of long history of mutual experiences and the mutual confidence in the good intentions and actions of the other party (e.g. (Mcknight, Cummings, & Chervany, 1998), (Jarvenpaa & Leidner, 1999)).

Trust and altruism are important facilitators of knowledge sharing between people. This is true for both face-to-face interaction and technology mediated teams working. Researchers agree that knowledge sharing happens more efficiently if there is a certain high level of trust existing between employees (e.g (Dave & Koskela, 2009), (Dignum & Eijk, 2005)). Being engaged in trustful relationships people are more willing to provide useful knowledge to others or to their team. On the other hand, people are more willing to listen, absorb and use each other's knowledge, when trust exists (A1.1). In addition to trust openness, availability and use of communication channels support knowledge sharing within organizations (Cheng, Hailin, & Hongming, 2008).

The next statement concerns the process of establishing trust which is important for both collocated communication and knowledge sharing via some IT media. Trust is commonly considered to be the result of long history of mutual experiences and the mutual confidence in the good intentions and actions of the other party (e.g. (Mcknight, Cummings, & Chervany, 1998), (Jarvenpaa & Leidner, 1999)). In the case of computer mediated groups there are more difficulties experienced than in collocated teams because of the difficulties of establishing social presence (King, 2006).

The social presence can be understood as the degree to which a medium facilitates awareness of other people and the development of interpersonal relationships (Bente, Rüggenberg, Krämer, & Eschenburg, 2008). Lack of social presence is a common problem for knowledge management information systems. As far as knowledge owners prefer to share their expertise within a controllable, trusted group under predictable conditions, users of IS need a more personal means of interaction to make them comfortable exchanging knowledge (Dignum & Eijk, 2005). Such personalization can be reached most effectively through the profiling systems, authorship tracking, and diverse communications means (A1.1, A1.2, A1.3).

Social networking tools with their profiling systems give people more information about each other and in such a way create social presence even in the dispersed computer-mediated groups. In addition to the tools that have social networks building as their main function, social networking elements can be identified in almost all the modern Enterprise 2.0 tools. Wikis, blogs and microblogs can be used effectively only after a user profile is created. Users provide some personal information, which creates more informal environment where participants can express themselves freely. Also professional information is useful in social network profiles; descriptions of specialties, areas of expertise and professional interests give opportunities to find

colleagues with similar interests, experts in particular area, etc. (A1.1, A1.2, A1.3) (Angehrn, Luccini, & Maxwell, 2009).

Social presence is created not only by static information in profiles, but also by facilitating awareness about other people and their work. Awareness means an understanding of the activities of others which provides a context for your own activity (Böhringer & Richter, 2009). Enterprise 2.0 tools allow everybody to become an author of a particular piece of knowledge (McAfee, 2006). Connecting a real person through his/her profile to a wiki article, a blog entry or just comment, edit provides a context for further connections, communication and collaboration (A1.5, A1.6). (Böhringer & Richter, 2009) have researched the case of introduction a microblogging tool; as a result organizational members posted their updates on the tasks and projects they worked, problems they encountered and solutions found. The authors came to conclusions that having information about a person to share knowledge with, and knowing the purpose for what the shared knowledge will be used, influence the willingness to share personal unique knowledge and pieces of work. Being asked for help by a concrete person or being willing to help with solving an urgent problem makes the aspects of social dilemma (described in chapter 2) less important for the final decision about sharing (A1.4).

The last statement deals with the importance of communication for establishing interpersonal trust. Enterprise 2.0 tools provide plenty of communication means. Discussions on forums and of wiki entries, blog and microblogs posts and following comments to them, commenting and messaging functions in social networking tools, etc. are widespread and easy means of communication. They create structured (e.g. discussion of a particular topic in comments of a blog post), visual (e.g. comments on status update) and searchable communication (O'Reilly, 2007). All this aspects contribute to the creation of communication history and mutual communication experiences that are essential to trust establishment, according to the definition of trust presented in the beginning of this section (A1.7, A1.8).

From the above discussion we come up with the Hypothesis 1. The proposed underlying working mechanism of the hypothesis is visualized in the Figure 3.1

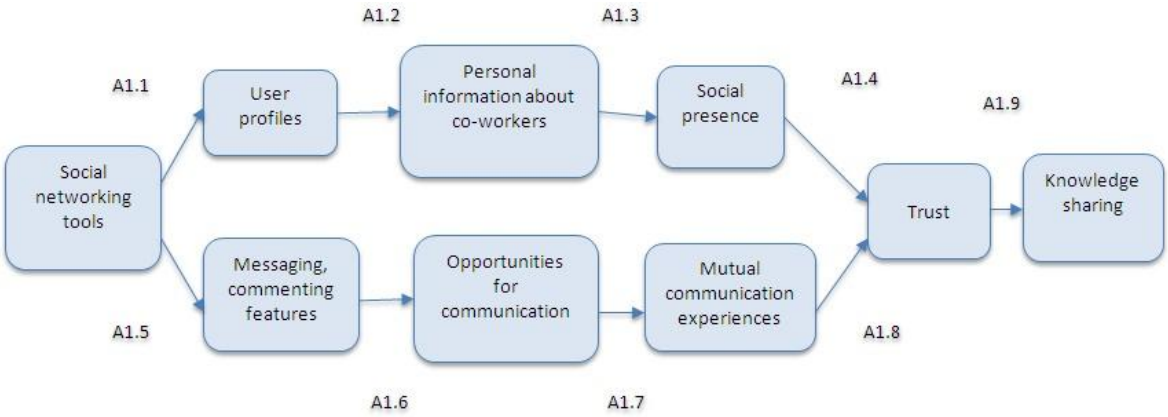

Figure 3.1 - The mechanism of the impact of Social networking tools on knowledge sharing.

H1: The use of social networking tools has positive impact on knowledge sharing by increasing the level of trust among group members.

3.2. Complexity of expressing and sharing knowledge

The following statements are considered to be true for the knowledge sharing and collaboration process based on the existing research literature review:

- Reducing perceived costs of knowledge sharing has positive effect on knowledge sharing intentions (Cabrera & Cabrera, 2002).
- Making it easier to express knowledge has positive effect on reducing the perceived costs of knowledge sharing (Cabrera & Cabrera, 2002).
- Enterprise 2.0 tools make it easier to express knowledge and create pieces of knowledge from small individual contributions.
- Enterprise 2.0 features (e.g. folksonomies, commenting) can facilitate implicit knowledge sharing ((Chatti, Klamma, Jarke, & Naeve, 2007)).

The statements above lead us to defining the main constructs to be used to come up with the theory on the barrier of complexity of expressing knowledge. The main constructs and their definitions, as used in the current research are:

- *Collaboration* is a process in which two or more people or organizations work together for achieving common goals by sharing knowledge, learning and building consensus (M.-W. Dictionary, 2010).
- *Costs of sharing knowledge* – is the amount of resources used for sharing or contributing knowledge as perceived by the person who shares knowledge (Cabrera & Cabrera, 2002).
- *Implicit knowledge* – sometimes described as latent, implicit knowledge is highly personal, is hard to formalize and therefore difficult to communicate to others (Nonaka, 1994); this type of knowledge is kept in a person's mind without necessarily being expressed in words and is often acted on instinctively.
- *Folksonomies* are user generated classifications enabled by tagging. They reflect the information structures and relationships that people use, not the ones that were planned (McAfee, 2006).
- *Knowledge contribution* is defined here as pieces of unique content or documents, that contain personal insights, know-how's or pieces of the performed work, added to the IT systems of common organizational or team use or knowledge repositories.

As was discussed in chapter 2 one of the most critical barriers to sharing knowledge is the predominance of costs for sharing over the benefits. The situation of cost and benefits balancing is researched under the topic of social dilemmas. What should be emphasized is that the perceived costs and benefits of the sharing action are most important for sharing decision (Wang & Noe, 2009). The argumentation on the perceived costs of sharing is based on the following existing researches.

Kankanhalli et al. (2005) state that the higher the time and efforts, required from an individual to codify knowledge in order to share it with others the higher the costs are and so it is less likely knowledge is contributed to a Knowledge IS. Thus, one of the ways to facilitate knowledge sharing is to reduce the perceived cost for individuals of giving away their personal unique knowledge. One of the most effective ways to reduce the perceived costs of sharing is to make this process as easy as possible (Cabrera & Cabrera, 2002). Using IT to help people collaborate for creating pieces of knowledge, to give more opportunities for communication can make sharing process easier (A2.3, A2.4), for sure, under the condition of the ease of use of an IT tool itself.

Nevertheless, before defining measures to make the process of knowledge sharing easier for individuals, we should understand the underlying cause of the difficulties that make knowledge sharing a time- and effort-consuming process for many people. The difficulty of expressing thoughts, insights, relations, reasoning clearly, and so creating knowledge that can be understood and used by others is a critical individual barrier to making a positive decision to share (A2.2, A2.3) (Riege, 2005). So, effective communication both verbal and written is fundamental to effective knowledge sharing ((Riege, 2005), (Hendriks, 1999) and others). Besides, the diverse nature of knowledge itself, being explicit and relatively easy to express and pass, or being implicit, stuck in personal experiences and insights, and hard to express and pass, adds to the difficulties of knowledge sharing.

People differ in their communications skills and abilities to express freely their thoughts and knowledge, which is especially critical for the attempts to share implicit knowledge. But both skillful and less skillful in communication or, in relation to knowledge IS, in writing people possess valuable knowledge for an organization. This means that the efforts to make knowledge sharing easier, i.e. less effort- and time-consuming for everybody, should be devoted to establishing the processes for knowledge sharing supported by IT that do not require considerable skills and time to make a contributions to a common organizational knowledge repository or help a colleague with solving a concrete problem (A2.3, A2.7).

While wikis and folksonomies are highly effective forms of collaborative information management, they also are used for collaborative content creation. This process can be mapped on the SECI model as the one corresponding the knowledge combination phase (Chatti, Klamma, Jarke, & Naeve, 2007). At this phase reconfiguration of existing explicit knowledge through adding, reorganizing, and combining, can lead to new knowledge, possibly more complex. Here is where social software (Enterprise 2.0 tools) is beneficial to knowledge sharing and creation tasks by giving opportunities to harness collective intelligence. Looking at a well researched example of wiki use for content creation and storage, we can see that this technology is not just easy to be used, but also may require less time and efforts from collaborators (A2.1, A2.2, A2.3). In the wiki-style knowledge creation and combination the contributions of everybody is valuable, either it is several pages of content, a small edit, adding a reference or a mistake deletion. The collective intelligence decides what is valuable through filtering, rating, feedback, reviews, criticisms, and recommendations (A2.5, A2.6, A2.7) (Chatti, Klamma, Jarke, & Naeve, 2007).

However, what is considered a more difficult task is expressing and sharing implicit knowledge. It is considered to be a non-trivial task, which requires unique approach in every situation, type of knowledge to be shared, personality characteristics of those who share and who receive knowledge. In relation to the SECI model (Nonaka, Toyama, & Konno, 2000) these tasks correspond to the externalization phase. It is essential to knowledge creation, because it creates new, explicit concepts from implicit knowledge. According to (Chatti, Klamma, Jarke, & Naeve, 2007), blogs, on the one hand, can be an example of an Enterprise 2.0 tool that supports the externalization process by giving opportunity to everyone to comment and ask questions and providing friendly environment to capture personal knowledge, distribute it, have this knowledge reflected. On the other hand, blogs facilitate discussions, sharing insights in comments, and so documenting thoughts and reasoning (A2.6). Besides, as we mentioned earlier the context is crucial for effective implicit knowledge sharing. Social tools help to provide context to collaborative knowledge creation and sharing. As an example discussions around a blog post in comments and trackbacks to related and answering posts give more context to the codified knowledge (A2.5).

Figure 3.2 visualizes the above argumentation on the process of how knowledge sharing initiatives can benefit from collaborative Enterprise 2.0 tools. When introduced and used in an organization, collaborative

tools make knowledge sharing and new knowledge and content creation easier by allowing the creation of valuable content by small (not time- and effort-consuming) contribution from collaborating individuals, and providing opportunities for expressing implicit knowledge more easily by facilitating discussions in comments, trackbacks to knowledge entries (e.g. in blogs), classifying knowledge objects in categories that reflect user insights, etc. Figure 3.2 consists of the nodes, which represent the main constructs defined and used in the argumentation above, and arrows, which represent the causal links between the arguments.

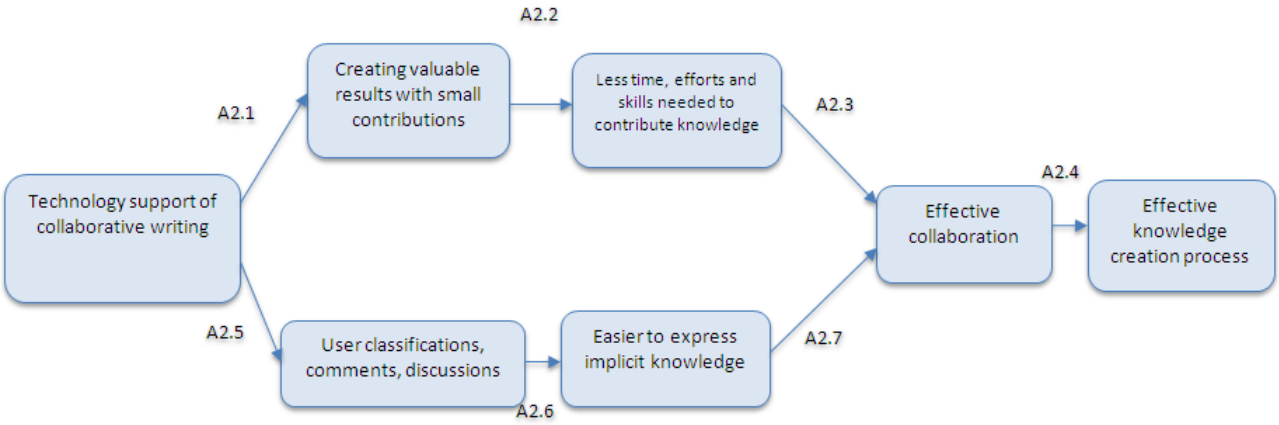

Figure 3.2 – The mechanism of the impact of Enterprise 2.0 collaborative tools on knowledge sharing.

H2: Enterprise 2.0 implementation has positive effect on the ease of knowledge sharing and knowledge creation process.

3.3. Lack of Supportive Culture and Contribution Visibility

For the problem of knowledge sharing culture the following axioms are extracted from the existing scientific literature:

- Supporting knowledge sharing culture has positive effect on knowledge sharing behavior of individuals (e.g. (De Long & Fahey, 2000), (Argote, McEvily, & Ray Reagans, 2003)(Yu, Lu, & Liu, 2010), (Levy, 2009), (Shaohua & Fan, 2008)).
- Visibility of individuals' work and contributions of knowledge has positive impact on the intentions to share knowledge (e.g. (Zhang, Vogel, Chen, Tian, & Guo, 2009), (King, 2007)).
- Enterprise 2.0 tools (such as ratings, tagging and other popularity indicators) introduction has positive influence on visibility of contributions ((Zhang, Vogel, Chen, Tian, & Guo, 2009), (Shaohua & Fan, 2008), (Dawson, 2008), (Newbold & Azua, 2007)).
- Enterprise 2.0 features and paradigms have positive effect on establishing the organizational culture that facilitates knowledge sharing ((Boeije, Vries, Kolfschoten, & Veen, 2009), (Costa et al., 2009), (Jing & Fan, 2008), (Shaohua & Fan, 2008), (Müller, Meuthrath, & Baumgraß, 2008), (Marfleet, 2008)).

From the statements above the following constructs are derived and their definitions are given in the following list:

- *Knowledge sharing visibility* can be defined as the extent to which employees' knowledge sharing behavior can be identified and monitored by other participants (e.g., their supervisors and peer knowledge reviewers) (Zhang, Vogel, Chen, Tian, & Guo, 2009).

- *Authoring* is the process of contributing to collaborative efforts or products the contribution of any kind, whether it is knowledge, insight, experience, a comment, a fact, an edit, a link, and so on (McAfee, 2006).
- *Reputation* means overall quality or character of a person or an object (in the researched case it can be a wiki article, blog, etc)) as seen or judged by people in general by voting, answering, commenting, reusing, etc ((McAfee, 2006), (M.W. Dictionary, 2010).
- *Awareness* is the state or ability to perceive, to feel, or to be conscious of events, objects or sensory patterns, in this research it means an understanding of the activities of others which provides a context for your own activity (Böhringer & Richter, 2009).
- *Organizational culture* describes the psychology, attitudes, experiences, beliefs and values (personal and cultural values) of an organization and its members.

Many authors agree that organizational culture that does not support free communication, help, sharing between members can become a critical obstacle to successful knowledge sharing (among others (De Long & Fahey, 2000), (Willem & Scarbrough, 2006), (Wang & Noe, 2009), (Kankanhalli, Tan, & Wei, 2005)). The impact of organizational culture can become apparent in social climate, availability of opportunities for communication between peers and across hierarchical levels, power and independence of knowledge employees in performing tasks, the organization wide values of sharing, mutual trust and help (A3.4). So established by organization's management norms and rules of behavior are reflected in the ways employees communicate, in the ways they can reach managers in higher positions, in how the risks of sharing unique valuable knowledge with colleagues are perceived ((Hasan & Crawford, 2003), (Kankanhalli, Tan, & Wei, 2005)). When an organization promotes knowledge sharing values and culture, the goal is to raise the awareness of knowledge management, reinforce the idea that participation in knowledge sharing and creation process is a duty for all members ((Mignon & Janicot, 2009), (Akiyoshi, 2008)). For the realization of these ideas the supporting environment and tools should be available in organizations, such as means of communication, recognition of knowledge sharing as an official task, low competition among employees, and gaining of reputation and respect according to knowledge and contributions and less due to the position in hierarchy.

The literature review in Chapter 2 showed that knowledge sharing visibility is considered to be an important factor adding to success of knowledge management initiatives (A3.4, A3.3). The visibility of individuals' sharing activities and personal contributions is related to the enhanced reputation of contributors as an aspect of intrinsic motivation and so encourages knowledge sharing behavior (A3.7) ((Zhang et al. 2009), (Newbold & Azua, 2007)). In general, visibility can be understood as the environment in which people's work efforts (knowledge sharing contributions in particular) can be identified, monitored and appreciated. As far as knowledge sharing is a non-trivial task with initially low visibility, there is a high probability of free-riding in KMS use (King & Marks, 2008). So contribution visibility is important for both monitoring and preventing free-riding in KMS use, as well as for motivating people to use the systems and contribute their knowledge by respecting, increasing the reputation and prestige of those who make the most valuable contributions.

Visibility of knowledge contributions to KMS was always an issue to be worked on. IS that use Enterprise 2.0 features and follow its principles can offer quite a number of elements that help increase the visibility of work in knowledge and content creation and sharing, and so make knowledge sharing more effective (Kosonen & Kianto, 2009), (Costa et al., 2009), (Shaohua & Fan, 2008), (John & Seligmann, 2006). Currently there is a number of different tools and platform for organizations that use Enterprise 2.0 paradigms and propose Enterprise 2.0 tools use (e.g. Jive, Yammer, etc). They address the visibility issue form different sides at the same time (A3.1, A3.2).

First, Enterprise 2.0 functionalities make it possible to build personal reputation, which is an important positive intrinsic motivating factor in knowledge sharing decision (A3.3) ((Rafaeli & Ariel, 2008), (Oreg & Nov, 2008)). The principle of authoring and profiling creates an obvious connection between a person, its identity in the virtual organizational environment (e.g. profile in organizational social network creates social presence) and the items s/he authors in the system (such as blog entries, microblogs status updates, comments, wiki articles and edits, tagging, etc). Such a connection in combination with rating, liking, trackback, reposting functionalities can become a background for a person's reputation (A3.5, A3.6) (Zhang, Vogel, Chen, Tian, & Guo, 2009), (King, 2007), (Shaohua & Fan, 2008). The ever increasing importance of the reputation in the virtual environment adds to the cultural shift in organizations (A3.4). The respect and appreciation of individuals' works and contribution are shown to those whose posts have the highest ratings, number of reuse or reposts and popularity. And this has nothing to do with the holding position and hierarchy in an organization.

Second, the enhanced visibility of personal contributions can make experts in a particular domain better known (A3.2) (Matteucci, Marcellin, & Gonella, 2009). In some contexts the main idea of knowledge management and IT usage is to communicate knowledge, not store it (Hansen, Nohria, & Tierney, 1999). In this situation the main tasks of IT systems are to make the experts, the most knowledgeable people in particular domain or people with specific experiences known to others. Enterprise 2.0 social networking environment facilitates the visibility of people's expertise, their work and knowledge contributions. However, it is not only important to identify domain experts, but also to encourage them to share their knowledge. The source of encouragement is related to employees' beliefs that their shared knowledge is useful to others ((Wasko & Faraj, 2000), (Wang & Noe, 2009)). In addition, microblogging, blogging, status updates can increase work awareness and facilitate knowledge and content reuse, as a result of the situation when people know for what purposes their knowledge contributions are used (Böhringer & Richter, 2009).

As was noted in the previous hypothesis argumentation, Enterprise 2.0 tools allow creating content from relatively small contributions from community members. This fact is considered to lead not only to the simplification of knowledge sharing tasks, but also to lowering the perceived risks of losing power as a result of sharing unique knowledge and insights. In an environment of socially connected individuals, participation may be an evidence of competency, a way to feel more engaged in the daily job or a way to be engaged in interesting tasks and networking (Bughin, 2008). People can also be motivated by the enthusiastic feeling that appears in the process of collaborative work, effect of mutual reinforcement and motivation. By the example of using wikis and other Enterprise 2.0 elements for collaborative patent reviewing case Noveck (2009) found that enthusiasm for collective actions is bolstered by the ability to be effective and powerful, and that power is in turn created by a shared enthusiasm for working together, the so called "oceanic feeling" (H3.7).

The visual representation of the mechanism of organizational culture and knowledge sharing visibility influence on the knowledge sharing behavior of organizational members is shown in the Figure 3.3.

H3: Enterprise 2.0 reputation and visibility enabling tools introduction has positive influence on establishing knowledge sharing supporting culture and encourages knowledge sharing behavior.

The upcoming chapters report on the empirical investigation of the proposed hypotheses. We have searched for examples and arguments related to the hypotheses in general and to the parts of the working mechanisms in particular. Evidences and reasoning that both support and questions the arguments embedded in hypotheses and mechanisms are of great interest for the research. Besides, we aim at identifying new insights and arguments, which were not found in the overview of previous research. The result of the empirical validation

of the hypotheses proposed here should be the improvement of the models of the working mechanisms and conclusions about the hypotheses being true of false.

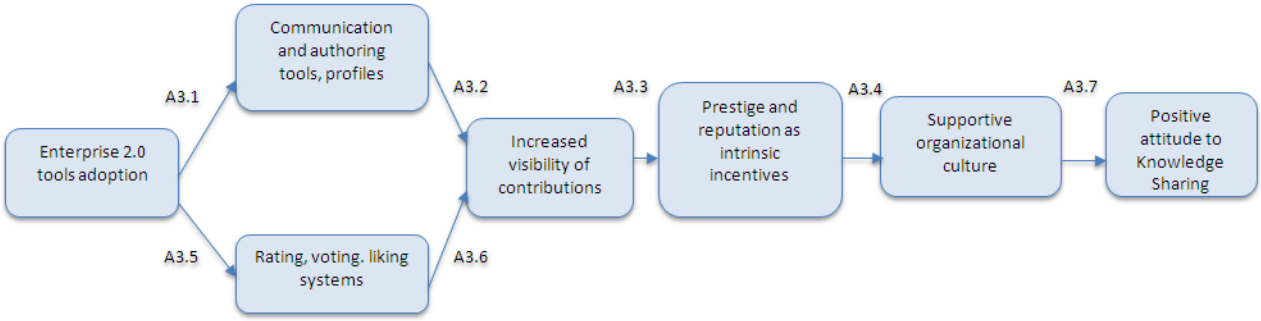

Figure 3.3 – The mechanism of the popularity indicator and awareness building tools on knowledge sharing behavior.

4. Research Method and Empirical research process descriptions

In this chapter we describe the process of the data gathering and data analysis research phases. The process of selecting professionals for the interviews and conducting the interviews with experts to get the perspective and insights from practice, the settings of the interviews and the main concepts touched in every interview are described in chapter 4.1. Chapter 4.2 is devoted to the data qualitative analysis process, which is summarized in the form of conceptually clustered matrix presenting the preliminary conclusions on the proposed research hypotheses.

4.1. Research Method Selection

Verschuren & Doorewaard (2007) defined two types of research, namely theoretical-oriented studies and practical-oriented studies. Theoretical-oriented studies are focused on developing or testing theories, practical research is focused on developing, testing, and evaluating solutions for practical problems. The research to be done can be primarily defined as a theoretical-oriented study. The ultimate objective is to develop and elaborate a set of hypotheses that describe the Enterprise 2.0 use for knowledge sharing and the possible changes it brings to sharing practices.

Research methods refer to systematic, focused and orderly collection of data for the purpose of obtaining information from them, to solve or answer a particular research problem or question (Ghauri & Gronhaug, 2005). Methods can be historical review and analysis, surveys, field experiments, case studies. In business studies the main methods used are structured, semi-structured or unstructured interviews, surveys and observations. Those methods can be considered either qualitative or quantitative research. The main distinction between qualitative and quantitative research is that quantitative researchers employ measurements and qualitative researchers do not. But also different perspectives of knowledge and research objectives are considered when choosing a particular research method.

In the given research the problem is new, it was not previously well-researched and so it is yet not completely structured. To create a good theoretical model all the constructs have to be identified and described. In the situation of the given research problem after a preliminary literature review we see that not all theoretical constructs are defined clearly and it is quite probable that not all of them can be identified at once based on the literature review.

That is why for this research the qualitative exploratory research method is chosen (Ghauri & Gronhaug, 2005). This type of research can be performed with the help of the research method of expert interview. The method can imply unstructured interviews in order to enable flexibility and give a researcher a possibility to adjust questions in the process of interviewing and so get better insights and find out some additional reasons, causes or influencing factors which can lead to formulating missing constructs and improving the theoretical framework.

So, at the first stage a structured literature review was performed which than becomes a basis for proposing a set of hypothesis that answer the main research question. At the second stage a number of interviews are conducted to get the opinion of industry experts and practitioners on the problem and on the relevancy and plausibility of the proposed hypothesis. The interviews will be conducted with experts in the area of knowledge sharing and Enterprise 2.0.

Open expert interview is the method of qualitative study, which can have a particular goal of coming up with a theory. The essence of the theory-generating interview is that its goal is the communicative opening up and analytic reconstruction of the subjective dimension of expert knowledge. The researcher seeks to formulate a theoretically rich conceptualization of (implicit) stores of knowledge, conceptions of the world and routines, which the experts develop in their activities (Bogner, Littig, & Menz, 2009).

The research method of expert interviews has its peculiarities compared to other interview types. Such interviews are conducted for collecting data about processes or situations in which the interviewee participated and about which he has specific information. Experts can be considered those persons who are responsible for and have significant experience in development, implementation or control of solutions, strategies or polices in knowledge management and Enterprise 2.0 specifically. From the expert interviews it is possible to get different types of knowledge about the researched problem, as well as to look at the problem from different points of view. In exploratory interviews with domain experts, information about technical aspects, process peculiarities, and what is most important, insights and explanations about the reasons and motives of some decisions and actions can be obtained. Besides, interviewing people from different companies and with different backgrounds and experiences, allows the researcher to view the explored problem from different angles.

However, there are some difficulties in this research method that a researcher should be aware of from the very beginning ((Yin, 2003), (Bogner, Littig, & Menz, 2009)). First, the information received from experts is not neutral, people tend to have their own opinions and stick to them during interviews. Besides, interview settings also influence the information obtained. Second, there is a rather high possibility that the interaction during interview influence the answers of the interviewee. Procedure of interviews is not strictly standardized, it is performed in the form of open semi-structured dialog in which the interviewer actively participates as well. To eliminate such influence the interview questions should be designed as neutral as possible and the interviewer should abstain from expressing his/her own opinions.

4.2. Research Reliability and Validity

The current research, as was addressed above, is considered to have an exploratory nature, which implies that its process to come to conclusions cannot be seen as strict, and the results cannot be generalized or repeated that easy. However, it is useful and necessary to address issues of reliability and validity, because they provide some indications of the overall quality of the study. To address the issues of reliability and validity, definitions and approaches by Yin (2003) are followed. Table 1.1 is adopted from (Yin, 2003) and shows the strategies to address construct validity, internal and external validity and research reliability in case studies, which can be applied to open interviews as well.

According to Yin (2003) *construct validity* deals with "establishing correct operational measures for the concepts being studied". In the current research to increase the construct validity, multiple sources of evidence were used, for getting both theoretical and empirical data. Structured literature review was done, and during the data collection stage two groups of experts were interviewed, which allowed taking three different perspectives in the research – from the point of view of theoretical findings, of external consulting settings and of the internal company settings. In addition, data collection and analysis are described in detail, which makes it possible to replicate this study. However, the study deals with quite abstract constructs, such as knowledge, trust, visibility, collaboration, which a complex, can have different definitions and are difficult to operationalize. To eliminate ambiguity we present definitions of the main concepts used before starting the explanations and argumentation on hypotheses (in Chapter 3).

Internal validity refers to "establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships" (Yin, 2003). To increase internal validity it is necessary to consider as more as possible causal relationships in the theoretical and empirical findings. In this research the relationships between the concepts in theory are linked with arguments (in Chapter 3 marks like "A1.1") in explanation of the proposed hypotheses and later in analysis of the empirical results, coding and making conclusions about the hypotheses. Besides, structured qualitative analysis was done using one of the qualitative analysis software and empirically clustered matrix was created to structurally present the results of the expert interviews and their links to the theoretical findings and proposed hypotheses. Nevertheless, it is close to impossible to address all the relations and test their validity. To make the risks of false or not supported conclusion lower the process was documented in details, summaries and conclusions made from the interviews were send to the interviewees for approval, and the argumentation was proofread by key informant.

External validity deals with the "establishing the domain to which a study's findings can be generalized" (Yin, 2003). Literature review on the main concepts in the domains of both knowledge sharing and social media was done in a structured way. The interviews for gathering data were conducted with experts with different backgrounds and experiences, which makes possible comparison of different organizational environments and knowledge sharing and Enterprise 2.0 use there. All data gathered is related to the Netherlands' cultural and business peculiarities, as well as to some industries. But as a far as the topic of the research is the use of the social media tools, which are by their nature global, open, don't have territorial or cultural borders, the research results could be interesting for professionals and researchers from different backgrounds.

Reliability deals with "demonstrating that the operations of a study – such as the data collection procedures - can be repeated, with the same results" (Yin, 2003). To increase the reliability of the results the interview questions guide was created and used during the interviews (Appendix A), the interviews recorded, transcribed, coded according to the structured coding scheme Table 4.1 in Appendix C, and the process was described and explained explicitly. But, because of the open, unstructured nature of the expert interviews it was not possible to strictly follow the interview guide. The interviews turned out to be quite diverse; they are the result of the background knowledge, opinions, and experiences and the collaborative process of the interviewees and interviewer. To address this risk, the topics of the proposed hypotheses were discussed on every interview. During the analysis stage the strategy to improve the reliability of the coding is to reread coded transcripts periodically to check whether one still agrees with the coding behavior (Miles & Huberman, 1994).

Table 4.1 Guarding reliability and validity, adopted from (Yin, 2003 p.34).

Tests	Case study and interview tactic	Phase of research in which a tactic occurs
Construct validity	Use multiple source of evidence Establish a chain of evidence Have key informants review draft case study report	Data Collection Data Collection Composition
Internal validity	Do pattern matching Do explanation building Address rival explanations Use logic model	Data Analysis Data Analysis Data Analysis Data Analysis
External validity	Use theory in interviews Use replication logic in multiple interviews, case	Research Design Research Design

	studies	
Reliability	Use interview, case study protocols Develop interview, case study database	Data Collection Data Collection

4.3. Description of the Data Collection Research Phase - Expert Interviews

4.3.1. Finding experts

As we discussed above one of the suitable research methods for an exploratory qualitative research is in-depth interviews with experts in the problem domain. According to Bogner et al. (2009) in scientific research an individual is addressed as an expert because a researcher assumes that she or he has knowledge, which she or he may not necessarily possess alone, but which is not accessible to anybody in the field of action under study. Additional value of the knowledge of experts in a certain field is that their knowledge is contextual, gained from experience and not only from observation, but also from positions of defining a situation and having the possibility to make decisions.

For the current study experts were selected according to their experience in the field of knowledge management and related projects, and their experience and interest in social media tools introduction and use in organizations, based on recommendations, professional profiles in LinkedIn social network and other types of professional activities. Expert knowledge is defined as special knowledge which an expert clearly and distinctly is aware of (Bogner, Littig, & Menz, 2009), that is why, being first contacted via e-mail, they were asked about their experiences and interest in the main research topic, and if the answer was positive an appointment (of usually one and a half hour) was arranged.

The resulting set of interviewees consisted of eight experienced practitioners in the field of knowledge management, who turn their current professional focus to the area of social media implementation in organizations. Four of the interviewees are consultants and four of the interviewees are responsible for knowledge sharing projects inside companies. The details about the settings and peculiarities of every interview will be given in the next sub-chapter.

4.3.2. Interviewing Experts

The interviews were held as face-to-face conversations based on the open questions prepared in advance which addressed the hypotheses under research (Appendix A). But because by nature a considerable part of expert knowledge is non-explicit, it is tacit, pre-theoretical experiential knowledge (Bogner, Littig, & Menz, 2009), the interviews did not always directly follow the questions list. In open interviews the answers discovered decisions' reasoning, provided examples, and gave experts' own outlooks and reflections on their personal experiences and on general trends and events in the field under research. In the process of the interviews after hearing an open question interviewees discussed a lot about relevant issues, things connected to their positions and functions and described their activities.

However, qualifying question were required to get more information close to the hypotheses and their underlying mechanisms, as well as some real life examples addressing the issues related to the research subject. The questions were focused on the "how" and "why" of decision making and acting. Besides, as far as "an expert is a man who has made all the mistakes which can be made in a very narrow field" (by Niels Bohr (Mackay, 1991)), in the end of interviews the interviewees were asked to share their professional

"lessons learnt" about knowledge sharing and social media adoption. This provided a lot invaluable insights to add to the theory in the research field.

Because of the different settings of the interviews with consultants and knowledge management professional who are permanent employees of companies, the sets of questions varied considerably. The aspects discussed with consultants required both abstract general questions and qualifying question about examples. The interviews with people who are internal in companies were devoted to one organization, its settings, projects in knowledge management, etc; and the questions in these interviews were aimed at getting as much as possible details about the organization, its activities and decisions in knowledge management aspect.

4.3.3. Results of the Expert Interviews Conducted

As we mentioned in Chapter 4.1 due to the explorative nature of the current research the goal of the interviews was twofold: first, interviews were aimed at supporting or questioning the proposed hypotheses; second, the semi-structured conversations are suitable to get additional perspectives and insights to improve the theory. The interviews fulfilled these two goals and provided arguments to deal with all three proposed hypotheses as well as new thoughts and examples to come up with improvements to the theoretical domain and clarifications to the mechanisms of the influence of Enterprise 2.0 tools use on knowledge sharing in organizations.

Further in this chapter we describe the peculiarities of the data received from the expert interviews. As far as the interviewees belong to two different groups – consultants and internal company employees, we find it reasonable to briefly address the differences in perspectives, and types of data received from those two different groups of interviewees.

Interviews with consultants

In total four of eight interviews were conducted with experts who provide consulting services for the projects in the area of knowledge management and IT implementation for knowledge sharing and storage in organizations. Besides, it was important that all of the interviewees had experiences in working with and introduction of Enterprise 2.0 tools in organizations. But inside this group of interviewees there is also some diversity in settings.

- Interview 1 (Appendix B-B1) was conducted with a consultant from a big consulting company, which provides services to industrial and marine enterprises around Europe.
- Interview 2 (Appendix B-B2) was a conversation with a person, who is an independent consultant and provides services in the areas of organizing Communities of Practice, social learning processes in organizations, and learning in Communities of Practice, and Enterprise 2.0 tools introduction to support these learning processes.
- Interview 3 (Appendix B-B3) was conducted with a freelance consultant, who specializes in helping non-profit organizations to benefit from the use of social media technologies in the projects related to knowledge sharing in dispersed groups.
- Interview 5 (Appendix B-B5) was arranged with two persons from a small consulting company, who have their professional focus in making information processes in organizations effective, i.e. sharing, structuring, organizing information and knowledge by introducing innovative technologies and Enterprise 2.0 technologies in particular, by analyzing and optimizing knowledge and information processes and making them findable and accessible.

The conversations with this group of interviewees resulted in gaining a lot of insights related to the researched questions. The interviewees reasoned about general trends in industries and in the field of knowledge management, the advantages and disadvantages of knowledge management systems and social media tools, and shared their lessons learned from their personal professional experiences. Besides, during these interviews, after being asked specifically, they gave examples from their experiences, which supported the claims they made. These examples can be further used as evidence and arguments in the process of hypotheses validation.

Interviews with internal knowledge management professionals in companies

The second group of experts consists of the people who work permanently in companies and as part of their daily jobs deal with the issues of knowledge sharing in organizations, take part or run projects of IT implementation for knowledge management and deal with Enterprise 2.0 tools adoption in their companies or have interest and plan to start such projects. This group, similar to the interviews with consultants, was quite dispersed in terms of the organizational settings, ranging from the purely technical engineering to consulting companies.

- Interview 4 (Appendix B-B4) was conducted with a person responsible for information architecture and information and knowledge processes in a big production company, which provides a diversity of services in the printing and information and document management fields. This organization is a good example of successful adoption of all kinds of social media tools for knowledge sharing around the company, as well as for helping people organize their personal knowledge and learning processes.
- Interview 6 (Appendix B-B6) was held in an engineering aerospace company with a person in a position of Knowledge Sharing Officer, who is responsible for the initiatives and activities aimed at capturing the organizational knowledge and experiences and sharing them. In the organization there is no previous history of usage of any of the Enterprise 2.0 tools for these purposes, but this interview is valuable for the research in terms of gaining evidences of barriers to knowledge sharing and the gaps in knowledge sharing process that can be addressed by social media.
- Interview 7 (Appendix B-B7) was a conversation with a head of the company that provides sports data services to all kinds of mass media. This is not a big company, their business processes are very information intensive, but in general, they are quite strictly regulated in guidelines and handbooks, so there is not much room for learning, experiences sharing. The interview is useful for the current research by giving insights of the use of social media tools, their principles and peculiarities and their use for internal and external communication, community and reputation building.
- Interview 8 (Appendix B-B8) was done with a head of one of the business units in a big consulting company. This person in his job deals with a big organizational change project, which touches the whole organization; and a significant part of the project is devoted to facilitating knowledge sharing. The organization had a long history of knowledge management initiatives and IT systems use for this. Several years ago they implemented a wiki and now are in the process of introduction of all kinds of social tools, such as social networking functionality, microblogging, tagging and social bookmarking, and tools for collaborative content creation.

Thus, the interviews with the knowledge management professionals inside companies provided a background for detailed and thorough case description for analysis. The questions were devoted to the very details of organizational settings and peculiarities. So this set of interviews will be able to provide supportive situations and case studies for the theoretical or high level conclusions of the research. Besides, the interviewees were

always willing to reason about the situations in their organizations, compare them and make grounded conclusions on the challenging questions proposed to them.

4.4. Description of the Data Analysis Research Phase

The process of analysis of expert interviews is slightly different from the approach to case studies. In the initial analysis of the interviews attention is focused on thematic units that are passages or phrases with similar topics, which can be in different order in different interviews (Bogner, Littig, & Menz, 2009). After that when all the relevant units are identified and structured, analytical approach, similar to the one taken for the analysis of case studies (Yin, 2003), (Bogner, Littig, & Menz, 2009), will be used. In this chapter we present the description and a report on the initial processing of the interviews data, which are the recordings and notes made during the interviews.

The main important actions in the initial interview data processing are:

- Transcription – this is the prerequisite for the further analysis;
- Coding – establishing correspondence between terms and phrases in every interview transcript and the research question, main constructs or variables;
- Thematic comparison - grouping together the thematically comparable passages from different interviews;
- Theoretical generalization - arranging the categories according to their internal relations; when representing the result of research the empirically generalized findings are framed by the theoretically inspired perspective (Bogner, Littig, & Menz, 2009).

Transcription
In the data analysis phase recordings of the interviews were transcribed, the summaries of the transcripts were made and approved by the interviewees. Further thematic analysis was done with the help of qualitative analysis software (Atlas.ti). In total, 50 codes were created, which were linked to 196 paragraphs and statements (Quotes). As far as often statements referred to several concepts from the researched domain, or examples given can be used to support several arguments, Quotes were assigned to more than one code each.

Coding
A coding scheme was developed based on the proposed hypotheses and the arguments used to describe the working mechanisms of the hypotheses (Chapter 3). The results of the literature review and proposed theory were kept in mind. Table C.1 (Appendix C) presents the coding scheme used for the interviews analysis according to the hypotheses researched. Some codes are related to the axioms defined during the literature review and used for hypotheses, some codes reflect the most questionable statement and parts of the hypotheses, that is why codes with positive and negative meaning (with + or -) are created. All codes can be traced back to the arguments used in the explanations of the hypotheses in Chapters 3.1, 3.2 and 3.3, which are the marks like "A1.1" in the text and Figures 3.1, 3.2 and 3.3.

Besides the codes related to the hypotheses, it was reasonable for further analysis to create codes that reflect which Enterprise 2.0 tools were discussed, what barriers to knowledge sharing were mentioned by the experts, and what new insights, ideas and lessons from practice can be learnt from the interviews in order to be able not only to support or question the theoretical statements derived from literature, but also to improve the theory. Table 4.2 presents the code families of barriers to knowledge sharing and Enterprise 2.0 tools discussed, and additional findings gained.

Table 4.2 Coding scheme for supplementary code families.

Code Group	Codes and Explanations
Enterprise 2.0 Tools	- Social Networking - Wiki - Blog/ Microblogs - Tagging
Additional Insights	- Make knowledge sharing an official task - Business Need - Simplicity - Openness - SM create context - Proper Tooling - Learning to Learn - IT Combined with Organizational Change - Game-Fun feeling
Barriers to Knowledge Sharing	- Lack of Trust - Not a Core Task - Complexity of Task of Knowledge Codification - Loss of Competitive Advantage + - Loss of Competitive Advantage -

Thematic comparison and Theoretical generalization

As was explained above all codes correspond to hypotheses, and with the help of qualitative analysis software we have grouped the codes to families according to hypotheses or other groups. This allowed us to see how many quotes are related to certain hypotheses or to certain arguments. Besides, the relationships between codes were established. For instance, we say that Additional insights – Openness is associated with the construct of the Hypothesis 3- Organizational culture. The details of grouping of codes according to the researched hypotheses and other groups can be found in the Appendix C. Figures 4.1, 4.2 and 4.3 show the networks of concepts (codes) related to the Hypotheses 1, 2 and 3 correspondingly with the number of quotes for every concept in the interviews with consultants. In the figures the numbers in brackets (e.g. Social Networking {12-4}) show the number of quotes corresponding to this code (first number) and the number of relations to other codes (second number).

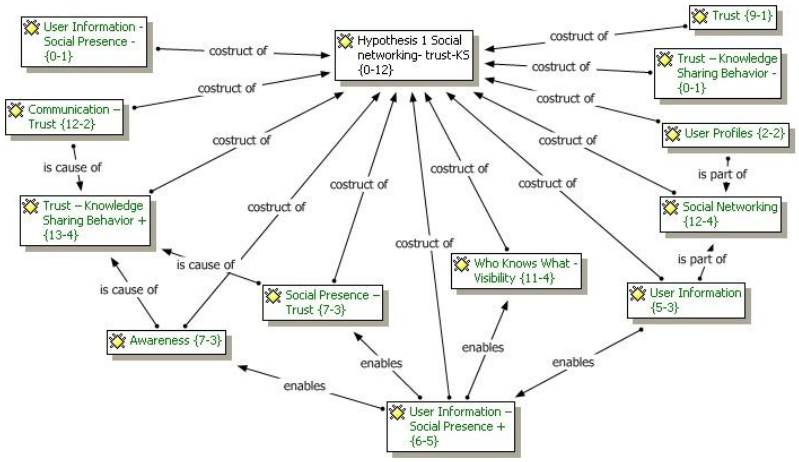

Figure 4.1 – View of the family of associated codes for Hypothesis 1(Set of the interviews with consultants).

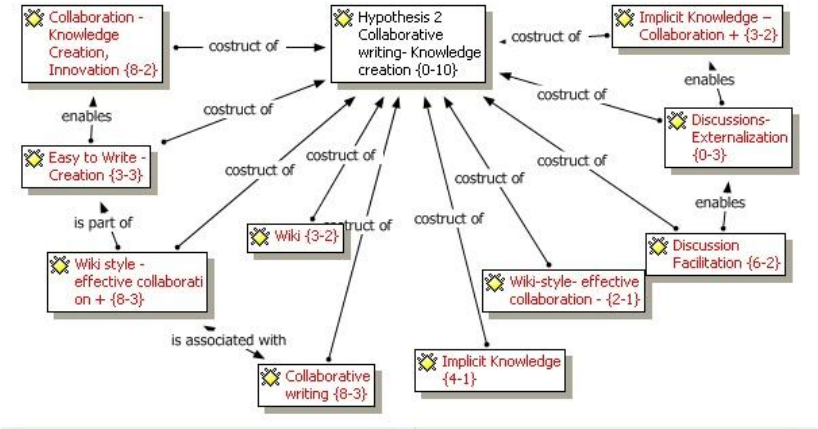

Figure 4.2 – View of the family of associated codes for Hypothesis 2 (Set of the interviews with consultants).

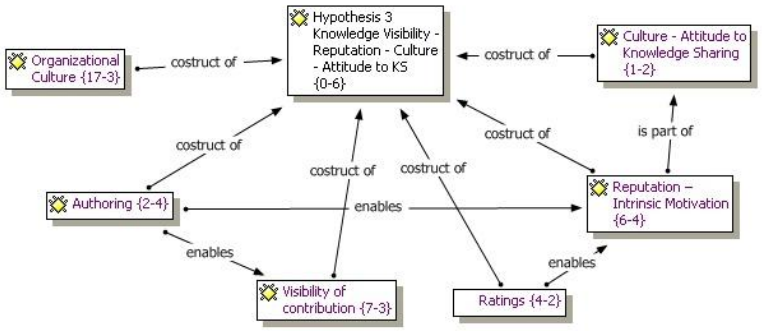

Figure 4.3 – View of the family of associated codes for Hypothesis 3 (Set of the interviews with consultants).

Figure 4.4 presents the network view of the group of codes that refer to the new ideas, findings and insights gained for experts. We can see that they are well-grounded (have enough supportive quotes) and several of them are linked with other and other codes, which is useful for the further analytical argumentation about the questions under research.

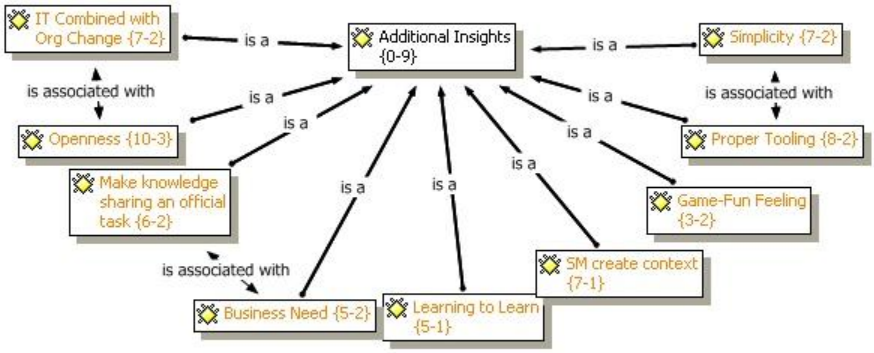

Figure 4.4 – Additional ideas and insights gained from the interviews – view of the family of codes (Set of the interviews with consultants).

The figures above present the results of grouping of codes for the set of interviews with consultants. Similar grouping for the set of interviews with representatives of companies can be found in Appendix D. The results of the qualitative analysis of the expert interviews data are summarized in the form of conceptually clustered matrix. A conceptually clustered matrix is a data display, which is ordered according to concepts or variables (Miles & Huberman, 1994). It has its rows and columns arranged in the way that shows how grounded the theoretical concepts are. We take the understanding of groundness from the process of transcripts analysis in the qualitative analysis software used. The more linked quotes a code has, the more grounded a concept represented by this code can be. That is why the conceptually clustered matrix has the codes (which reflect the main arguments and concepts used in theory - hypotheses) and the number of corresponding quotes in each interview. Table E.1 (Appendix E) represents the resulting conceptually clustered matrix. The cells of the table are filled with the numbers of quotes in every interview that correspond a certain code – concept from theory.

5. Argumentations and Conclusions Based on the Empirical Results

In this part the research hypotheses are discussed with respect to the empirical results; for every hypothesis arguments are provided, which allow prove or modify the statements about the role and influence of the Enterprise 2.0 technologies on knowledge sharing in teams and organizations. In the process of interviews analysis and hypotheses argumentation we see that it is not easy and even no more reasonable to distinguish between three separate mechanisms of the influence of Enterprise 2.0 tools on knowledge sharing, as was proposed in the theory development part (Chapter 3). In the following subchapters we discuss the research hypotheses about trust, organizational culture and collaboration in knowledge sharing separately, but with a lot of interlinks to each other.

The chapters 5.1, 5.2 and 5.3 are structured as follows. First, the arguments about the existence and importance of the barriers to knowledge sharing are given, such as lack of interpersonal trust, complexity of codifying knowledge and organizational culture as a major factor influencing sharing behavior. Second sub-chapters are devoted to the discussion on the implementation and use of different Enterprise 2.0 tools in organizations. And in third sub-chapters the analysis of influence of Enterprise 2.0 tools use on the barriers to knowledge sharing is presented, which provides the answers to the research hypotheses. Besides, the improved models of the influencing mechanism (which were proposed in Figures 3.1, 3.2, and 3.3 for every hypothesis respectively) are developed taking into account the findings from the interviews.

5.1. H1: The use of social networking tools has positive impact on knowledge sharing by increasing the level of trust among group members.

All the experts interviewed agreed that trust is an important factor in knowledge sharing. However, it can be seen from the interviews analysis that trust can be addressed from different perspective. On the one hand, interviewees discussed trust in interpersonal relations between colleagues, team members, etc; and on the other hand, trust can be understood as a factor in relations between employees and an organization. The latter aspect is related to organizational culture, to how open an organization is in its communications. This aspect was mentioned as an emerging change in organizations' corporate cultures and structures and is closer to the concepts of Hypotheses 3, so it will be discussed in more details in the paragraph 5.3.

5.1.1. Lack of interpersonal trust as a barrier to knowledge sharing

Lack of trust between colleagues, team members was mentioned quite often as a barrier to effective sharing of knowledge in organizations. Several examples of the situations when trust is critical for the decision to write down and share pieces of content were given by experts. Some refer to group dynamics and feeling confident in a group of other people to open up and to present your knowledge, which is not an absolute truth, but subjective experiences and opinions.

> "*To expose what you do in a really honest manner, to share what matters to you applies in the networks you trust, for example, one person is very dominant and you feel that if you say something, he will become angry, or you think that others are more confident than you.*" (Interview 2)

> "*It is scary to show what you know especially in the area which you are not very certain about.*" (Interview 3)

Another possible underlying cause of lack of trust is related to the feeling of safety, need to be able to predict reactions and behavior of other organizational members, to be sure that nobody will appropriate the knowledge or content shared.

> *"There should be the feeling of safety - to feel safe when saying that this is my knowledge and I shared it, and to be safe enough that another colleague reads it, and does not start laughing, expressing dominance. Then it does not make any sense. You always have to be sure that you have your back covered."* (Interview 5)

One of the examples to illustrate such a situation given in the Interview 5 referred to the experience of collaborating in Google Wave. This tool allows collaborators to see what others type in real time, which was mentioned as a reason for people to stop using this tool. The possibility of typing in real time requires from collaborators a very high level of mutual trust, understanding and respect. In teams that don't have a long history of working together these tools can be not appropriate, because it does not provide the opportunity to rethink or rewrite contributions. This is very different from what people used to have in e-mail, people tend to rethink and reread the emails they write before pressing the button "Send", even if it is an e-mail to a person they know well.

> "*Numerous times we had people stopping using Google Wave. When they are not quite sure what to add and start typing, then it was not what they thought and they had to rethink their contribution. And because everybody can watch typing in real time, people started commenting on the other people's contributions that were still in the thinking process, somebody responded "That is a very dump answer, why do you say this?"*(Interview 5)

This goes in line with the existing research findings which investigate the importance of psychological safety and confidence between employees and find that there is a link between these factors and knowledge sharing behavior (Siemsen, Roth, Balasubramanian, & Anand, 2008). Psychological safety is defined as "sense of being able to show and employ one's self without fear of negative consequences to self-image, status, or career". And the previous research suggests that knowledge sharing and learning initiatives are more likely to be successful in the organizational environment that is perceived to be safe. Another aspect of trust in for knowledge sharing is the feeling of confidence, which can be defined as "an employee's belief that his or her "undocumented," work-related knowledge is accurate and justified". These aspects are critical for the decision to share knowledge, because eventually the motivation to share is the employee's inner drive to do this, to transfer some particular, work-related knowledge to a coworker (Siemsen, Roth, Balasubramanian, & Anand, 2008).

The feeling of safety and trust is important not only for such new possibilities as real time typing. As far as in a considerable part of cases we deal with knowledge sharing via some IT medium, we often lack the context, which in real life communication is added by non-verbal level of communication, previous experiences or some settings in the environment.

One more aspect related to trust in organizations is the perception or attitude towards the future reuse of the shared documents, content, and experiences. There can be an attitude that if you share specialized information, others can misunderstand it or further use in a wrong way. So, there should be trust in the expertise of colleagues and their intentions.

> *"I am an IT governance expert and if I share a document about governance and someone else who is not a governance expert use it, then he will use it wrongly. It can be trust issue, because you do not*

trust the expertise of a colleague, but it can also be an attitude issue, sharing attitude: if I think that someone else is not going to use a document in a right way, then he knows that himself and then he will contact you." (Interview 8)

And the last, but still quite important aspect identified is trust of employees to their management. On the one hand, some employees can think that if they share something publicly inside an organization, they would be judged by their management according to the content they shared.

"You see people looking at it that way, but what is going to happen there and if I am open and transparent and my boss can read that, higher management can read that, does this have implications?" (Interview 4)

However, this should be a reciprocal process. As we have mentioned above and will discuss in the following subchapter, management should also be able to trust their employees, be sure that they don't share sensitive, ungrounded or critical commercial information (as was discussed in interviews 7 and 8). These considerations allow conclude that the use of social media in organizations may require from organizational members changes in the relationships between hierarchical levels (e.g. (Levy, 2009)), to more unstructured, based on trust, which is considered one of the difficulties in the process of Enterprise 2.0 tools adoption.

So, we see that trust as a factor influencing knowledge sharing can be seen from different perspectives: as a feeling of confidence in a team, as a feeling of safety in a group of organizational members, and as a perception of the expertise of colleagues and the right to reuse the shared knowledge.

5.1.2. Use of Social Networking tools

Organizations have realized the need to make their corporate knowledge, as well the knowledge of their employees visible and so useful. For this purposes traditionally some database-like tools are used, yellow pages of employees and their expertise areas are created. However, the interviewed experts expressed some possible difficulties of such an approach to work:

"Sometimes database can also work, but there is a huge danger that people fill in their profiles once and then they never get updated." (Interview 2)

Social networking tools when used in organizations can, actually, have either just similar function, i.e. to provide structured information about employees, or provide means for people to connect and communicate. Most Enterprise 2.0 tools used in companies have social networking functionalities – user profiles with the possibility to follow each other or add to networks, in blogs and microblogs the possibility to follow, as well as to see who is the author of a wiki article and track changes. In addition, all this functionalities can be aggregated in or supplemented by one enterprise system or environment, for instance MS SharePoint. This creates context and background for all semi-formal or unstructured communications and information exchange in organizations.

As we can conclude from the expert interviews, it is most critical for medium and large organizations to create organization-wide context for knowledge sharing and to bridge the gap between formal hierarchical communications and communications at informal events, coffee breaks, in chats, etc. In a case of a large engineering and consulting company there was a gap identified between the structured information processes occurring in organization-wide production systems, such as ERP, document management systems, etc, and the unstructured communication and information and knowledge exchange.

"If you look at the organizations from information perspective there are basically two types of information that is used in an organization: more structured information processes and more unstructured ones. Information management usually in most businesses has money and focus on the structured side of the organizational information - product data management systems, very structured and detailed decomposition of how our products are designed and in the end this information goes to the manufacturing side… On the other hand you have unstructured information and information processes and tools to support it. That is basically the rest - e-mail, file-shares, collaboration tools."

"But between e-mail, the document archive for documents and memos and the formal tools for structured processes there is a whole area in-between where the interaction is going on which is basically not supported. And social media, it fills those gaps, it helps people to share the information that does not fit in e-mail, does not really fit in a formal report management system. It is context to all the other information going around in e-mail, document management tools and supporting product data management and ERP tools." (Interview 4)

Thus, we see that it is important for big organizations to create context and facilitate with tools the unstructured information processes. In the unstructured communications there is a lot of knowledge exchange going on inside, as well as between organizations; and some organizations use this for their knowledge management strategy of personalization (Hansen, Nohria, & Tierney, 1999). And Enterprise 2.0 technologies are considered to support it by providing connections and communication opportunities in an informal manner.

Social networking tools are essential for connecting people and helping them stay in touch and communicate. Rettie (2003) in her research of communication channels found that the feeling and the need for connectedness is one of the most important factors influencing a choice of a means of communication. Moreover, Kuwabara et al. (2002) proposed the term "connectedness orientated communication" and define it as exchanges that allow people to be aware of each other and contribute to maintaining social relationships. The authors say that it can be observed in network communications, for example in text messaging.

The main difference and advantage of Web 2.0 tools for social networking is that they can considerably lower costs (such as time, efforts) of connecting and networking.

"I think the whole concept of networking has changed and now you can network with much larger number of people online and you don't have to invest in one to one contact. For instance, I met people in an online course, normally you would lose contacts, but through blogs, Twitter, LinkedIn I am still in touch with them and we can keep relationships. This is a big difference with face-to-face communication." (Interview 2)

"There is also a real life social network in the organization. And people refer to each other and find each other in that way as well. But one of the reasons that we have technology to support this is that we are a large world-wide organization." (Interview 4)

But technology support for connecting people and networking can be critical not only for large organizations. The situation in a medium-size engineering company, that does not use any particular supportive IT tools, illustrates that being able to connect to different people, and also across social networks, thus establishing weak ties, is important for success of the knowledge sharing initiatives. In the company there are several distinct real life social networks, which was caused by some historical reasons like projects done and waves of hiring people. So, the main distinct characteristic of the networks is the age of their members.

Communication between the networks is quite difficult, and the main problem is that not all networks have a need and want to communicate. The network with the oldest organizational members is quite self-sufficient, the middle-aged group has connections all over the organization and the network of the youngest employees has limited access to the expertise of the older colleagues, because they are not acquainted with them. When somebody needs advice, an older employee would know who to ask, directly or for a reference. For younger employees the case is more difficult, they always have to ask for a reference. But nobody can be always sure that they ask for advice a most knowledgeable person in the problem domain. After seeing this situation in the company the decision was made to support knowledge and expertise visibility and communication with knowledge maps.

> *"We made knowledge maps - knowledge areas and persons and put this in the system. I like it and I know that younger generation loves it, too. The older generation says they know everybody. But it is interesting to have this discussion between the older and the younger people, saying "You know everybody, but I can't get into your network" - "Then just call me". But then he (an expert in some field) starts complaining that he is constantly being questioned about trivial things. Then he realizes that it is interesting to write it down. Besides, I can always say that if you have a question about manufacturing engineering ask "Jan", because he knows everybody, who knows something about the question. But then Jan will start to complain for constantly being bothered by people with some questions. And then they agree on writing down who knows what."* (Interview 6)

Another interview provided the case of a big consulting company, which is active in their knowledge management initiatives and introduction of social media tools. For them social networking tools also provide information about the members' contributions on blogs, shared document storages, comments and the ratings of the contribution. This can influence the reputation and the social position of a person, as well as ratings can create the feeling of game and competition. These issues are related to the concepts of organizational culture and personal motivating factors and will be discussed in the upcoming chapters.

> *"All the activities are linked to authors and their profiles; I can see how many documents you uploaded, ratings for them, etc."* (Interview 8)

Thus, we can conclude that in organizations, that use social networking software tools, they have the goal to effectively connect people and groups of people, providing means of communication, filling in such a way the gap between formal and informal information processes in organizations, and making experts and knowledgeable people in different domains visible and easier to find and contact.

5.1.3. Building trust in organizations

We have discussed above how trust as a factor influencing knowledge sharing is understood by the professionals, the situations and purposes of the use of social networking software in organizations. This actually is comparable and gives some insight in addition to the axioms and explanations given in the chapter 3.1 devoted to the development of the hypothesis 1. In this chapter we analyze and present arguments which address the hypothesis itself and the most important and questionable parts of the mechanism illustrated on the Figure 3.1 and marked by A1.3, A1.4, A1.7, A1.8 and A1.9.

From the theoretical study we have learnt that establishing trustful interpersonal relationships between organizational members has positive effect on their attitude towards and leads to sharing knowledge and learning in organizations. We were interested in the process of establishing trustful relationships and found out that mutual experiences (A1.8), awareness and social presence (A1.4), which means having clear context

and information about people you communicate and share with, are important for building trust in organizations. We have also found in theoretical research and logically supported the statements that social networking tools give context, communications opportunities and information about users, which leads to social presence and mutual communication experiences (A1.3, A1.7).

From the empirical research phase we gained the evidences to support the proposed mechanism, as well as some additional factors influencing trust, that are enabled by the use of social networking tools usage. From the interview analysis we see that social networking tools use in organizations create the following effects:

- creates awareness among employees about the work of their colleagues and about the processes in an organization;
- creates social presence and context for communication;
- enables informal communication, enables networking and connections between people;
- makes personal and corporate knowledge more visible and accessible, which is especially important in regard to implicit and experiential knowledge.

Social presence in the computer-mediated groups is important for establishing trustful relationships, which means having some information about a person you communicate with, collaborate, share experiences, and rely on in fulfilling tasks. Such information can be a profile picture, people you know in common and are friends or colleagues with, previous projects done, as well as defined by a person himself specialties, interests and hobbies. However, it can be a problem for people to reveal such information about themselves publicly in companies. On the one hand, this is related to the issues of privacy, which is becoming a burning topic in the open environment of internet, but also in intranets. Some people just do not tend to open by nature; others are consciously concerned about their privacy.

> *If there are trust issues or privacy issues for people, I can use an example from their private lives. When you are going to be taken to a hospital and you need help in your house, you ask the people you trust for help. I ask: "How do you know who to trust?" – The answer is: "Well, I have known them for a while" – "How do you know that?" – "I see them." So I say: "If you show your face online you get more people you can trust and then you get safer, too." I tell everybody that online is the same as in real life, it is just bigger. And it works."* (Interview 3)

On the other hand, experts noticed a "cultural shift" occurring in companies towards more open and transparent relations. This is happening not only in virtual worlds but in real life too. It is possible to say that the interaction of virtual and real life creates a virtuous circle that leads to a more open organizational culture and trustful relationships between people. This is how the information and knowledge management professional from a major production and service company describes the processes happening in their company.

> *"Social media has to do with mentality, basically when you move into social media and use it personally within or outside an organization, you also say that you have certain expertise, but you don't know everything and you also have a lot of questions, you still learn. You give other people an opportunity to answer and to ask their questions. It is some kind of a knowledge sharing eco-system that emergently comes up. Other systems can't do this: e-mail is a closed system, product data management systems and ERP systems are basically too heavy to support true knowledge sharing. We are pretty social and open organization; it is not a problem at all for you to go to a colleague and*

ask to talk and for help on a certain topic. There is hardly any colleague who will say No." (Interview 4)

But from the interviews we see that in spite the fact that social media can help provide social presence to the working environment and interactions, it is not the same as "looking somebody into the eyes". We are human beings and mostly rely on the feelings, intuition, subconscious processes, physical appeal, when it comes to trusting people. No any mediator can transfer this, and even long communication history can't build such strong links as real life experiences.

"I don't meet many of those people I work with online, a couple of them I saw for the first time years after I worked with them. The way of interacting changed dramatically after I met them - I felt safer, I knew their opinions more than with only conference calls, WebEx sessions, and sharing documents. I had context, more than a profile or a resume, I looked someone in the eyes and I had my opinion based on impression, based on a story. Those were the things blocking me from being open to them in collaborative environments." (Interview 5)

"It is really important to reconnect face-to-face, but because people are just living in other countries or working on other projects, it doesn't mean that I don't want to talk to them or share knowledge with them. I ask many people for advice and they ask me for advice." (Interview 1)

Another effect of Enterprise 2.0 tools use and social networking in particular is ***awareness*** about the corporate knowledge, colleagues' works and different aspects of company life. From the interviews with experts we see that awareness can be brought to organizational life with a number of different tools – corporate and personal employees' blogs, updating about the important events and findings, different content aggregators, wikis, tagging, tag clouds and social bookmarks, where everybody can see the most read or commented articles, microblogs, which explicitly indicate the most trendy topics when everybody posts what they are thinking, doing or working on. So we see that awareness increase can be attributed not only to social networking tools, but to different social media and traditional enterprise systems, and their combination with real life activities. This to some extend contradicts the arguments in the theoretical explanation of the Hypothesis 1, which considered that social networking functionality of Enterprise 2.0 tools was essential to creating awareness, social presence and so trust.

The Enterprise 2.0 tool that was most times mentioned and discussed in the interviews in regard to facilitating awareness and trust is microblogging. There have been several different opinions proposed and each of them touches different aspect of the usage of the tool and facilitating awareness. Even though messages in microblogs are limited in length, the ease and little time needed to post – thus, low entry and adoption barrier - make the tool gain popularity in organizations.

Some interviewees say that microblogging can do more or less the same as "looking somebody into the eyes". This emphasizes the difference between microblogging and more formal forums, discussion boards or collaborative environments, because in a microblog a person can share not only professionally relevant things, but also any thoughts on different topics, share links, post some personal updates. All this can create a feeling that you know a person quite well, if you follow him or her in a microblog.

"In microblogs the context is there that is missing in other environments. That is the value of microblogging to support the personal side of things, make people feel confident, make people feel safe, because they think they know each other, because they share more personal information. Especially if you look at multinational companies, when you work together with somebody you don't meet, only call or e-mail, you never really

know the person, but if you see him tweeting about buying a puppy today, then you are connecting. The coffee room breaks online." (Interview 5)

In one of the examples given by a consultant from her professional experience the implementation of Enterprise 2.0 tools in some division of Belgium government was described. In the case wiki and blogs were introduced to facilitate collaboration, and at the same time microblogging functionality (via Yammer) was added to stimulate their adoption. The surprising thing was that people started to use microblogging immediately, without any support or motivation. The main reason for this, as also emphasized not once by other experts, can be the presence of the real life organizational need for such a tool that helps people stay in touch.

> *"Exchanging on the daily basis of what you are doing can build trust. In a team in some time, if you exchange short messages about what you are doing, you will get to know people, and it is definitely will build trust. … There are people in the department who are often on conferences and events, and they yammer a lot. Usually they didn't have a clue what others were doing. Through Yammer exchange they got much better understanding of what their colleagues are doing. So I think if people are open to sharing and can process a lot of information, it helps to avoid communication problems. If you are aware of what others are doing and the way they are doing this, then there are no problems that you forget about colleagues, you forget to inform them and collaboration improves."* (Interview 2)

As we see from the quotes above availability of some personal information and regular communication are really the factors that positively influence trust and further collaboration. But there are some more effects provided by social networking functionalities, such as connecting people, *making communication easier, and making personal knowledge ("who knows what") visible.* Those things may seem quite obvious, and were not explained in detail, only implicitly throughout the theoretical part and in relation to all three hypotheses. Nevertheless they are indispensable for building trust and sharing culture, and were many times accented during the interviews and some illustrative examples were given.

One of the practitioners from major production and service providing printing company (in Interview 4) expressed a thought that social media in their company help people to connect to each other on an expert level. They use a microblog, blogs, which everybody in the organization can follow and read. In this way the organization makes the expertise of its employees explicit; people ask and answer questions, so connecting and sharing knowledge with each other. However, tools themselves are just tools. Without human facilitation and interaction with offline world they have much less value. What is done in this organization is information and knowledge management professional (the interviewee) takes the role of a connector and, also with the help of social tools, refers people who have questions or help in some knowledge domain to those people who are most likely to possess the knowledge.

> *"In the social media area people are very willing to refer to each other and this is a very important part of knowledge management. Basically, helping people find each other, even when it is hidden, even when the person who is an expert does not have a blog, twitter account, whatever, he is still a knowledgeable person, because I know him as a knowledgeable person."* (Interview 4)

> *"We want people to find relevant knowledge fast and find relevant expertise fast. Basically, we were providing tools that enable them to do that. So, we had a wiki, file shares and Groove, but not blogging or other systems. Now we are rolling out a new system."* (Interview 8)

Hence, we can conclude that the general idea of the hypothesis 1 is supported by the empirical study, interviews with experts. As far as this is an exploratory study, we paid a lot of attention to the possible new explanations and relations between constructs. From the above interviews results summarization it is possible to say that Enterprise 2.0 tools and social networking functionality contribute considerably to the establishing of trustful relationships in organizations by providing communications opportunities, context and social presence. As was described by one of the interviewees the experience in communicating online can build trust.

> *In some networks I've been communicating with people and I've never seen them. Based on their behavior on-line for a certain period of time I started trust people. I think, it takes more time, than in real life, but yes, I trust a lot of people I've never seen, because they demonstrated in their way of communicating that they are interested; they help me, I help them and they appreciate it. These tools can support trust.* (Interview 1)

> *"Also [LinkedIn, Google Wave, microblogs, SharePoint] are all pending towards knowledge sharing, discussion facilitation. All areas are blending and if you look at this eco-system there are a couple of things that are important to address the question of trust, credibility and who is who (the LinkedIn kind of profile), and feeling safe within those people you know in real life or only online."* (Interview 5)

In addition to the arguments already found in literature review, some complemetary explanations of how trust is built appeared. The importance of creating work awareness, of connecting people around their work and professional knowledge, which allows making knowledge visible, was emphasized. There is no way to have trustful relations, if any, if you don't connect with others or if you don't know what your colleagues are working on or thinking about. Fugure 4.3 shows how the findings from the expert interviews change the theoretical model of the mechanism of the process of building trust in the situation of using social networking tools in teams or organizations. We see that the awareness about colleagues and their work is the result of the established social presence online, the ability to know "who knows what" and mutual communication and collaboration experiences. In the existing research the concept "awareness" is referred to as an understanding of the activities of others, which provides a context for your own activity (Dourish & Bly, 1992). Besides, social networking tools create a sense of connectedness or feeling of being in touch, which also influences awareness. Connecting by awareness may be as important for building trust as the content of the communication.

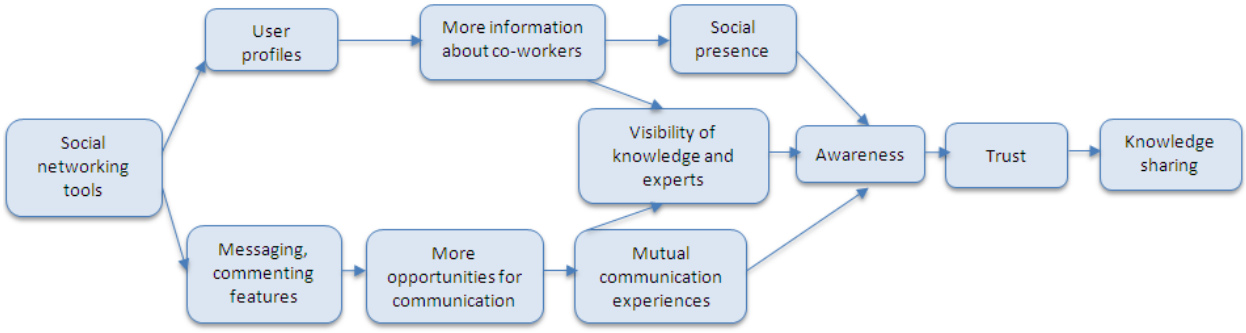

Figure 5.1 - Mechanism of the impact of Social networking tools on knowledge sharing improved base on the empirical study results.

What else has become obvious after the thorough analysis of the first hypothesis is that everything is interconncted. It is not easy, or not possible at all, to distinguish separate mechanisms of the influence of particular tools, or one particular social media principle on the barriers to knowledge sharing. Trust and privacy issues may be seen as part of organizational culture, while awareness about colleagues' work is important for effective collaborin ation, etc. That is why we consider it reasonable to present this new aspects in one resulting theoretical model together in Chapter 6.

5.2. H2: Enterprise 2.0 implementation has positive effect on the ease of knowledge sharing and creation process.

This chapter is devoted to the discussion of the hypotheses 2 about the collaborative Enterprise 2.0 tools and how they can facilitate collaboration and knowledge creation processes in organizations. Here we follow similar structure as was presented in the previous chapter. First we describe how the experts reflect on the central to this hypothesis barrier of the complexity or high personal costs of contributing knowledge, then the use of the collaborative tools is discussed, and finally, the arguments and general conclusions about the hypothesis and its mechanism are presented according to the insights gained from the interviews.

5.2.1. Complexity of contributing knowledge as a barrier to knowledge sharing

In the empirical research phase we have encountered quite a number of supporting arguments and examples of the complexity of codifying or making explicit knowledge as a barrier to knowledge sharing. In the theoretical part we concluded that this barrier and the difficulty of making implicit experiential knowledge can prevent professionals from contributing it to structured electronic knowledge repositories (A2.7). In addition, this is a task that requires devoting time to it, which is usually a scarce and valuable resource for people (A2.3). As was noted in one of the interviews, the main problem in making people share their thoughts and knowledge is not their unwillingness, but the difficulty of how to do this.

> *"People do want to share knowledge, but they have difficulties in how to do it. They will say:"Well, if I explain what a solution is, then people don't understand what I mean". So, the problem is not about the willingness, it is about knowing how to - an expert is not a teacher. Many experts are not really thinking about what they know, they just do their job."* (Interview 1)

So it is possible to look at the problem from two perspectives. First, it can be really not easy to express, to externalize (in terms of SECI model) knowledge gained from experience, based on feelings and intuitions. This situation is most often observed in consulting or not technology oriented industries or departments, where an organization's main asset is the knowledge of its employees, their experiences, know-how's, etc. Second aspect of this barrier is the time and efforts needed to write down some piece of content so that it can be shared with others, be clearly understood, and so be valuable. Here again the interviewees noted that people want to share knowledge, but they are always busy with their primary tasks, they have deadlines and projects to be done. That is why writing an article or making a presentation about, for example, lessons learnt from some projects will always have lower priority, than starting a new task or meeting a deadline. In the end, it is always about the whole unit or company producing its product and being profitable.

The situation in an engineering company, from which one of the knowledge management professionals was interviewed, can illustrate this problem quite well. The company's top management is aware of the need to devote time and resources to knowledge management and there are a number of initiatives started in this direction. After every project the "lessons learnt" are captured, knowledge maps and the base of different

materials are created, as well as a lot of work is done for changing the attitude of employees towards sharing, asking questions, helping each other. However, the main obstacle for the success of the initiatives is that the activities devoted to knowledge management usually have a lower priority than all other daily tasks for middle managers, and so they can't assign time for these activities. That is why among engineers and other employees sharing experiences, helping, etc. does not work well, in spite of the fact that they see the importance and value of this.

> *"Middle management gets the targets, they have to make sure that a project is done in time with correct deliverables; they get the budget for this. So they need somehow to make these investments to knowledge sharing. That is one of the biggest barriers at the moment. That is what they say - time and money, "what's in it for me" are the obstacles."* (Interview 6)

The solution for such a situation, as seen by all the experts interviewed, is the participation and support of the high levels of management in knowledge management projects and assigning certain time, creating official tasks for every employee, so that there is no feeling that when you write some piece of content to share, to contribute to a repository, you waste your time that should be spent on primary projects. But this solution is related to the organizational side of knowledge management and is not entirely in the scope of the current research. What we are interested in here is whether the collaborative opportunities provided by the Enterprise 2.0 tools can help in communicating implicit knowledge and reduce the time and efforts needed for knowledge codification - the costs of sharing, and how they can do this.

5.2.2. Use of collaborative tools

Based on the empirical study we are able to say that a number of social media tools are used for collaboration in organizations, as well as across organizational boundaries in professional communities, mutual projects, etc. The specific Enterprise 2.0 tools mentioned in the context of collaboration were quite diverse, from already traditional wikis, to discussions in blogs and microblogs, collaborative tagging, creating content collaboratively in such tools as Google Wave or MS Word 2010.

Different reasons for the need to collaborate were discussed by the experts. Collaboration across companies is today indispensible for innovation and successful functioning. As was coined by one of the interviewees in an example of a food company, which wanted to create a new product and at the same time to keep the trade secret, it is not possible to lock a team of fifteen people to work together for many years and still expect them to invent a new type of yogurt. Another expert explained why his big consulting company needs to collaborate.

> *"When you innovate, you can do this by yourself. But most smart people do not work within your organization. A lot of people at universities or other companies are also very smart. So we want to attach ourselves to that knowledge. Therefore we are actively pursuing and building partnerships with other organizations. And also we are trying to innovate together with our customers, because they are the people who are actually having the real world problems that we, as consultants, are trying to solve. So, that is basically trying to bring together the wisdom of the crowds, things like co-creation."* (Interview 8)

Sure, such types of collaboration and innovation require mostly activities on organizational and management level, as well as personal interaction. Software tools can help in coordination of common activities and support the lower levels of collaboration, for example, writing an article together. The use of wikis and other technologies for collaborative writing (e.g. Google Docs) is spread in communities of professionals, of people

united by common goal or interests. The situation can be a bit different in a closed corporate environment, because people are used to having meetings to discuss their work, and they feel no need to change this or to learn to use new tools. And it is quite understandable as there may be no real need to look for new means and medium when the people you collaborate with are always in the room next to yours.

> *"In our company we work in a global environment, we tend to use a lot of collaborative facilities that are free and open. In the corporate environment what we see is that collaborative settings are different, for example, a team has to write a project plan, and they tend to use services like WebEx, the sharing functionality. And they try to virtualize meetings basically."* (Interview 5)

And when there is a need to do a piece of work together, to collaborate, software tools are not just making it easier, their usage becomes inevitable.

> *"We use wikis, Google Docs, etc., because otherwise collaboration does not happen. If I make a presentation and send it via e-mail it ends up in a pile of hundred other e-mails that need attention. And if you globally arrange a timeslot call or Skype each other and collaboratively work on a document, then you're much more effective."* (Interview 5)

> *A week before I reviewed a document in SharePoint 2010, and I just reviewed it in the document and my colleague could see that I was editing it and he could see in real time what changes I was making. So you can really work together on the same document, it is so much faster, it works really well , it makes work more efficient and you really can work together on one document.* (Interview 8)

The most popular collaborative Enterprise 2.0 tool lately was wiki. Companies have implemented it for different purposes – knowledge structured storage, content co-creation, facilitation of innovation, etc. As was described by one of the interviewees from a big consulting company, in their organization wiki was introduced a couple of years ago with an intent to create and share knowledge. Now it is considered to be a starting point for the new organizational philosophy and focus on knowledge sharing and expertise building in an open manner, facilitating employees in collaboration and personal learning, and collaborating with other organizations and customers. In the company, similar to other organizations as we know from the expert interviews and literature review, wiki was a success for one group of people, who use the tool often and effectively, and was not suitable for other employees. One of the explicit reasons for some people not to use wikis is that the software itself is not that easy and user-friendly, as it may seem at first. The underlying concept of a wiki "I start with a document and then you add a little part" works well for collaboration, but the process of adding a contribution or editing (in some wiki software it requires some skills in HTML) is not intuitive for everybody.

> *"Collaborative writing and wikis support getting more people to write, even if they are dispersed, because it supports reacting to the things that other people wrote down. You even can send to some people an invitation "Please, reply to my contribution". May be then they will. If there is no wiki technology, those people do not write and you would like them to write down, then wiki makes a difference in 5% in getting them to write down. And there are still 95% of other things that you have to solve. So, it's not a magic tool, and it is a big problem in organizations at the moment."* (Interview 1)

5.2.3. Facilitating collaboration in organizations

Above in this chapter we have addressed the barrier of the complexity of knowledge codification and the peculiarities of the use of collaborative software. In this part we discuss the insights gained from the empirical research and present the arguments related to the hypothesis 2. Through the text there are marks in brackets (e.g. "A2.1") which connect the argumentation here to the parts of the hypotheses as presented in the theoretical part (Chapter 3.2).

During the interviews with experts in the questions about collaboration, co-creation and technologies used for this the main attention was devoted to the statements proposed in the theory: collaborative Enterprise 2.0 technologies can reduce time and efforts needed for content creation and writing down knowledge (A2.1, A2.2, A2.3); and Enterprise 2.0 technologies use can make it easier to express and transfer implicit knowledge (A2.5, A2.6, A2.7). These statements have gained both supportive arguments and alternative or specifying explanations.

In addition, some complementary perspectives and points have been arisen at the interviews. They touch some aspects of collaboration and knowledge creation in organizations in general, and this related the discussion of this hypothesis to the next hypothesis 3 about organizational cultural settings. The findings also reveal some new aspects of the process of collaboration in teams and across teams and the use of Enterprise 2.0 tools for this. So the main findings of the expert interview analysis are summarized in the following list and explained in details further in this chapter:

- In the collaborative content and knowledge creation people can take different roles and fulfill different parts of tasks;
- The success of the collaborative process is to some extent dependent on the number of collaborators;
- There should be a real life need for people to use some means to collaborate;
- Enterprise 2.0 tools still are not suitable for everybody, in spite of the fact that in general they are regarded as being easy to use;
- Collaborative tools that create discussions and awareness are good at enabling innovation;
- Different Enterprise 2.0 tools to some extent can be a means of expressing and transferring implicit knowledge.

In the theoretical part we defined that collaborative content writing, writing in a "wiki-way", i.e. with small contributions from many different people can make the creation process less time- and effort-consuming for every individual. From the empirical study we see that collaborative writing can be more effective not only because collaborators write many little pieces, but because they write a part or do the task they are good at. So people may take *different roles during the collaboration process*.

> *"Some people are good at starting a story, others are good at finishing, some are good at fact checking, others are good at checking grammar or checking the structure of the story."* (Interview 3)

Besides, some people are good at generating content, but can be not comfortable with technology. The situation observed by one of the interviewees in the company where he takes the role of information and knowledge manager, illustrates this. One person writes an article and another person can help in putting it online, on a wiki, for instance, thus collaborating and dividing the tasks. And later yet somebody else can read and check grammar in the article, so that it becomes a "perfect piece of text".

Experts agree that writing in such a manner can help to create better texts or make the process more efficient. But people still have to write, to devote some time and efforts for this, to be willing to structure their thoughts and put them on paper. No tool can solve the problem if a person just does not like writing or is not willing to express their thought.

However, as was mentioned in one of the interviews (Interview 1), when somebody starts writing, it is much easier to respond or to add, than to have a blank page in front and start from the very beginning. In organizations the process of engagement into collaboration was describes as follows:

> *"If you look at the process, there is always a relatively small group of people, who just want to write down the things they are keen on doing. Then there is a group of people who might want to write something down, but they always doubt if it is right or wrong, or maybe they think they will look stupid if they write something down. So they tend to wait to see somebody else writing down, then they respond. And this first group pulls in the second group, they get them working. Then the third group, a big group in organizations, after a year or two may get interested, too, because something is happening and they are not part of it. And they would like to become part of it, because it starts to be the new way of working."* (Interview 1)

Collaborative writing can be useful and make more people contribute their knowledge. But during the interviews another factor was mentions not once – *collaboration can be effective with a certain number of people*. This is the aspect that is different for open Internet environment and closed corporate intranets. While for Wikipedia the principles of wisdom of crowds and collective intelligence work perfectly, organizations don't have such an amount of people to benefit from these effects. And they don't need to, because collaborative activity there usually has a concrete goal, a deadline and a certain group of people to whom the task is assigned. And for example, if a group of twenty people has to collaborate writing some text, it is unlikely to be effective, because the process would be difficult to moderate, to arrange a timeslot suitable for everyone, and a lot of other normal project management challenges would apply. But as was noted in the interviews, collaboration with several people usually results in deliverables of better quality and in shorter term.

> *In one-to-one or one-to-three kind of setting, a collaborative way is much more effective, because in one hour you'll have much more result then when a person works for half hour, sends the document to two others, then they read it, then they don't have context and cannot ask questions. So based on assumptions they give feedback, the feedback is half of time correct and half is based on wrong assumptions. So it is a long process. Real time and distributed in time collaborative working is effective.* (Interview 5)

In addition, some of the experts looked at the collaborative process from a different angle and expressed an opinion that for a piece of text, an article, chapter, book, etc., to have value and quality in the end there has to be one author and his wisdom added. During the process many people can work together collecting and checking facts, bookmarking, expressing ideas in shared collaborative environments (e.g. Google Docs or a wiki), and the result of this process is factual information, structured, checkable and reliable. But it is very difficult or even impossible with a lot of people to make a story that has a purpose and is unified under one idea. So, one or two persons then make a complete story, to be put on a blog or to become an article, etc.; they add their personal opinions, visions and wisdom, and the text has their signature. Further discussions and responses take place in comments, but not in the text any more. Thus, we see that in organizational settings

the principle of wisdom of crowds is not fully applicable, because collaboration is more effective in relatively small groups, in which collaborators take different roles (Interview 3).

Even though collaborative tools can optimize the process of writing and knowledge co-creation, and make it possible for more than one person to work on one piece, it requires from people some change in the usual ways of working, of organizational cultures. For people to start using some tools and means to collaborate there *should be a real life organizational need* to do so. There is no much use from a wiki in a small company, in which all employees are in one building, anybody can always ask colleagues for help, and collaboration takes place in meeting rooms. While in dispersed teams and communities, there are no other opportunities for collaboration, but with the help of social technologies.

In an example given by one of the consultants during the interview, in healthcare sector in the Netherlands a certain institution provides training, networking, communication, and collaboration opportunities for quality managers. To facilitate those specialists collaborate on the content online was not a goal of the institution. But people had a need, they started writing protocols together, do the critical part of their job at the time even without any particular tools at their hands, just using shared Word documents (Interview 3). Another situation was observed in a big production company (Interview 4) there was a need to manage project information and it was suggested to use a wiki for this. After some time they saw that the tool did not fit for managing project information. But people have learnt about the value and peculiarities of wikis and realized that another type of information – process information can be shared and stored in there.

> *"At a certain point I said "We are going to use wiki, but we are only going to use it for process information, the information about what processes look like, how they are described and working methods". More encyclopedia kind of information is being shared in the wiki. I don't say that you can't use it for other types of information, if you want to, you can, but I just say that wiki is best for this type of information. We do this overtime, we learn how blogs and microblogs, etc. are being used and then at a certain point we'll say that microblogging can be used in that way for the best sharing of a particular type of information, and e-mail is best used to share another type of information."* (Interview 4)

So, if there is an objective necessity in collaboration or in using a tool, it will be adopted and will add efficiency to the process. However, the idea of proposing the *technologies as easy to use*, as intuitive and friendly as possible was one of the central in all interviews. People are different in their skills in technologies usage, young generation is native with computers and don't really see the difference between discussing and writing an article together in one room or doing it from different places in a shared document, for example. Older generation would prefer not to use technological medium, if it is possible to avoid this.

> *"Collaboration requires certain skills also from people to be able to cope with it. I am not sure that everybody can still learn it. The new generation will not have any problems with it, because they simply grow-up with it. I am not saying that it is not for people of 55 or 60, because I see and use social media a lot myself and I know a lot of people who are very enthusiastic about it. But I see that there are some people who may not really get enthusiastic about e.g. Yammer, who would feel like it is information overload. I am not sure if everybody can cope with it and can change."* (Interview 2)

Thus, it is possible to see that for collaboration to be successful there should be two main conditions in place. On the one hand, people have to write, to know what to contribute, and this is true no matter if you write an article, a wiki page or just a comment to a blog post; on the other hand, to contribute some piece of content you use some software tools, e.g. wiki, blog, and it should not be difficult to work with it, so some skills are required.

> *"If you look at blog platforms, their text editor function is very simple. These new technologies are really down-to-earth, they are very simple, basic. It is just that you make a heading and a title and then you start writing. So if you know how to write something, if you know what to write, it is a very easy way to put something to the intranet or to internet."* (Interview 1)

Most interesting for the current research is what additional value these tools bring to collaboration and knowledge sharing process and how they do this. From the literature review research phase we have learnt that Enterprise 2.0 tools improve the development of *innovative ideas* and improve explicating and transferring implicit knowledge. However, in the empirical research we have not gained significant evidences for these statements. The main reason for this may be that the conclusions about the social media influence on innovation and implicit knowledge externalization may seem quite abstract and require long analytical chains to come to, which is natural for the scientific area, but may not be interesting for practical field.

What we have observed during the interviews is that experts describe a lot of situations when social collaborative tools make connections, communication, and idea generation faster and more productive. Also it was mentioned that social media is changing the view on innovation. Understanding of the process of innovating migrates from forcing internal R&D department and trying to keep commercial secrets to the way to do innovation by learning from experiences in other areas of expertise, collaborating in communities of practice, with other organizations and customers.

> *"Yes, we have our own group of consultants around social media. We have set up a Yammer group and quickly discovered that we were invited by the same clients, we help each other when we have certain client questions. So we can easily pool different ideas and resources together. And it makes you think also. Without the tool we would not have as much inspiration and new ideas as with the tool."* (Interview 2)

Besides, setting a proper organizational culture is important for facilitating innovation in organizations. Recently this has started to mean working in a networked way, across department boundaries. For the culture of continuous innovation it is considered to be necessary to stimulate and to market learning and knowledge sharing inside a company, to create a tension for workers to invest time and efforts in sharing knowledge (Interview 2). However, the examples given just described the usage of Enterprise 2.0 tools for knowledge capturing, sharing and learning, and sometimes some indications were presented that this makes collaboration and learning more effective and productive.

> *One of the reasons that we have technology is that we are a large world-wide organization. Flying around the world is expensive and you can't do that every day. We also need technology mediated interaction. For instance, we have a microblogging platform, in Yammer everybody can collaborate with everybody. And what you see is that there are all kinds of interesting collaboration over certain company parts, locations, but also all over the world. People from USA, from Australia, Vietnam are joining and helping each other, solving problems, finding answers, and speeding up, improving productivity in that way.* (Interview 4)

Another supposition from the theory was that Enterprise 2.0 technologies when used create an environment for colleagues in organizations *to share implicit knowledge (A2.5, A2.6)*. Theoretical research states that social media has potential to help explicating and transferring experiential knowledge. However, no explanations how this can be achieved are given. During the empirical phase of the research in the interviews with experts not much attention was paid to this question. Interviewees discussed the problem of sharing implicit knowledge in regard to different situation and use of tools. In Interview 1 it was mentioned that the

main problem of sharing implicit knowledge is that experts, experienced professionals don't think about what they know, they do their jobs. When it comes to sharing knowledge, it could be difficult to define most important experiences, or it may not be always appropriate to go into very deep details. But being asked about some aspects in particular or participating in a discussion, experts can come up with relevant examples and detailed explanations.

In the Interview 6 the problem with sharing non-explicit knowledge in a technical engineering company was described. There are different kinds of documentation describing the designs of products, but there is no attention or any mechanism for capturing the design decisions logic and rationale, which can be considered to be different for every individual or situation, and really not explicit. And in the company it was found that having such information about the decision making process, can considerably decrease time for developing new similar designs and facilitate reuse of knowledge about designs and parts of designs. The company does not have a final solution to this situation.

From other interviews we see that the illustration of the use of social media tools can bring some elements of transferring implicit knowledge into daily routine. Blogs and microblogs were mentioned in this context as tools that facilitate discussions and asking questions, and so encourage people to give examples, to reason and to go into details. Besides, tagging was labeled by some interviewees to be able to transfer some underlying logic. When people tag some piece of content, by doing this they say that they find the piece of information important. The effect is similar to highlighting key ideas in a book with a marker (from Interview 1). Another effect of tagging is making the organization or industry specific terminology explicit. One of the interviewees has shared such an example from her professional experience.

> *During one of the government projects I was searching for some information about a particular topic on agriculture. I was looking in their database of scientific studies. And there was no any documents for the keyword I searched for. The people who are in scientific area don't use the same lexicon as people who are in the government. And probably they don't use the same words as farmers. But people write about the topic in their blog post and their wiki, use tags in del.isio.us. … And a tool (guus.net) is aggregating them, and there is a tag cloud generated automatically around information and around people. So everybody learns which words are used to identify a certain kind of information and that makes the discovery of the ways it is understood by people really clear and useful.* (Interview 3)

Hence, from the discussion of the interview results we can conclude the Enterprise 2.0 tools are used for collaboration on content more and more and they start to be a precondition for collaboration to happen. We have defined some differences in the collaborative process in organizations and in open internet environment, such as collaboration coordination, number of collaborators and roles taken in the collaborative process in companies. Some insights were gained in relation to the mechanism proposed in the research Hypothesis 2: empirical study fully support the theoretical arguments (A2.1, A2.2, A2.3), which say that Enterprise 2.0 tools make collaborative content creation less time- and effort consuming by providing opportunities to co-author texts, and other types of content. The second part of the theoretical argumentation about facilitating sharing implicit knowledge (A2.5, A2.6, A2.7) has not gained considerable proof and evidence for us to be possible to accept it. But we saw that the features of Enterprise 2.0 collaborative tools, such as comments, replies to status updates, posts, etc. can encourage discussions. The real time collaborative writing tools (Google Docs and others), that are constantly gaining popularity reduce the time for editing and content discussions (that usually took place in e-mail conversations). The insights discussed above are reflected in the

improvement of the theoretical model of the mechanism of influence of collaborative tools usage on collaborative knowledge creations and codification. The improved model is presented on the Figure 5.2.

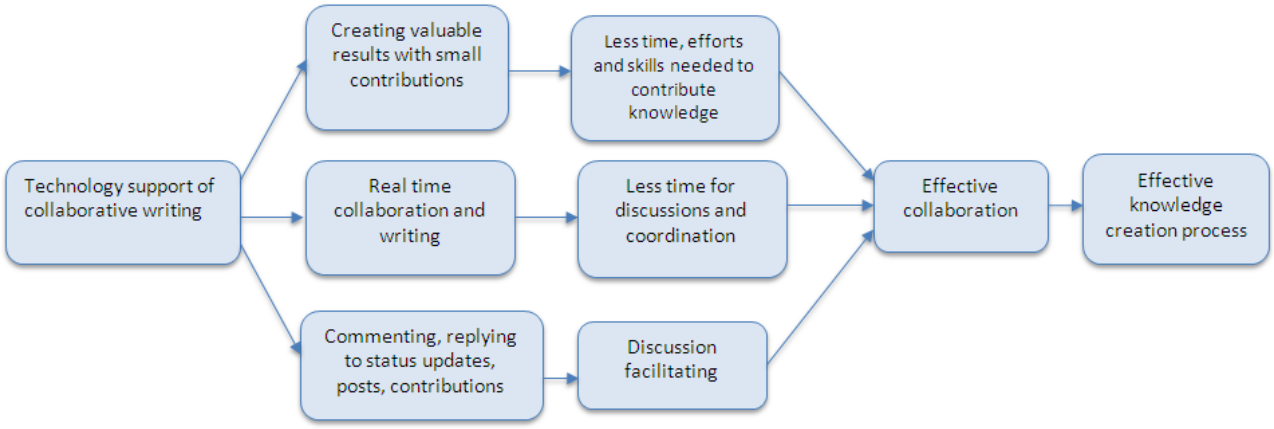

Figure 5.2 – Mechanism of the influence of collaborative tools on knowledge co-creation and codification, improved based on the empirical research.

5.3. H3: Enterprise 2.0 reputation and visibility enabling tools introduction has positive influence on establishing the knowledge sharing supporting culture and encourages knowledge sharing behavior.

This hypothesis turns out to be the most general and high level. In the previous two chapters while explaining the results on the Hypotheses 1 and 2 we have several times referred to the analysis in this chapter. Here the ideas and arguments from the interviews with experts are presented on the topics of organizational culture, what it should look like for successful knowledge sharing, and how it changes with social media introduction in companies.

5.3.1. Organizational cultural settings as a factor influencing knowledge sharing behavior

In contrast to the previous hypothesis we address organizational culture as an influencing factor, but not a barrier. Environment in companies can be favorable or not for learning, but it is not appropriate to call it a barrier. During the expert interviews all the interviewees expressed opinions that organizational culture, communications patterns, hierarchies and management leadership are important for creating an environment suitable for effective knowledge sharing and learning. When talking about organizational culture it is impossible to leave out different other aspects and factors related to knowledge sharing in organizations. We have already discussed trust, feeling of safety, environment for collaboration and innovation in the hypotheses above and have left some issues to be addresses here.

One of the main difficulties for companies to create an environment of constant learning and knowledge sharing is the existence of formal hierarchies. It is much more difficult to build trust and openness in organizations across the boundaries of hierarchies and departments, than, for example, in communities or networks of professionals with similar background, industry, specialty and interests. Not every company has and strives to have open culture, and it is not possible to define what kind of companies would be most successful in it. From the interviews we see that the more technology oriented companies tend to have an

open culture towards knowledge sharing. This can be explained in a way that technical knowledge is objective, not much dependant on personal experiences, than, for instance, knowledge of consultants, marketing specialists, etc., and so this knowledge is not associated much with personal value, and in addition, is easier to express.

Besides, an important point to consider is the aim of knowledge sharing. If a company realized the need to innovate and so to create a culture of continuous innovation, it is important to stimulate knowledge workers to share, to invest time and to collaborate across departments and even across organizational boundaries. For such global initiatives and changes one of the critical success factors is support of management. Their leadership, participation and investments into knowledge sharing and change initiatives make a difference in companies.

5.3.2.Use of social media and organizational culture

When Enterprise 2.0 software is introduced in an organization, similar to any other intervention with IT, it requires from employees and organization some efforts to change the ways of working, some daily routines. In the case of social media, in addition, even to start an initiative in implementing a wiki, or a social networking tool, etc, a certain open culture, willingness to experiment in an organization is necessary. Usually consultants and knowledge managers in companies combine interventions from the IT side with workshops, trainings, motivating activities to make people start using the tools.

> *Sometimes I do sessions in organizations and I see that some people are very reluctant, because they work in a certain manner and they are not open to new ways of working. So I think it helps. So indefinitely speaking, but not exclusively it helps.* (Interview 2)

On the other hand, from the interviews we see that a certain level of an open organizational culture is required for social media to grow. In examples of successful social media introductions we see that in a team or organizational initiatives from employees are welcoming, a bottom-up approach can work well. In an example of big production company described by the information and knowledge professional in Interview 4, the cultural settings are open and employees are encouraged to try new tools in their work. So, a lot of supporting technologies for knowledge sharing came to the organization from bottom-up. There are two main reasons we can see for this to be possible. First, social media tools are cheap or free and open source, so there is no need to start a long journey to get investments and approvals; as well as they are easy to set up.

> *"Now in knowledge management, and social media, of course, there is lots of technology going on there, but it hardly has anything to do with IT department as such. I mean you can set up a Twitter account or a blog in three seconds and you don't need any IT person. You select a template and you have a name and you're there. And I find this very interesting what they call consumarization of IT. It is that all of a sudden you and I have very complex technologies at our finger tips in seconds."* (Interview 4)

Second reason is that employees, especially young people, already use the tools a lot in their private lives and many also can't imagine their professional communication without them. So, people want the technologies that they are used to and that make their work more productive at their working places.

Some companies follow this trend and experiment with integrating the things people are already doing in their personal lives, for instance, share links, bookmarks, upload pictures and movies, post on blogs, etc. into

organizational environments. One of the examples of such initiatives was discussed in the interview with a representative of a big consulting company (Interview 8). For them these activities related to making their organization more open and social are critical for several reasons. First, they support the strategic focus on innovation and thought leadership in industry. Second, social communication technologies, either commercial SharePoint 2010 used in this case, or free and open tools, used in the big production company (Interview 4), can address the problems of work of dispersed teams and the feeling of detachment experienced by consultants or other professionals who often work out of office.

One of the results of these trends noticed by experts is that people who are using social media are becoming more independent, which is especially true for knowledge workers. Organizations start to value the knowledge work on the output basis, the deadlines and deliverables, not based on the hours spend in office, as was reasoned by the experts (Interview 8, 3 and others).

> *They want their own laptops, they want unlimited Wi-Fi, unlimited access to the internet, they want to use social media that they are using in projects. And they don't want to use systems that are too restrictive any more. So, they are becoming very autonomous.* (Interview 3)

This can be quite distracting for organizations and the smooth working processes and require being flexible and open minded. When people find and start using their own tools, communicate about jobs while doing their jobs, collaborate across departments, it questions organizational structured and brings chaotic processes. Some people can feel good about these processes, for other, who are conservative, this may be scary.

The difficulty of the adoption of social media tools in organizations, which are not used to open, trustful ways of communication and working, is in the mentality aspects. Traditionally, knowledge sharing means somebody telling or writing something that he or she knows well, has a lot of experience in, and so can be considered an expert. It was not a purpose of knowledge management to generate discussions and new questions. Social media makes the focus on interactions, discussions and asking questions, not just fixing some pieces of knowledge in a repository.

> *Social media is typically about telling a bit about what you know and asking questions, saying "I need help, I want to learn, I want to interact with people and in that way I want to become a nicer or a smarter person". And you have to understand that and show that in daily practice to have social media become a success. If you don't want a conversation, don't go for social media, you will be very disappointed in a couple of weeks.* (Interview 4)

5.3.3. Creating organizational culture favorable for effective knowledge sharing

The main idea of this hypothesis is that Enterprise 2.0 tools by providing means of communication, authoring, and valuing individual contributions (A3.1, A3.5) give opportunities for people to build their reputation based on their knowledge and work (A3.2, A3.3, A3.6), with less focus on positions in hierarchies. Reputation building in the scientific literature is considered one of the means of intrinsic motivation for knowledge sharing. Expressing respect to and admitting leadership of colleagues not based on their formal position, helps create an environment where sharing knowledge is considered to be positive and useful for career (A3.4, A3.7).

In general, the interviews with experts provided supportive arguments for the hypothesis. Experts agree that employees consider their reputation inside companies important and regard answering question from colleagues, writing articles, blogs, etc. as means to connect, to create a good image. The link between

personal reputation and the whole organizational culture is not quite clear. Actually, along with trust and collaborative settings, recognition of personal image inside organization as a reward for sharing valuable knowledge is a part of organizational culture that can be considered favorable for sharing and learning.

In addition to the summary above the following points were mentioned by experts, which contribute insights to the discussion of the organizational culture importance and the relations to Enterprise 2.0 technologies use.

- The barrier of losing competitive advantage in case of sharing unique knowledge is becoming less influential;
- Building reputation and taking leadership for people independently from positions in hierarchies is more widespread;
- Different kinds of rating and valuing systems can work for building personal reputation;
- There can be observed a tendency of organizational culture to become more open.

All the interviewed experts were aware of the *loss of competitive advantage* as a factor that can keep people from sharing knowledge. However, everybody expressed the opinion that it is becoming less influential for decision about sharing some documents, knowledge, etc. Besides, this factor can have different importance depending on the type of knowledge to be contributed and professional surrounding. On the one hand, professionals for whom experiences, know-how's create their "market value" are still reluctant to spend time on sharing their experiences, and the feeling of losing some value is there. But recently they start to realize that their "market value" increases not only through possessing knowledge, but through connecting with others and showing what knowledge they have. On the other hand, for people with more technical and engineering professions the feeling of losing competitive advantage was never regarded as an important issue. Their knowledge is objective, and engineers are usually so keen on their work and on talking about it, that the most important thing is to come to a solution. But, as mentioned by several interviewees, engineers don't tend to advertise what they can or celebrate victories, they are focused on the puzzles to solve, don't pay much attention to such things as reputation, so it is very difficult to motivate them share knowledge.

A very illustrative example was given by one of the consultants interviewed (Interview 1). In a knowledge management project in one technical company there was a need to capture knowledge about using a certain machine. One of the employees worked with the machine faster and more productively than others. But when he was asked to explain how he worked, he refused. The explanation to his refusal was that he did not want to give away his unique advantage; if he explained the way he worked, others could also become more effective and he would not be valued so high by his manager any more. The solution to this situation was following – this person was proposed to answer some questions from a question list, and then those answers were put on a blog so that other people could look at them and give responses. The person agreed to do this. When knowledge is given to somebody, and not just to a faceless system, and people respond, discuss and thank for sharing valuable knowledge, a good feeling of being important appears.

> *I think the experts who have a feeling that giving knowledge away only costs something and does not bring any benefits, may change their opinion when people respond to them.* (Interview 1)

Other interviewees referred to this effect as a "paradigm shift". Previously a knowledgeable and experienced person could be regarded as an expert and be important for others by not sharing his knowledge. But while the environment is becoming more transparent, people create connection and want to benefit from them, it is no more possible to stay relevant and important without sharing, may be just some part of knowledge and experiences.

> *If I look ten years ago within a consulting company where I worked then, it was more that people had their own field of expertise and didn't share that, because that was not good for their market value. Now this is the other way around.* (Interview 8)

However, there are still a lot of concerns about the content and knowledge used by somebody else without referring to the author.

> *Some people find it very difficult to be open about the things they do, because they think "If I share, then somebody else can use it." Others think it is not an issue, because as soon as you share it in social media you name is there and the date and time are there. So you can always say that your idea was there before somebody else's idea, and somebody else used your idea to make it an even better idea.* (Interview 4)

Social media provide many opportunities for <u>*building reputation and creating some influence*</u> in organizations, teams or communities of professionals. Literature and interviewees sometimes relate personal image and influence to the number of readers of a blog, or number of connections in social networks. However, what was emphasized is that good reputation is built only by valuable and high quality contributions. In wikis, blogs, microblogs, social networking tools there are discussions going on and the content shared is always in one way or another valued by other people, in such a way filtering information. So the process is open and transparent.

> *"Simple things like Thumb Up-Thumb Down on postings are extremely helpful. We have run a pilot with a microblogging platform; this kind of functionality was used a lot. Just one person answer a question and people naturally without being asked click Thumb Up or Thumb Down options a lot. And this helps, because if there are 20 Thumb Up and 3 Thumb Down, then the answer should be good."* (Interview 5)

What was described in the interviews explicitly is the increasing importance of personal branding both inside and outside the boundaries of companies (Interview 5). Compared to some years back, companies now subcontract, hire flexible workforce more. For these people it is extremely important to do proper personal branding, to make sure that companies and managers know what their expertise is, what their experience is and what they can be hired for. But also within companies successful people are those who are aware of their reputation and put some efforts in it.

> *"In a classic environment you talk about sharks that do succeed at the costs of others, but in a sense what people now do with LinkedIn profiles, giving recommendations to others there. By sending e-mails to whole teams - we see this a lot within Philips - managers complementing their teams, put everybody in the CC, especially higher management, and say "My team is doing a great job and I am very proud of you" in a sense "I did a great job"."* (Interview 5)

> *"There is something else that is now important - it is more about the number of followers you have, than about the expertise you have. You have expertise and share it and create noise around - you have more followers; and if you have more followers - your impact increases. So now it is more about making sure that people know about your expertise, that they see you as an expert in the field. If you do that well, then you have a lot of followers and if you have a lot of followers then your value increases."* (Interview 8)

So it is important to support people in *making visible what they know*, and Enterprise 2.0 technologies make a step towards this. As was noted in one of the interviews, this can be done not just by making available rating systems. Ratings may work in young organizations, where people enjoy a game and competition environment. On the other hand, giving knowledge sharing and creation a scent of fun or game is regarded by some organizations as good and appropriate for creating an open culture favorable for sharing and learning.

> *"If you look at how people work, it is more output oriented now; this can also be applied to knowledge management. Basically in the system you can see how many documents you have uploaded, how your documents are rated and how many followers you have, and how many reactions you placed in comments. And making this transparent is one of the mechanisms, you have something like achievements in a game, e.g. Xbox."* (Interview 8)

However, it does not make a person knowledgeable if he or she starts a blog, because everybody can start a blog, everybody can act like a guru in a certain subject. But if they get followed, if their contributions are valued and generate discussions, they create an image of an expert.

Thus, we see that making contributions visible and allowing people rate content leads to the creation of authors' reputations. But for people to perceive a reputation building a motivating factor that can overweight the feeling of loss of advantage or insecurity when sharing unique knowledge, there should be a *certain organizational environment and organizational norms*. Some interviewees pointed to changes in culture and communication patterns going on in their organization. But it is impossible to say whether these changes can be attributed to starting using social media tools, or they are triggered by some other environmental factors.

From the interviews we can conclude that the shift to more open and flat culture is occurring not in all organizations. As far as from the set of the professionals interviewed we can compare organizations more focused on engineering and technology, and organizations (or just parts of organizations) that do less specific tasks, or governmental organizations. So, engineering organizations don't observe changes in their ways of working and interaction. For consulting, service companies, for some governmental organizations the experts described considerable changes in culture and communication. The reason for this may be the necessity to innovate, to come up with new business models, services and products in order to stay in the market, because customers are constantly gaining power and becoming more demanding. So, collaboration between organizations, innovation and networking is critical for all organizations and for "soft" sectors in particular.

> *"We came from the area of "Knowledge is power" and information is power. And we see that sharing and connecting, and knowledge, of course, is power."* (Interview 4)

One additional insight gained front the interviews concerns the issue of trust in organizational culture. We have dealt with an issue of interpersonal trust in the explanation of the hypothesis 1 (chapter 5.1). But there is another aspect of trust, trust between organization in general and its employees. With the introduction of Enterprise 2.0 tools in companies, and also with more and more people using social media in their daily lives, companies start to be concerned about the security and confidentiality of their internal affairs. If every employee can post any details about a project he is working on, then it is difficult to predict the consequences, and this is what worries companies' management. Different decisions are made to deal with this situation. Some organizations close access to certain external websites from the corporate IP addresses, etc., others decide to be progressive and trust their employees in terms that they are loyal to their company and would not do anything to harm its wellbeing. The main point is that communications departments cannot any more control all the internal and external communications. And organizations are leaning towards being

open and transparent in their relations and communications with employees and establish some guidelines or norms for sharing sensitive information.

The discussion of the interview results gives us a possibility to say that hypothesis 3 brought up an important aspect of knowledge sharing and use of social media. The main assumptions and relations in the model of its working mechanisms are true, but some relations, like the relations between reputation building and organizational culture (A3.4), are very general and difficult to prove. Organizational culture is a complex and multidimensional concept, and it would be useful to make the causal link between reputation building as a motivating factor and organizational more precise. That is why the mechanism of the influence of the use of Enterprise 2.0 tools on organizational culture and knowledge sharing is improved by including the concept if building leadership in organizations beyond the existing formal hierarchies. This makes culture more open, based on trust and respect and reflects the main principle of social media – the importance of networking, connections and flatness. Figure 5.3 presents the theoretical model of the mechanism of the influence of the use of Enterprise 2.0 technologies and principles on the organizational culture and the role of knowledge sharing.

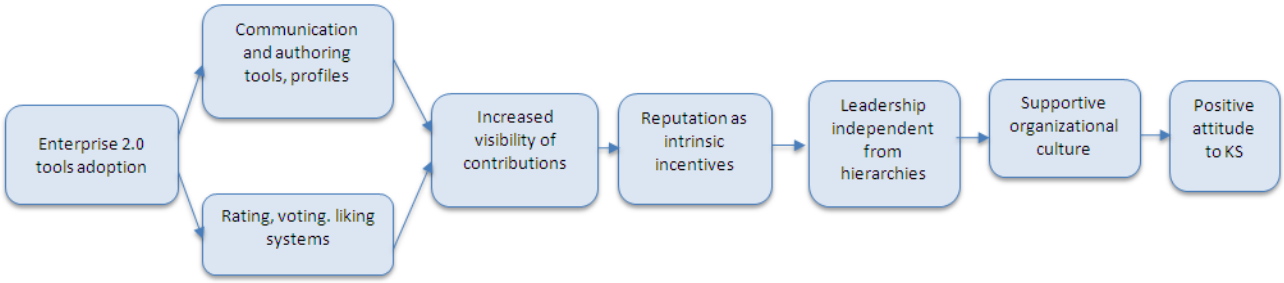

Figure 5.3 – Mechanism of the influence of Enterprise 2.0 tools use on organizational culture and knowledge sharing, improved based on the empirical research.

5.4. Research Conclusions

In this chapter we summarize the discussion and findings presented above and make conclusions about the whole research. The conclusions on hypotheses are given in Table 5.1. The results and conclusions of the research are presented in Table 5.2

In the previous chapters we have discussed in details the findings from the interviews with experts in relation to the proposed hypotheses. The observations and opinions of the experts were summarized in the argumentation on the influence of the use of social networking functionality in the establishing of trust, the use of collaborative tools for content co-creation and knowledge codification, and the influence of Enterprise 2.0 tools on the organizational culture and communication norms. The arguments and quotes from the interviews made up a line of reasoning that allows us to draw conclusions on whether hypotheses are true or not.

The conclusions on every hypothesis are presented in the Table 5.1. Results are given for hypotheses (whether they are supported or not), for the mechanisms which are visualized in chapter 3 and some possible improvements for these mechanisms are named. More detailed formal conclusions for every step of the influencing mechanism (marked "A1.1" in Figures 3.1, 3.2, 3.3) are provided in Appendix F Table F.1. There we say which parts of the mechanisms are addresses by the empirical study and have enough arguments to be left in the theoretical models or to be excluded.

Table 5.1 General conclusions from the empirical research – expert interviews.

Hypothesis	Formulation	Research result
Hypothesis 1	*Social networking tools introduction has positive impact on knowledge sharing by increasing the level of trust among group members*	Hypothesis is supported; Mechanism (Fig. 3.1) is supported; Additional concept to be added.
Hypothesis 2	*Enterprise 2.0 implementation has positive effect on the ease of knowledge sharing and creation process*	Hypothesis is addressed and partially supported; Mechanism (Fig. 3.2) is partially supported; Some concepts are not addressed properly to be proved true or false.
Hypothesis 3	*Enterprise 2.0 reputation and visibility enabling tools introduction has positive influence on establishing the knowledge sharing supporting culture and encourages knowledge sharing behavior*	Hypothesis is supported; Mechanism (Fig. 3.3) is supported; Some concepts need to be reformulated.

However, the current study is of an exploratory character, the statements for hypotheses are formulated in general words and a qualitative research approach is used to address them. That is why the main research outcomes are not a statistical proof of the validity of the research statements, but the analytical reasoning and the new insights and findings that help to improve the theory, to describe the mechanism of the influence of Enterprise 2.0 use on knowledge sharing in organizations. Table 5.2 contains the summary of the findings and our conclusions from the research done on the use of Enterprise 2.0 for knowledge sharing in organizations. The findings and conclusions are grouped according to the topics of hypotheses.

Table 5.2 Summary of the research results and conclusions.

Hypotheses	Findings from the expert interviews
Hypothesis 1 *The influence of the use of social networking functionality of Enterprise 2.0 tools on knowledge sharing.*	➢ Trust is an important factor influencing the decision to share knowledge; ➢ Trustful relationships can be understood as feeling of safety, ability to foresee the actions of other members, the confidence in good intentions of others in reusing knowledge; ➢ There are different social networks between and inside organizations, communication barriers between social networks are the obstacles for knowledge sharing and reuse; ➢ The use of social networking tools creates some effects that influence positively the decisions of individuals to share knowledge; o The use of social networking functionality creates awareness of employees about the work of their colleagues and about the processes in an organization; o The use of Enterprise 2.0 tools creates social presence and context for informal and semi-structured communication and information flows; o The use of Enterprise 2.0 tools enables informal communication, enables networking and connections between people; o The use of Enterprise 2.0 tools makes personal and corporate

	knowledge more visible and accessible; ➢ The use of social networking tools influences positively the establishing of trustful relations between organizational members.
Hypothesis 2 *The use of Enterprise 2.0 collaborative tools influence positively the efficiency of knowledge codifications and creation*	➢ The complexity and the costs (time and efforts) for knowledge sharing (writing down, contributing to an IS) is an important barrier for organizational employees to share knowledge; ➢ There should be a real life need for people to use some means to collaborate; ➢ The following observations were discussed in the expert interviews in regard to the use of Enterprise 2.0 collaborative tools (blog, wikis, microblogs, shared documents, etc.): o In the collaborative content and knowledge creation people can take different roles and fulfill different parts of tasks; o The success of the collaborative process is to some extent dependent on the number of collaborators; o Enterprise 2.0 tools still are not suitable for everybody, in spite of the fact that in general they are regarded as being easy to use; o Collaborative tools that create discussions and awareness are good at enabling innovation; o Different Enterprise 2.0 tools to some extent can be a means of expressing and transferring implicit knowledge; ➢ Different collaborative tools can have different purposes, such as wikis are suitable for data and facts storage, blogs – for discussions generations, shared documents (e.g. Google Docs) – for collaborative writing; ➢ The use of collaborative tools make the costs of writing down knowledge lower and the codification process easier to some extent, but people still need to have the desire and skills to write. ➢ The relations between the collaborative content creation, use of collaborative tools and explicating implicit experiential knowledge are not possible to define based on the current study.
Hypothesis 3 *The use of tools that support knowledge visibility has positive effect on establishing favorable organizational culture for knowledge sharing.*	➢ Organizational culture is an important factor defining the success of knowledge sharing initiatives in companies; ➢ Communications patterns, hierarchies, management leadership, average employees age, company industry specifics (e.g. production, engineering, consulting, etc) define the organizational culture, which can be seen as an eco-system, environment for the information and knowledge processes; ➢ The main observations discussed by the experts in regard to the use of ratings and visibility functionality of Enterprise 2.0 tools are the following: o The barrier of losing competitive advantage in case of sharing unique knowledge is becoming less influential; o Building reputation and taking leadership for people independently from positions in hierarchies is more widespread; o Different kinds of rating and valuing systems can work for building personal reputation; o There can be observed a tendency of organizational culture to become more open. ➢ Trust is becoming more important in organizational context with the adoption of social media tools in working environment and private lives; communication inside and outside organizational boundaries are hard to control, so trust to employees and openness become part of new strategies; ➢ The use of the ratings and contribution visibility functionality is a

	controversial issue: on the one hand, for some people or environment these tools bring the fun, game and competition feeling, which facilitates knowledge processes; on the other hand, the ratings and visibility tools do not necessarily spotlight the actual knowledge and knowledgeable employees.

6. Discussion

In the section of theory development we made distinctions between the mechanisms of Enterprise 2.0 tools influence on knowledge sharing via building interpersonal trust, facilitating collaboration and changing organizational culture. In the empirical phase analyzing the results of the expert interviews we have seen a lot of interactions of the arguments from different hypotheses, or in other words, Enterprise 2.0 tools features and properties create different effects that influence more than one barrier to knowledge sharing. The causal relationships become miscellaneous, and it becomes reasonable to unite the three mechanisms from the Figures 4.3, 4.4, 4.5 in one framework, which describes Enterprise 2.0 tools influence on knowledge sharing and learning in organizations. The resulting framework is presented on Figure 4.6.

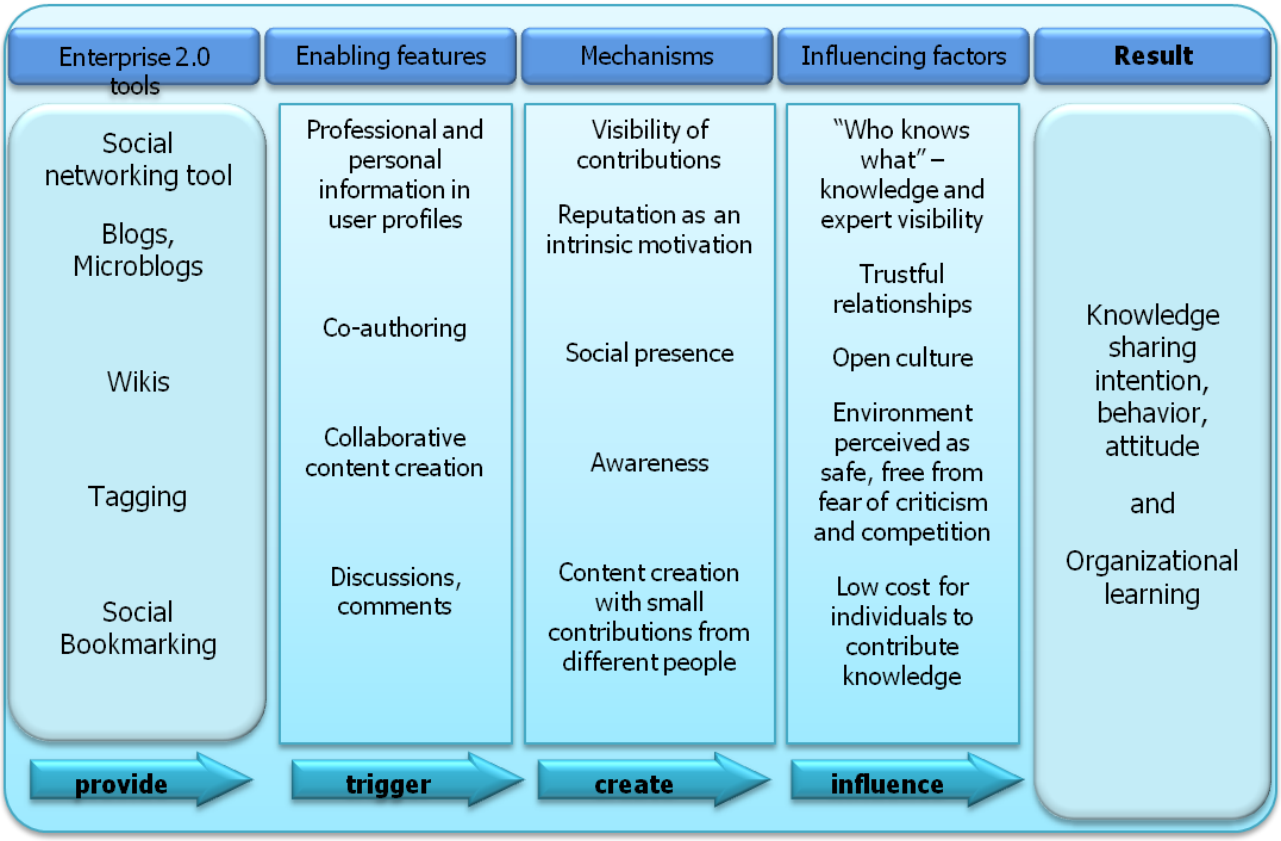

Figure 6.1 – Framework of the use of Enterprise 2.0 technologies for knowledge sharing and organizational learning.

Summarizing findings in one framework can be reasonable because Enterprise 2.0, when adopted and used routinely, creates a whole environment of sharing, connecting and collaborating either in departments, organizations or across company boundaries. From the theory on organizational learning we know that for innovation and learning to happen there should be certain conditions. When knowledge sharing is seen as a part of the social exchange process, the process can be stimulated by a trustful and open culture and by fair treatment from the organization (Schepers & van Der Berg, 2006). Organizational learning theory is comprised of four main constructs: Knowledge acquisition, Information Distribution, Information interpretation and Organizational memory (Huber, 1991). These constructs and the sub-constructs presented

in the paper by Huber (1991), show that knowledge and information processes flow through entire organization. And so to have the whole objective picture it is reasonable to consider the impact of Enterprise 2.0 tools not just on some specific barriers and factors related to knowledge sharing, but on the general information and knowledge environment in an organization.

Besides, we have observed the intersections and a lot of cross links between the researched mechanisms of social media influence on knowledge activities in organizations. The analysis of the expert interviews showed that not all the relations proposed in the theory (Chapter 3 marks or the arguments "A1.1") are significant for the researched process of social media use in organizations and some additions were introduced by the interviewees. A unified framework on the Figure 6.1 arranges the process of interaction of social media and knowledge sharing into 4 steps and unites the causal relations in four arrows in the lower part of the figure. Thus, the figure can be read as follows. The use of the Enterprise 2.0 technologies in organizations provides the features (such as user profiles, commenting, authoring, etc.) that trigger the mechanisms (such as social presence, awareness building, reputation and thought leadership building, etc), which in their turn create the factors (such as trust, proper culture, knowledge visibility, etc) which are important for successful knowledge sharing in organizations

Social presence, trust, organizational settings

From the literature review in Chapter 2 we know that trust is crucial for the decision of people to share or withhold their knowledge, experiences or success stories. From the interviews with experts we have learnt that trust can have the perspective of the feeling of safety about the actions and reactions of colleagues (related to the concept of evaluation apprehension (Bordia, Irmer, & Abusah, 2006)) and of the confidence in knowledge and opinions. But also trust is an inalienable part of individuals' attitudes, interpersonal relationships and organizational environment on the whole, because it is considered to reduce uncertainties and helps to engage into interactions (Luhmann, 1980).

The central question of this research is what role social media tools play in building trust. And as practitioners claim that the use of Enterprise 2.0 tools in organizations bring some changes to the communication norms, interpersonal relations and work activities. Theories can add explanations to why this is possible to happen. From the one side, we know that Enterprise 2.0 tools have diverse functionalities for social networking, connecting and exposing personal information, e.g. blogs, wikis, microblogs, let alone social networking software; they all provide opportunities to follow, connect, and track changes and contributions of other network members. From the knowledge sharing side, supported by years of scientific research and practical experiences, trustful, safe and collaboration friendly environment (where there is no competition pressure), reciprocity, trust, and recognition are considered significant enablers and determinants of knowledge sharing behavior (e.g. (Davenport & Prusak, 1998)). But what lies in-between, what is the process that goes from interventions in an organization to establishing social and psychological environments favorable for collaboration, knowledge sharing and learning?

The concept of social presence is suggested to be the link between the interventions with the introduction of social media tools and establishing trustful relations, communication facilitation environment, and eventually knowledge sharing. The concept was introduced back in 1976 by (Short, Williams, & Christie, 1976) and was addressed as a subjective quality of a medium of communication which varies between different technologies. The medium of communication affects the nature of interaction and also is defined by the purpose of interaction. Sallnäs et al. (2000) say that users are more or less aware of the level of social

presence of communication media and choose the one most suitable for the situation and purpose of task and communication.

Moreover, the concept of evaluation apprehension is important as a motivational barrier to knowledge sharing. It can be defined as anxiety arising from a concern that one's knowledge or expertise may be evaluated unfavorably by an audience (Bordia, Irmer, & Abusah, 2006). According to the authors, evaluation apprehension has not been investigated much in the context of knowledge sharing. We have not included this concept as a construct in the theory building part, but in the course of discussions with experts some of the examples referred to the importance to feel confident that shared knowledge will not be criticized or misused. This idea has gained additional emphasis with the adoption of real time collaboration tools, and especially real time typing (e.g. Google Wave, Docs, and others). The research by Bordia et al. (2006) showed that employees are less likely to share knowledge when they are apprehensive.

Taking into account the concept of evaluation apprehension may lead to two ideas for further discussion and research. On the one hand, use of social media tools that provide a high level of social presence and help to build trustful relationships in technology mediated groups can reduce the feeling of fear to be judged or expect unfavorable evaluation. On the other hand, the research by Bordia et al. (2006) also showed that "evaluative component may exist in organizational knowledge sharing, as the knowledge that is shared will be reviewed and assessed by the target audience in terms of its quality and usefulness". This is what is done with the help of a variety rating features (ratings, reviews, comments, "like" and starts buttons, etc.) in social software. And the availability of so many evaluating possibilities may increase the risk that many users fear possible criticism of what they might post (Ardichvili, Page, & Wentling, 2003). A lot in this situation depends on the organizational settings and additional research is needed to understand all the underlying influencing factors and the possibilities of finding balance and right settings for knowledge sharing.

A lot of other concepts and theories are involved in the mechanism of establishing trust and knowledge sharing in groups, where a group is defined as two or more individuals connected by and within social relationships (Forsyth, 2009). The concepts from social exchange theory, social psychology, group dynamics (Forsyth, 2009), leadership and behavioral science, concepts from perceived organizational support theory (Eisenberger, Huntington, Hutchison, & Sowa, 1986), reciprocity of citizenship behaviors theory (Cardona, Lawrence, & Bentler, 2004) and others can be used to describe the process of building trust, awareness, overcoming evaluation apprehension and intentions to open and share experiences in groups.

Costs of sharing

Another aspect researched is the impact that the use of Enterprise 2.0 tools have on the process of collaboration in teams and organizations and the transformation of individuals knowledge into organizational knowledge. From the theoretical study we see that that the costs of sharing knowledge as one of the barriers to it are often described with the help of social exchange theories (e.g. (Cabrera & Cabrera, 2002)). It is considered that knowledge sharing is a kind of investment to the future relationships, learning and organizational innovation. But for every person to make a decision about such an investment the costs and benefits should be clear (Bock, Zmud, Kim, & Lee, 2005). Different theories describe the processes of making a decision about sharing, such as social dilemma, game theory, researches on motivating factors, etc. However, as was mentioned by one of the interviewees, any actions to encourage knowledge sharing would be unsuccessful if a person thinks that opening and contributing knowledge only leads to costs for him or her.

The costs of sharing knowledge, as we know from both theoretical study and interviews with experts, mostly add up to the time to be devoted to writing down experiences, stories, etc. or to restructuring existing document and presentation for possible future reuse, and the efforts and skills needed to do this. Often it is very difficult for employees to find time and to justify it under a pressure of fulfilling current primary projects. From the empirical part we have found that the tools provide the functionality to codify knowledge and create some valuable pieces of content with many small contributions, to review and coordinate collaborative actions efficiently, which can be perceived as decreasing the cost for sharing knowledge, such as time and efforts.

Benefits of knowledge sharing are a more complex subject. They are not just quite difficult to define, but also different for organizations and individuals, for different people. But if people do contribute their knowledge, that is because they find something valuable and beneficial for them. It is a topic of a full research, but here we were interested in what additional benefits sharing thorough social media tools are. At the organizational level it is an effective way of making personal and organizational knowledge structured and visible, to reduce the time and efforts needed for writing. The benefits on the individuals' side can be very different: as was discussed in the interviews with experts some people see the benefits of connecting and networking, some see showing what they know as a way to build their professional reputation, thought leadership both inside and outside organizations. And what was interesting to find in the current research that with the usage and integration of social media, more open organizational cultures and communication patterns emerge. Also this leads to the situation when a cost of losing a competitive advantage of having unique experiences and knowledge is overweighed by the benefit of having a good image of a knowledgeable person, professional and a leader. And these are the directions and topics to be researched by the cost and benefit and incentives perspectives in knowledge management (Ekbia & Hara, 2006).

Simplicity of tools reduces the cost of sharing and facilitates adoption

Another aspect of the introduction of the Enterprise 2.0 tools in organizations is their simplicity. All experts referred to the fact that the new tools used for communication, writing, contributing knowledge are very simple. There should be no technology barrier. Anyone who knows how to type can participate in collaborative writing, in creating pieces of knowledge, innovating with others or making his or her personal knowledge available to colleagues through blogs, microblogs, personal pages, etc. Thus, the use of simple and intuitive tools for knowledge sharing can reduce the perceived cost of sharing.

There was a lot of research done in the field of innovation, information systems adoption in organizations and for knowledge management in particular ((Rogers, 1983), (Davis, 1989), (Damodaran & Olphert, 2000), (Venkatesh, Morris, Davis, & Davis, 2003), (Günther, Riehle, Krasnova, & Schöndienst, 2009) and others). And one of the factors which was always considered as important for people to start adopting a technology or software is the ease of learning and use. Both previous research literature and discussions during the interviews showed that the social media tools are quite easy to use, and so the adoption process can be smooth. But there are some points different from what was previously found. Social tools differ in their simplicity to use and the skills and capacity required from people to benefit from the adoption. For instance, contributing to wiki can be challenging to some people from the point of view of the tool usage, because some skill of HTML are required. Others may find it difficult to actively use blogs, microblogs because of the level of openness they require, because of the necessity to openly ask questions and help, and to say what you know.

Besides, the simplicity of the Enterprise 2.0 tools can be seen from the perspective of their setting up and starting to use. To introduce a knowledge management system a lot of things, such as considerable budget, IT specialists, servers and time are needed. But to start a blog, microblog, social network, etc. can be free, fast and can be done by anybody, which is today referred to as consumerization of IT (e.g. (Burt & LeHong, 2007), (O'Donovan, 2007)). That is why the bottom-up approach of adoption mentioned by a number of interviewees is possible in the process of introduction and adoption of social media tools. However, bottom-up adoption approach is only possible in specific organizational settings. These issues can become a topic for research in the field of technology adoption, factors influencing it and how they change with the changing role, quality, attributes and goals of IT.

The main focus of the research was on the mechanisms of the influence of the use of Enterprise 2.0 tools on the barriers to knowledge sharing, and not on the process and the factors influencing adoption of social media tools. However some insights from interviews with experts and our analysis worth mentioning in regard to the process of Enterprise 2.0 adoption for knowledge sharing. As far as both sharing knowledge and using social media tools are the activities that are dependent on volunteering and intrinsic motivation, the main starting point is the feeling of employees that there is a real organizational need for them to use the tools and to share knowledge, for example, in dispersed teams. The second point is that for successful adoption of Enterprise 2.0 a certain type of culture and communication norms should be already present in an organization. In highly structured and dependent on hierarchies organizations, it would be very difficult to accept and benefit from the principles of openness and unstructured and constant communication, which are central in social media. There is a lot of research going on in the area of the different information and communication technologies adoption and organizational change introduction, which could help to find recommendations for the adoption process optimizations. For this research the topic of adoption lies out of its scope.

7. Conclusion

7.1. General conclusions

The current research performed for the final graduation master project is devoted to investigation of the impact of the adoption of Enterprise 2.0 tools in organizations on knowledge sharing practices. The study is considered to be an explorative research. In spite of the fact that the social media use and knowledge management areas have recently gained significant popularity and importance, not so many previous structured research works are available on the topic. That is why the goal of the research was to create a theoretical model of the mechanism of the interaction of Enterprise 2.0 and knowledge sharing activities in organizations based on the existing scientific findings and insights from practitioners.

The study consists of the two main phases – theoretical literature review and the qualitative study of the use of social media and knowledge sharing practices. Three main research questions were brought forward in Chapter 1.2 and answered in the course of the research. Here we briefly repeat the questions and conclusions on them. *The first research question* was what theories and concepts could be derived from the existing scientific literature in the field of knowledge sharing. From the literature review on knowledge management and knowledge sharing we found that the there are certain barriers to successful sharing process on different levels (Chapter 2.1):

- At the individual level - personal characteristics such as individual understanding and ability to express insights in combination with the task complexity of sharing complex and tacit knowledge;
- At the interpersonal level - lack of interpersonal trust between group members;
- At the organizational level - centralized and insecure organizational culture that does not support the values and norms of sharing or does not address the perceived risks of losing power and job security after sharing unique valuable knowledge by employees.

The second research question was formulated to find out what are the main concepts and previous research findings about Enterprise 2.0 with the focus on implications for knowledge management. After the structured literature review on the use of Enterprise 2.0 technologies in organizations for knowledge sharing was done (Chapter 2.2, and 2.2.4 in particular) we could define four main areas of the influence of Enterprise 2.0 use on knowledge sharing:

- The use of Enterprise 2.0 technologies has impact on communications patterns facilitating connections between members, interpersonal trust, and work awareness.
- The use of Enterprise 2.0 technologies has impact on the knowledge creation process by making it more collaborative.
- The use of Enterprise 2.0 technologies has impact on the organizational culture by focusing on participation, collaboration and knowledge sharing.
- The use of Enterprise 2.0 technologies has impact on visibility of knowledge sharing activities and authors' reputation which enhances the importance of intrinsic motivation of employees for knowledge sharing.

The structured literature review resulted in proposing a set of three hypotheses, which aimed at explaining the positive influence of the use of social media tools on the main barriers to successful knowledge sharing, such as interpersonal trust, personal costs to share knowledge, complexity of codification and organizational environment. The hypotheses were formulated as follows and supportive argumentation and the visualizations of the mechanisms of the hypothesis were presented in the corresponding chapters:

- Hypothesis 1 - The use of social networking tools has positive impact on knowledge sharing by increasing the level of trust among group members. (Chapter 3.1)
- Hypothesis 2 - Enterprise 2.0 implementation has positive effect on the ease of knowledge sharing and knowledge creation process. (Chapter 3.2)
- Hypothesis 3 - Enterprise 2.0 reputation and visibility enabling tools introduction has positive influence on establishing knowledge sharing supporting culture and encourages knowledge sharing behavior. (Chapter 3.3)

The third research question aimed at finding what practical insight can be gained from the empirical study that supports or confronts the hypotheses and the models of the mechanisms. The empirical research phase consists of the eight interviews with experts in the field of knowledge management and introduction of Enterprise 2.0 technologies in organizations. The interviews allowed us to support the hypotheses to be true and to improve the models of the mechanisms, which were proposed in the theoretical part and describe how and with what principles, functionalities and effects the Enterprise 2.0 tools, when used in organizations, change the daily practices of knowledge sharing, communication and collaboration.

The study report is structured around the three research hypotheses (Chapter 5): the impact of the use of social media on interpersonal trust, collaboration and knowledge co-creation, and on the incentives structure for knowledge sharing and entire organizational environment. We have found for the first research hypothesis that the use of social networking functionality and providing a diversity of means of communications allows colleagues connect to each other, stay in touch while working in different locations, share personal and professional information; and this helps in creating social presence and awareness in technology mediated communication and collaboration, which results in establishing trustful relationships and positive attitude to knowledge sharing. However, modern social media tools differ in their ability to provide social presence in communication and knowledge sharing. This can be a positive issue, because the diversity of tools can satisfy the diversity of needs of different people for openness and connection, as well as anonymity and security.

The results for the next research hypothesis showed the costs of sharing knowledge, such as time and efforts needed to write down or contribute to a repository some knowledge, stories, or documents are significant barriers for people to do this. During the research we have found supportive arguments for the statement that the use of Enterprise 2.0 collaborative tools makes collaborative writing possible and so collaboration and knowledge contribution easier and less costly for employees. Besides, the availability of a number of functionalities that facilitate discussions, asking and answering questions, being aware of the work of others and having context for discussions and collaboration make content and knowledge co-creation possible and effective. However, in contrast to the theoretical claims, the proposition that discussion facilitation and the use of tools that support discussions help to externalize, explicate and share implicit knowledge have not gained enough support in the empirical study phase.

The research direction of the influence of the use of the social media on organizational culture (Hypothesis 3) was researched from the point of view of the importance and structure of incentives for sharing knowledge. It was interesting to find that the barrier to knowledge sharing widely mentioned in literature - the loss of competitive advantage - is not considered to be a significant factor when contributing to or communicating via Enterprise 2.0 tools. The principle of authoring under your user name connected to personal page or profile makes the contributors and their contributions visible, open for discussions and evaluations. So, employees start to see the process of knowledge sharing as a way to build their reputation both inside their companies and outside, for example, in professional communities. And the particular aspect of cultural

change, as seen from the empirical research phase, is that reputation building is perceived as a benefit that overweighs the fear of losing advantage of possessing knowledge.

In this research organizational culture was perceived as one of the factors that influence knowledge sharing behavior of employees. But during the process of interviews analysis a lot of arguments from the discussions of interpersonal trust, collaboration practices, the possibilities and desire of employees to share knowledge, learn, innovate, etc. referred to organizational settings and its importance in the decision of every person to open or to keep their experiences for themselves. Hence, the tendency of organizations to have a more open culture, to trust their employees and make communication easy, and appreciate initiative and innovation can be seen as favorable for continuous organizational learning and knowledge transfer and creation by employees.

The focus of this research is on defining the areas of the impact of the use of Enterprise 2.0 technologies on knowledge sharing and on the process of overcoming the barriers to effective knowledge sharing and learning in organizations. Particular focus was given to modeling the mechanisms of this impact. So, the literature review, examples and usage cases gained from the expert interviews concerned mostly situations when the Enterprise 2.0 tools are already used in organizations. The process of adoption of social media tools is beyond the scope of this study. However, such factors as existence of organizational need for social tools and some level of openness, simplicity of the tools can be favorable for faster and easier adoption of Enterprise 2.0 in organizations.

7.2. Limitation and directions for future research

The current research has some specifics that should be mentioned to avoid mistreatment of its results. The issues of the research method validity and reliability were discussed in Chapter 4.2. Here we mention three main sources of possible limitations of the whole study: the character of the research and its goal, the limitations of the research method and the limitations of the geographical location of the research.

First, the research is of exploratory character, which main goal is not to make some claims or design a methodology, but by structuring and building on the existing research findings, and by contrasting them with the opinions of experts in the area, come up with a theory, which can become a foundation for future deeper studies. That is why it operates with high level concepts, quite abstract terms and a number of generalizations.

Second, the chosen method of expert interviews implies some limitations on the generalization of results. The main issues of the reliability and validity of the expert interviews research method are addressed in Chapter 1.2.3. Eight interviews were conducted; they provided a number of examples and analytical evidences to address the research hypotheses. We tried to approach professionals with different backgrounds and experiences to get diverse and objective opinions, but common to this research method, subjectivity is possible. So it is possible that a qualitative study with other interviewees and quantitative research can give more insights, clarity and support to the theory.

Third, the interviews were conducted only in The Netherlands, and most of the examples given by experts were related only to the Benelux market. The situation in The Netherlands can be considered representative for Western Europe, from the point of view of advanced IT integration in business, but might be slightly different in other parts of the world. Besides, such an important factor as organizational culture differs considerably across countries, nationalities and environments. In almost all the interviews experts stated that organizational culture is not a barrier to communication and sharing knowledge, organizations are flat

enough, people of all positions are accessible, and the level of openness and trust is high to create favorable conditions for learning and innovation. Taking into account that Dutch organizations are less hierarchical and strict in cross hierarchy communications than in other countries, we can recommend applying the research results to companies in other countries carefully. Besides, the level of openness, trust and willingness to share depends on the overall situation in economy in a particular country or in the world. In the times of crisis, when people don't feel safe about their jobs, the desire to gain competitive advantages may become critical for the decision of sharing knowledge. Hence, the results of the current research can reflect the general trend, but may depend on peculiarities of countries, general stability, and corporate settings.

The limitations described above make clear the directions for the future research to improve the theory. We see the next research steps could be deeper qualitative and quantitative studies on such subjects as:

- The use and the influence of Enterprise 2.0 tools in different cultural environments and geographical locations;
- What other barriers to knowledge sharing exist and what are the mechanisms of social media influence on them;
- How the use of social media changes the incentives structure for knowledge sharing; in particular a quantitative study on the increasing importance of reputation;
- The levels of social presence and awareness of different Enterprise 2.0 tools, which can allow better selection of tools for different purposes;
- To what extent different Enterprise 2.0 tools support making knowledge visible, which would allow better selection;
- What is the role of social media tools in externalizing implicit knowledge; numerous studies say that interactions, discussions, etc. help explicate and transfer implicit knowledge (e.g. (Ardichvili, Maurer, Li, Wentling, & Stuedemann, 2006), (Chatti, Klamma, Jarke, & Naeve, 2007), (Wan & Zhao, 2007), (Costa et al., 2009)). But in the current research not enough supportive arguments were gained to make conclusions about the role of social and collaborative technologies in the process of knowledge externalization.

7.3. Practical impact

This study may be useful for those organizations that plan to start experimenting with Enterprise 2.0 technologies for knowledge management, because it helps to understand the possible impacts of such interventions, as well as to see the necessary changes in an organization, its culture and routines to successfully integrate social media and knowledge sharing in daily processes. The study can help to define some areas of benefits and costs for creating a business case of introduction of Enterprise 2.0 technologies.

Besides, the study enables to see clearly the consequences, as well as costs and befits of social media usage. This is important, because not all organizations can devote a lot of efforts to knowledge management and need special tools, especially social tools. There are differences between the settings and needs of big and small organizations, technology oriented and customer oriented organizations, those working with objective explicit knowledge and those the competitive advantage of which is in experiences and competences of employees. This can be a topic of a separate extensive research, but the main lesson learnt here is that there should be a real life organizational need to use any new technology and social technology in particular. A small group of ten people who work on some engineering problem is less likely to need a social tool, a microblog or a social networking tool, for example, but they may need a wiki to store their pieces of work and structure them, or a collaborative workspace to work together in real time. In contrast, a big consulting company may benefit a lot by introducing a microblogging, blogging and social networking functionality,

which will help to create an environment for building personal reputation for employees, to create awareness about the projects people work at, strengthen connections and enhance the foundations for innovative and collaborative environment.

In the current research we do not devote considerable attention to the social media adoption process, but there are some insights gained from the interviews with experts that worth mentioning. As was mentioned above, there should be an organizational need, a problem in daily processes or communications that can be solved by the introduction of new communication media. Second, for successful adoption, new technologies should be easy enough to use. This idea is not new and has been researched in relation to all kinds of IS. What was new is the idea that the simplicity of Enterprise 2.0 tools in both usage and installation facilitate the bottom-up initiatives of adoption, and for this approach to succeed certain organizational settings, such open enough culture, encouragement of innovation and initiative from employees, etc., should be in place. This issue one more time highlights the interaction loop between organizational culture, knowledge sharing, influencing factors and the technology support of these processes.

References

Abrams, L. C., Cross, R., Lesser, E., & Levin, D. Z. (2003). Nurturing interpersonal trust in knowledge-sharing networks. *Academy of Management Executive*, *17*(4), 64-77.

Adler, B. T., Alfaro, L. D., Pye, I., & Raman, V. (2008). Measuring Author Contributions to the Wikipedia. *Computer Engineering*.

Akiyoshi, M. (2008). Knowledge sharing over the network. *Thin Solid Films*, *517*(4), 1512-1514. doi: 10.1016/j.tsf.2008.09.042.

Alavi, M., & Leidner, D. E. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*, *25*(1), 107-136. Retrieved from http://www.jstor.org/stable/3250961.

Angehrn, A., Luccini, A. M., & Maxwell, K. (2009). InnoTube: a video-based connection tool supporting collaborative innovation. *Interactive Learning Environments*, *17*(3), 205-220. doi: 10.1080/10494820902924862.

Ardichvili, A., Maurer, M., Li, W., Wentling, T., & Stuedemann, R. (2006). Cultural influences on knowledge sharing through online communities of practice. *Journal of Knowledge Management*, *10*(1), 94-107. doi: 10.1108/13673270610650139.

Ardichvili, A., Page, V., & Wentling, T. (2003). Motivation and barriers to participation in virtual knowledge-sharing communities of practice. *Journal of Knowledge Management*, *7*(1), 64-77. doi: 10.1108/13673270310463626.

Argote, L., McEvily, B., & Ray Reagans. (2003). Managing Knowledge in Organizations: An Integrative Framework and Review of Emerging Themes. *Management Science*, *49*(4), 571-582. Retrieved from http://www.jstor.org/stable/4133958.

Bakker, M., Leenders, R. T., Gabbay, S. M., Kratzer, J., & Engelen, J. M. (2006). Is trust really social capital? Knowledge sharing in product development projects. *The Learning Organization*, *13*(6), 594-605. Emerald Group Publishing Limited. doi: 10.1108/09696470610705479.

Barnes, J. A. (1954). Class and Committees in a Norwegian Island Parish. *Human Relations*, *7*(1), 39-58. doi: 10.1177/001872675400700102.

Barson, R. J., Foster, G., Struck, T., Ratchev, S., Pawar, K., Weber, F., et al. (2000). Inter- and Intra-Organisational Barriers to Sharing Knowledge in the Extended Supply-Chain. In *e2000 Conference Proceedings*.

Bente, G., Rüggenberg, S., Krämer, N. C., & Eschenburg, F. (2008). Avatar-Mediated Networking: Increasing Social Presence and Interpersonal Trust in Net-Based Collaborations. *Human Communication Research*, *34*(2), 287-318. doi: 10.1111/j.1468-2958.2008.00322.x.

Blinn, N., Lindermann, N., & Nüttgens, M. (2009). Web 2.0 in SME Networks - A Design Science Approach Considering Multi-perspective Requirements. *Lecture Notes in Business Information Processing*, *36*, 271-283. doi: 10.1007/978-3-642-03132-8_22.

Bock, G. W., & Kim, Y. (2002). Breaking the Myths of Rewards : An Exploratory Study of Attitudes about Knowledge Sahring. *Information Resources Management Journal*, *15*(2), 14-21.

Bock, G., Zmud, R. W., Kim, Y., & Lee, J. (2005). Behavioral intention formation in knowledge sharing: Examining the roles of extrinsic motivators, social-psychological forces, and organizational climate. *MIS Quarterly*, *29*(1), 87-111.

Boeije, R., Vries, P. D., Kolfschoten, G. L., & Veen, W. (2009). Knowledge Workers and the Realm of Social Tagging. In *Proceedings of the 42nd Hawaii International Conference on System Sciences - 2009* (pp. 1-10). IEEE.

Bogner, A., Littig, B., & Menz, W. (2009). *Interviewing Experts* (p. 281). Palgrave macmillan.

Bonabeau, E. (2009). Decisions 2.0: The Power of Collective Intelligence. *MIT Sloan Management Review*, *50*(2).

Bordia, P., Irmer, B., & Abusah, D. (2006). Differences in sharing knowledge interpersonally and via databases: The role of evaluation apprehension and perceived benefits. *European Journal of Work and Organizational Psychology*, *15*(3), 262-280. doi: 10.1080/13594320500417784.

Bothos, E., Apostolou, D., & Mentzas, G. (2009). Collective intelligence for idea management with Internet-based information aggregation markets. *Internet Research*, *19*(1), 26-41. doi: 10.1108/10662240910927803.

Bughin, J. (2008). The rise of enterprise 2.0. *Journal of Direct, Data and Digital Marketing Practice*, *9*(3), 251-259. doi: 10.1057/palgrave.dddmp.4350100.

Burt, M., & LeHong, H. (2007). Consumerization of IT in Retail: Be Ready When Employees Come to Buy Corporate Technology in Your Store. doi: ID Number: G00147742.

Böhringer, M., & Richter, A. (2009). Adopting Social Software to the Intranet: A Case Study on Enterprise Microblogging. In *Proceedings Mensch und Computer 2009* (pp. 1-10). Berlin.

Böhringer, M., Gluchowski, P., Kurze, C., & Schieder, C. (2009). On the role of social software techniques for the design of self-organising enterprise reporting portals. In *Proceedings of the ITI 2009 31st International Conference on Information Technology Interfaces* (pp. 153-158). Ieee. doi: 10.1109/ITI.2009.5196072.

Cabrera, A., & Cabrera, E. F. (2002). Knowledge-Sharing Dilemmas. *Organization Studies*, *23*(5), 687-710. doi: 10.1177/0170840602235001.

Cabrera, Á., Collins, W. C., & Salgado, J. F. (2006). Determinants of individual engagement in knowledge sharing. *International Journal of Human Resource Management*, *17*(2), 245 - 264. Routledge, part of the Taylor & Francis Group. doi: 10.1080/09585190500404614.

Cardona, P., Lawrence, B. S., & Bentler, P. M. (2004). The influence of social and work exchange relationships on organizational citizenship behavior. Group. *Group and Organization Management*, *29*(2), 219-247.

Chatti, M. A., Klamma, R., Jarke, M., & Naeve, A. (2007). The Web 2.0 Driven SECI Model Based Learning Process. *Seventh IEEE International Conference on Advanced Learning Technologies (ICALT 2007), 5*, 780-782. Ieee. doi: 10.1109/ICALT.2007.256.

Cheng, W., Hailin, L., & Hongming, X. (2008). Does Knowledge Sharing Mediate the Relationship between Trust and Firm Performance? *2008 International Symposiums on Information Processing*, 449-453. Ieee. doi: 10.1109/ISIP.2008.130.

Christensen, P. H. (2007). Knowledge sharing: moving away from the obsession with best practices. *Journal of Knowledge Management*, *11*(1), 36-47. doi: 10.1108/13673270710728222.

Chua, A. (2003). Knowledge sharing: a game people play. *Aslib Proceedings*, *55*(3), 117-129. doi: 10.1108/00012530310472615.

Connelly, C. E., & Kelloway, E. K. (2003). Predictors of employees' perceptions of knowledge sharing cultures. *Leadership & Organization Development Journal*, *24*(5), 294-301. doi: 10.1108/01437730310485815.

Costa, R. A., Silva, E. M., Neto, M. G., Delgado, D. B., Ribeiro, R. A., Meira, S. R., et al. (2009). Social Knowledge Management in Practice: A Case Study. *Lecture Notes in Computer Science*, *5784*, 94-109.

Cress, U., & Kimmerle, J. (2008). A systemic and cognitive view on collaborative knowledge building with wikis. *International Journal of Computer-Supported Collaborative Learning*, *3*(2), 105-122. doi: 10.1007/s11412-007-9035-z.

Damodaran, L., & Olphert, W. (2000). Barriers and facilitators to the use of knowledge management systems. *Behaviour & Information Technology*, *19*(6), 405−413.

Dave, B., & Koskela, L. (2009). Collaborative knowledge management: A construction case study. *Automation in Construction*, *18*(7), 894-902. doi: 10.1016/j.autcon.2009.03.015.

Davenport, T. H., & Prusak, L. (1998). *Working Knowledge: How Organizations Manage What They Know.*. Boston: Harvard Business School press.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319-340. Retrieved from http://www.jstor.org/stable/249008.

Dawson, B. (2008). Facilitating Innovation: Opportunity in Times of Change. *Museum Management and Curatorship*, *23*(4), 313-331. doi: 10.1080/09647770802517316.

De Long, D. W., & Fahey, L. (2000). Diagnosing cultural barriers to knowledge management. *Academy of Management Executive*, *14*(4), 113- 127.

Dignum, V., & Eijk, R. M. (2005). Towards a Model to Understand the Influence of Trust in Knowledge Sharing Decisions. In *WORKSHOP ON TRUST AAMAS*.

Dixon, N. M. (2000). *Common knowledge: how companies thrive by sharing what they know*. Harvard Business School press.

Dourish, P., & Bly, S. (1992). Portholes: Supporting awareness in a distributed work group. In *Proceedings of ACM CHI* (pp. 541-547).

Eisenberger, R., Huntington, R., Hutchison, S., & Sowa, D. (1986). Perceived organizational support. *Journal of Applied Psychology*, *71*(3), 500-507. Retrieved from http://eisenberger.psych.udel.edu/files/22_Perceived_Organizational_Support.pdf.

Ekbia, H. R., & Hara, N. (2006). Incentive Structures in Knowledge Management. In D. Schwartz, *Encyclopedia of Knowledge Management* (pp. 237-243). Idea Group Inc.

Fang, Y., & Chiu, C. (2010). In justice we trust: Exploring knowledge-sharing continuance intentions in virtual communities of practice. *Computers in Human Behavior*, *26*(2), 235-246. doi: 10.1016/j.chb.2009.09.005.

Forsyth, D. R. (2009). *Group Dynamics* (Fifth edit., p. 680). Cengage Learning.

Gettier, E. L. (1963). Is Justified True Belief Knowledge? *Analysis*, *23*(6), 121-123. Univ Minnesota Pr. doi: 10.2307/3326922.

Ghauri, P., & Gronhaug, K. (2005). *Research Methods in Business Studies*. Prentice Hall.

Günther, O., Riehle, D., Krasnova, H., & Schöndienst, V. (2009). Modeling Microblogging Adoption in the Enterprise. In *15th Americas Conference on Information Systems. In Value Creation in E-Business Management* (pp. 1-10).

Hahn, J., & Wang, T. (2009). Knowledge management systems and organizational knowledge processing challenges: A field experiment. *Decision Support Systems*, *47*(4), 332-342. doi: 10.1016/j.dss.2009.03.001.

Hall, H. (2001). Input-friendliness: motivating knowledge sharing across intranets. *Journal of Information Science*, *27*(3), 139-146. doi: 10.1177/016555150102700303.

Hansen, M. T., Nohria, N., & Tierney, T. (1999). What is your strategy for managing knowledge. *Harvard Business Review*, *March/ Apr*, 106-116.

Hasan, H., & Crawford, K. (2003). Codifying or Enabling: The Challenge of Knowledge Management Systems. *The Journal of the Operational Research Society*, *54*(2), 184-193. Retrieved from http://www.jstor.org/stable/4101609.

He, W., Fang, Y., & Wei, K. (2009). The Role of Trust in Promoting Organizational Knowledge Seeking Using Knowledge Management Systems: An Empirical Investigation. *Journal of the American Society for Information Science*, *60*(3), 526-537. doi: 10.1002/asi.

He, W., Qiao, Q., & Wei, K. (2009). Social relationship and its role in knowledge management systems usage. *Information & Management*, *46*(3), 175-180. doi: 10.1016/j.im.2007.11.005.

He, W., Xu, L. D., Means, T., & Wnag, P. (2009). Integrating Web 2.0 with the Case-Based Reasoning Cycle: A Systems Approach. *Systems Research and Behavioral Science*, *26*, 717-728. doi: 10.1002/sres.976.

Hendriks, P. (1999). Why share knowledge? The influence of ICT on the motivation for knowledge sharing. *Knowledge and Process Management*, *6*(2), 91-100. doi: 10.1002/(SICI)1099-1441(199906)6:23.0.CO;2-M.

Hsu, M., Ju, T., Yen, C., & Chang, C. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human-Computer Studies*, *65*(2), 153-169. doi: 10.1016/j.ijhcs.2006.09.003.

Huber, G. P. (1991). Organizational Learning: The Contributing Processes and the Literatures. *Organization Science*, *2*(1), 88-115. doi: 10.1287/orsc.2.1.88.

Jakubik, M. (2007). Exploring the knowledge landscape: four emerging views of knowledge. *Journal of Knowledge Management*, *11*(4), 6-19. doi: 10.1108/13673270710762675.

Jarvenpaa, S. L., & Leidner, D. E. (1999). Communication and Trust in Global Virtual Teams. *Organization Science*, *10*(6), 791-815. Retrieved from http://www.jstor.org/stable/2640242.

Jing, H., & Fan, Y. (2008). Usability of Wiki for Knowledge Management of Knowledge-Based Enterprises. *2008 International Symposium on Knowledge Acquisition and Modeling*, 201-205. Ieee. doi: 10.1109/KAM.2008.133.

John, A., & Seligmann, D. (2006). Collaborative Tagging and Expertise in the Enterprise. In *Proc WWW 2006*. Edinburgh, UK.

Johnston, K. (2004). Folksonomies, Collaborative Filtering and e-Business: is Enterprise 2.0 One Step Forward and Two Steps Back? *Electronic Journal of Knowledge Management*, *5*(4), 411 - 418.

Kankanhalli, A., Tan, B. C., & Wei, K. (2005). Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation. *MIS Quarterly*, *29*(1), 113-143.

Katz, J., & Townsend, J. B. (2000). The Role of Information Technology in the "Fit" Between Culture, Business Strategy and Organizational Structure of Global Firms. *Journal of Global Information Management*, *8*(2), 24 - 35.

Kim, D. J., Hall, S. P., Yue, K., & Gates, T. (2009). Global Diffusion of the Internet XV: Web 2.0 Technologies, Principles, and Applications: A Conceptual Framework from Technology Push and Demand Pull Perspective. *Communications of the Association for Information Systems*, *24*, 657-672.

King, W. (2007). IT STRATEGY AND INNOVATION: Recent Innovations in Knowledge Management. *Information Systems Management*, *24*(1), 91-93. doi: 10.1080/10580530601082004.

King, W. R. (2006). Knowledge Sharing. In *Encyclopedia of Knowledge Management* (pp. 493-498). Idea Group Inc.

King, W. R., & Marks, P. V. (2008). Motivating knowledge sharing through a knowledge management system. *Omega*, *36*(1), 131-146.

Kittur, A., & Kraut, R. E. (2008). Harnessing the Wisdom of Crowds in Wikipedia: Quality Through Coordination. In *Proceedings of the ACM 2008 conference on Computer supported cooperative work* (pp. 37-46). New York, NY, USA: ACM. doi: 10.1145/1460563.1460572.

Kosonen, M., & Kianto, A. (2009). Applying Wikis to Managing Knowledge—A Socio-Technical Approach. *Knowledge and Process Management*, *16*(1), 23-29. doi: 10.1002/kpm.

Kuwabara, K., Watanabe, T., Ohguro, T., Itoh, Y., & Maeda, Y. (2002). *Connectedness oriented communication: fostering a sense of connectedness to augment social relationships*. *Proceedings 2002 Symposium on Applications and the Internet (SAINT 2002)* (pp. 186-193). Washington, DC, USA: IEEE Comput. Soc. doi: 10.1109/SAINT.2002.994476.

Lai, L. S., & Turban, E. (2008). Groups Formation and Operations in the Web 2.0 Environment and Social Networks. *Group Decision and Negotiation*, *17*(5), 387-402. doi: 10.1007/s10726-008-9113-2.

Lazar, I. (2007). Creating Enterprise 2.0 From Web 2.0. *Business Communications Review*, *37*(8), 14-16.

Levin, D. Z., & Cross, R. (2004). The Strength of Weak Ties You Can Trust: The Mediating Role of Trust in Effective Knowledge Transfer. *Management Science*, *50*(11), 1477-1490. doi: 10.1287/mnsc.1030.0.

Levy, M. (2009). WEB 2.0 implications on knowledge management. *Journal of Knowledge Management*, *13*(1), 120-134. doi: 10.1108/13673270910931215.

Li, J. (2007). Sharing Knowledge and Creating Knowledge in Organizations: the Modeling, Implementation, Discussion and Recommendations of Weblog-based Knowledge Management. In *2007 International Conference on Service Systems and Service Management* (pp. 1-6). IEEE. doi: 10.1109/ICSSSM.2007.4280206.

Luhmann, N. (1980). *Trust and power : two works by Niklas Luhmann* (p. 208). Chichester [etc.] : Wiley.

Lykourentzou, I., Papadaki, K., Vergados, D. J., Polemi, D., & Loumos, V. (2010). CorpWiki: A self-regulating wiki to promote corporate collective intelligence through expert peer matching. *Information Sciences*, *180*(1), 18-38. doi: 10.1016/j.ins.2009.08.003.

M.-W. Dictionary. (2010). Merriam-Webster Online Dictionary - Collaboration. Retrieved from http://www.merriam-webster.com/dictionary/collaboration.

M.W. Dictionary. (2010). Merriam-Webster Online Dictionary - Reputation. Retrieved from http://www.merriam-webster.com/dictionary/reputation.

Mackay, A. L. (1991). *A Dictionary of scientific quotations* (2 ed., p. 297 pages). CRC Press.

Marfleet, J. (2008). Enterprise 2.0 -- What's your game plan?: What, if any, will be the role of the information intermediary? *Business Information Review*, *25*(3), 152-157. doi: 10.1177/0266382108095037.

Matteucci, G. L., Marcellin, L., & Gonella, L. (2009). Collaboration, Knowledge Sharing, Communication: The "Enterprise 2.0" Model in Operation in a Research Centre, Csp in Turin. *Journal of e-Learning and Knowledge Society*, *5*(1), 139 - 148.

McAfee, A. P. (2006). Enterprise 2.0: The Dawn of Emergent Collaboration. *MIT Sloan Management Review*.

McAfee, A. P. (2009). Enterprise 2.0 How a Connected Workforce Innovates. *Harvard Business Review*, 80.

Mcknight, D. H., Cummings, L. L., & Chervany, N. L. (1998). Initial Trust Formation in New Organizational Relationships. *The Academy of Management Review*, *23*(3), 473-490. Retrieved from http://www.jstor.org/stable/259290.

Mignon, S., & Janicot, C. (2009). Knowledge Use, Capitalisation and Sharing in the Audit and Consultancy Professions. *Knowledge and Process Management*, *16*(4), 174-185. doi: 10.1002/kpm.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: an expanded sourcebook* (2nd ed.). Thousand Oaks, CA, Sage Publications.

Moore, G. C., & Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. *Information Systems Research*, *2*(3), 192-222. doi: 10.1287/isre.2.3.192.

Müller, C., Meuthrath, B., & Baumgraß, A. (2008). Analyzing Wiki-based Networks to Improve Knowledge Processes in Organizations. *Journal of Universal Computer Science*, *14*(4), 526-545.

Newbold, D. L., & Azua, M. C. (2007). A model for CIO-led innovation. *IBM SYSTEMS JOURNAL*, *46*(4), 1-9.

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, *5*(1), 14-37. Retrieved from http://www.jstor.org/stable/2635068.

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge- Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press.

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and Leadership: a Unified Model of Dynamic Knowledge Creation. *Long Range Planning*, *33*(1), 5-34. doi: 10.1016/S0024-6301(99)00115-6.

Noveck, B. S. (2009). *Wiki-Government: how technology can make government better, democracy stronger and citizens more powerful*. Brookings Institution Press.

O'Donovan, P. (2007). Home Networking Is a Strong Driver of the Consumerization of IT. doi: ID Number: G00148685.

O'Reilly, T. (2007). What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software. *Communications & Strategies*, *1*(65), 17-37.

Oreg, S., & Nov, O. (2008). Exploring motivations for contributing to open source initiatives: The roles of contribution context and personal values. *Computers in Human Behavior*, *24*(5), 2055-2073. doi: 10.1016/j.chb.2007.09.007.

Osterloh, M., & Frey, B. S. (2000). Motivation, Knowledge Transfer, and Organizational Forms. *Organization Science*, *11*(5), 538-550. Retrieved from http://www.jstor.org/stable/2640344.

Quaddus, M., & Xu, J. (2005). Adoption and diffusion of knowledge management systems: field studies of factors and variables. *Knowledge-Based Systems*, *18*(2-3), 107-115. doi: 10.1016/j.knosys.2004.11.001.

Rafaeli, S., & Ariel, Y. (2008). Online Motivational Factors : Incentives for Participation and Contribution in Wikipedia. *In A. Barak (Ed.), Psychological aspects of cyberspace: Theory, research, applications*. Cambridge University Press, Cambridge, UK.

Rainer, R. K., & Miller, M. D. (2005). Examining Differences across Journal Rankings. *Communications of the ACM*, *48*(2), 91-94.

Rettie, R. (2003). A Comparison of Four New Communication Technologies. In *Human-Computer Interaction: Theory and Practice (Part I)* (pp. 686-690). Mahwah, New Jersey, USA; London, UK: Lawrence Erlbaum Associates.

Riege, A. (2005). Three-dozen knowledge-sharing barriers managers must consider. *Journal of Knowledge Management*, *9*(3), 18-35. doi: 10.1108/13673270510602746.

Rogers, E. M. (1983). *Diffusion of Innovation* (First edit.). The Free Press.

Rosen, B., Furst, S., & Blackburn, R. (2007). Overcoming Barriers to Knowledge Sharing in Virtual Teams. *Organizational Dynamics*, *36*(3), 259-273. doi: 10.1016/j.orgdyn.2007.04.007.

Sallnäs, E., Rassmus-Gröhn, K., & Sjöström, C. (2000). Supporting presence in collaborative environments by haptic force feedback. *ACM Transactions on Computer-Human Interaction*, *7*(4), 461-476. doi: 10.1145/365058.365086.

Schepers, P., & van Der Berg, P. T. (2006). Social Factors of Work-Environment Creativity. *Journal of Business and Psychology*, *21*(3), 407-428. doi: 10.1007/s10869-006-9035-4.

Schwartz, R. B., & Russo, M. C. (2004). How to Quickly Find Articles in the Top IS Journals. *Communications of the ACM*, *47*(2), 98-101.

Shaohua, H., & Fan, Y. (2008). Comparative Studies on Enterprise Knowledge Sharing and Wiki. In *Knowledge Acquisition and Modeling Workshop, 2008. KAM Workshop 2008. IEEE International Symposium on* (pp. 968-971). Wuhan. doi: 10.1109/KAMW.2008.4810653.

Shimazu, H., & Koike, S. (2007). KM2.0: Business Knowledge Sharing in the Web 2.0 Age. *NEC Technical Journal*, *2*(2), 50-54.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications* (p. 205). John Wiley & Sons Ltd.

Siemsen, E., Roth, A. V., Balasubramanian, S., & Anand, G. (2008). The Influence of Psychological Safety and Confidence in Knowledge on Employee Knowledge Sharing. *Manufacturing & Service Operations Management*, *11*(3), 429-447. doi: 10.1287/msom.1080.0233.

Szulanski, G., Cappetta, R., & Jensen, R. J. (2004). When and How Trustworthiness Matters: Knowledge Transfer and the Moderating Effect of Casual Ambiguity. *Organization Science*, *15*(5), 600-613. Retrieved from http://www.jstor.org/stable/30034760.

Tapiador, A., Fumero, A., Salvachua, J., & Aguirre, S. (2006). A Web Collaboration Architecture. In *International Conference on Collaborative Computing: Networking, Applications and Worksharing, 2006* (p. 12).

Tuten, P. (2003). A constructivist perspective on knowledge management. *IEEE International Professional Communication Conference, 2003. IPCC 2003. Proceedings.*, 170-174. Ieee. doi: 10.1109/IPCC.2003.1245486.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27*(3), 425-478. Retrieved from http://csdl.ics.hawaii.edu/techreports/05-06/doc/Venkatesh2003.pdf.

Verschuren, P., & Doorewaard, H. (2007). *Het ontwerpen van een onderzoek*. Den Haag: Uitgeverij Lemma.

Wagner, C. (2004). Wiki: a technology for conversational knowledge management and group collaboration. *Communications of the Association for Information Systems*, *13*, 265-289.

Wan, L., & Zhao, C. (2007). Construction of a Knowledge Management Framework Based on Web 2.0. In *International Conference on Wireless Communications, Networking and Mobile Computing, 2007. WiCom 2007.* (pp. 5341-5344). Shanghai, China. doi: 10.1109/WICOM.2007.1308.

Wang, S., & Noe, R. A. (2009). Knowledge sharing: A review and directions for future research. *Human Resource Management Review*, 1-17. doi: 10.1016/j.hrmr.2009.10.001.

Wasko, M. M., & Faraj, S. (2000). "It is what one does": why people participate and help others in electronic communities of practice. *The Journal of Strategic Information Systems*, *9*(2-3), 155-173. doi: 10.1016/S0963-8687(00)00045-7.

Willem, A., & Scarbrough, H. (2006). Social capital and political bias in knowledge sharing: An exploratory study. *Human Relations*, *59*(10), 1343−1370. Retrieved from http://ideas.repec.org/p/rug/rugwps/05-355.html.

Yang, C., & Chen, L. (2007). Can organizational knowledge capabilities affect knowledge sharing behavior? *Journal of Information Science*, *33*(1), 95-109. doi: 10.1177/0165551506068135.

Yin, R. K. (2003). *Case Study Research Design and Methods*. Sage Publications.

Yu, T., Lu, L., & Liu, T. (2010). Exploring factors that influence knowledge sharing behavior via weblogs. *Computers in Human Behavior*, *26*(1), 32-41. doi: 10.1016/j.chb.2009.08.002.

Zhang, X., Vogel, D., Chen, Z., Tian, W., & Guo, C. (2009). Supporting Knowledge Sharing Visibility: A Qualitative Analysis. In *Pacific Asia Conference on Information Systems*. Association for Information Systems. Retrieved from http://aisel.aisnet.org/pacis2009/35.

Appendix A - Expert Interview Guidelines

Questions to be addressed during the interviews with experts:

How can you describe your main occupation and your main expertise areas?

Could you please give a few examples of your experiences in dealing with, implementation of knowledge management practices, defining strategies, implementing IS, Enterprise 2.0?

1. What main trends can you identify in the modern KM practices?
2. What organizational and individual level obstacles to sharing knowledge between organizational members can you name?
3. Can you describe how the modern trends and tools in KM address those difficulties (barriers) in the process of sharing knowledge, both tacit and explicit?
4. The concept of Enterprise 2.0 is in its hype now. How would you describe the current use of Enterprise 2.0 for knowledge management?
5. What obtained and potential practical value do you see in Enterprise 2.0 tools use for KM practices?

For Hypothesis 1

6. Is interpersonal trust an important factor in defining an individual's decision to share unique valuable knowledge? Why do you think so?
7. What is the mechanism of establishing trust in professional groups? Is it true that close and frequent communication and mutual experiences and collaboration, more personal and professional information about a peer facilitate trustful relationship between colleagues?
8. Do you agree that Enterprise 2.0 tools (social networking, blogs, etc) are useful for enabling trustful relationships between organizational members? How this can occur? What is the mechanism so to say?

For Hypothesis 2

9. What are the main perceived costs of sharing by knowledge workers?
10. What are the main benefits?
11. What incentives do you consider to be the most effective for encouraging knowledge sharing? For explicit knowledge, for tacit knowledge, for different strategies?
12. What are the main changes (if they are) in the collaborative work activities with the introduction of Enterprise 2.0 tools and principles?
13. Sometimes the most influential reason of not sharing knowledge is not the costs or risk of losing job security, but the complexity of expressing insights, explaining underlying reasons of decisions, etc. Can collaborative tools help reduce the complexity of the task of knowledge sharing? To make the task to be perceived as easier? E.g. wikis which allow a complete piece of content creation with small and not time- and effort consuming contributions from collaborating group members.
14. One of the barriers to KS is considered to be the perceived loss of power. Can you describe how Enterprise 2.0 tools address it? Is it possible to say that contributing a small piece of knowledge or content (like in wiki) or building personal reputation by authoring valuable and popular pieces of knowledge (like in blogs and comments) can reduce the perceived risks of losing job security, losing power.

For Hypothesis 3

15. Organizational culture is a major factor influencing knowledge sharing (53% - proportion of all factors). How would you describe favorable organizational settings for knowledge sharing?
16. What are most influential motivators for KS?
17. How would you explain the visibility of (knowledge sharing) tasks? Do you think that the increasing of visibility has positive influence on intentions and behavior to share knowledge?
18. Can social media tools bring visibility to knowledge sharing tasks? How?
19. What are the driving forces of the organizational culture change? Top-down or bottom-up (grass-root initiatives)?

Appendix B - Interviews Summaries

B1. Interview 1 Summary

April, 12 2010

Q: Could you please describe your main areas of expertise and experiences?

A: Areas of expertise are all sorts of internet and intranet technologies that can be used to support Knowledge Management, especially Knowledge Sharing technologies. My main specialty is in Searching and Navigations, Wiki technology, intranet solutions like SharePoint, Jive; Document Management systems, Semantic technology, and many others. I do big consulting projects from half to two years.

Q: What barriers of knowledge sharing have you seen and experienced in your practice?

A: I think one of the main problems is that Knowledge Management and Knowledge Sharing are not part of the responsibility of line daily management, but, for example, part of the responsibilities of HR or IT. Sometimes it happens that someone thinks that if he shares his knowledge, he will lose his competitive advantage in an organization. But it really does not happen a lot. I think that the problem is not about being willing, it is about knowing how to – an expert is not a teacher. Many experts are not thinking about what they know, they just do their job. They don't know how to write their (tacit) knowledge down. Structuring knowledge, organizing knowledge is a specific job, like driving a car.

Q: How can IT tools facilitate this process?

A: Well, if it is not a "line" management, but "staff", it is difficult to solve it by IT. But social software can be a good enabler for several things. It helps people to know who is who. Cultural differences between young and organizations with long history make a difference in the process of adoption of new tools and communications rules. Social media helps people to be connected and influences communication in organizations.

Q: Can you think of some examples how social media tool can address the barrier of interpersonal trust? Is it possible in general?

A: Yes, I think so. It's not a replacement for face-to-face. I personally support a number of social networks and communicate with people in those networks only virtually, we meet a couple of times a year. Based on their behavior on-line for a certain period of time I started trust people, because they demonstrated in their

way of communicating that they are interested, they help me, I help them and they appreciate it. I think these tools can support trust.

Q: When it comes to writing down their knowledge, experiences people may have difficulties. Do tools like wikis, blogs make it easier to express knowledge or makes the perceived costs of sharing less?

A: It helps a little bit. First, technologies like wiki or blogs are down-to-earth, technology is very simple. So if you know how to write and what to write, it is very easy way to put something to the intranet or to internet. Second, collaborative writing might help. If somebody starts writing who knows how to write, it is much easier to respond to something. There is always a relatively small group of people what always just want to write down the things, the second group responds and comments later, and the third group, a big group in organizations, after a year or two may get interested, too. However the adoption of a tool does not fix the problem of writing, you still have to react. Some people just don't. Wiki or blog may supports getting more people to write (may be a difference of 5%), even if they are dispersed, because they supports reacting to the things that other people wrote down.

Q: What are the main organizational means, incentives for stimulation using social software and knowledge sharing?

A: It is not different from motivating using other tools, groupware. Young people (digital natives) bring the usage of technology from private life to business and, if organizations support this way of working, adoption would be successful. There should be a need to use social software, like for consultants who stay at clients place very often but want to be in touch with their colleagues.

Q: One of the discussed barriers to knowledge sharing is the loss of power, loss of competitive advantage. Do you see it as an important factor?

A: It is, but it is not number one. Some people don't want to be part of collaboration, they don't like meetings. But it is also related to corporate culture, with how open your organization is. Sometimes people feel being judged, even if they are not, or they are afraid of asking questions. Besides, sharing a file or a presentation means sharing just information, not knowledge. I don't feel like losing something when I share my presentation, for example, because that was my experience that I put down on paper, not theirs. Sharing a file is sharing explicit knowledge that is not that useful. What is useful is the insight of an expert, his ability to understand if one thing is more important than another.

Q: Can visibility of knowledge be a motivating factor to share knowledge or ask question?

A: yes, absolutely. I believe in the idea of supporting people in making visible what they know. I don't like ranking in the form of stars or points. When people answer questions, the last three questions answered and who answered them may be shown on the home page. So even without giving people explicit points, you can still see who is active, who asks good questions and who gives good answers. This is still a type of visibility, and maybe some people avoid meetings, but they are visible online. This builds the online and real life reputation. I think when the experts who have a feeling that they're giving something away only costs something and does not have any benefits, they may change their opinion when people respond to them.

Q: Can it be the case when tagging, classifying information by knowledgeable people is also sharing insights or logic?

A: Yes, you can say that this is a way of making things explicit as well, because before there was tagging people used yellow markers to mark things in documents Still the ability to make a good summary selecting the right things, not the ability to mark something, is the competitive advantage, because some people mark too much. Those bookmarks that were revisited are the important ones, measuring the amount of reused items is interesting.

Q: Can you make a brief conclusion about what the most important things are which social software addresses in knowledge sharing?

A: The most important thing in making use of social software is to support people using it. This means helping people during the whole project, investing time in teaching a small group from month to month what to do. That is the way to get them trust the technology and adopt it. It is a good practice to make a summary of a meeting and make the most important point available for the afterwards online discussion.

B2. Interview 2 Summary

April, 13 2010

Q: I would like to ask you to describe your main areas of expertise and experiences?

A: I studied soil and water preservation. Later I got very interested in communities of practice, social learning theories, and learning in communities of practice. Now I do a lot of work in knowledge management from the social learning side. And I use the social media to support the learning processes.

Q: Thank you. Can you give some examples of the projects you participated?

A: I still have connections to the development sector. I work as freelance consultant now, so I have different assignments. I also do a lot of research type of work, but most of the work is advisory work and often it is related to learning networks.

Q: What barriers to knowledge sharing have you seen in your work and experience?

A: One barrier is trust in people. To expose what you do in a really honest manner, to share what matters to you applies in the networks you trust. Trust in organizations is very much linked to hierarchy and also the organizational culture. I work a lot with communities and networks between organizations, and when you connect practitioners with similar problems, automatically a lot of trust develops. It is still a process that you have to guide, but it is not that difficult, as if you were within an organization and you worked across hierarchies. It depends a lot on the culture of an organization, whether people are willing to share. So, you have to analyze the culture, what are the specific barriers in that organization.

Q: What kind of organizational settings can be favorable for knowledge sharing and facilitate it?

A: The example of Google shows the organizational culture of being interested in working in a networked way, when people work across department or boundaries. I think that this facilitates learning and innovation. Also the problems depend of what the aim of knowledge sharing is. If you want to develop a culture of continuous innovation, then it is very important to stimulate knowledge workers to share and invest time. In those companies where people have only to produce and where there is no tension in investing in learning and sharing, then people will not be inclined to do so. It is also very important that the management of organization participate, it is known that management and leadership can do a lot to influence the type of culture in organization.

Q: And how social media tools fit in the organizational cultures?

A: On the one hand you need a certain open culture, willingness to experiment in an organization for social media to spread, for people to accept and to start using it. I do sessions in organizations and I see that some people are very reluctant, because they work in a certain manner and they are not open to new ways of working. So I think social tools help, but not exclusively. I also think that you can use social media as an intervention to change the organizational culture. You really have to combine it with well designed change process and knowing what you want to achieve, and also knowing who in the organizations you should get on board.

Q: If we move to interpersonal setting, you mentioned the barrier of trust. Can you think of some examples from your experience how the usage of social media can influence building trust?

A: I think that one medium that really stands out is microblogging, like Twitter and Yammer. When Twitter didn't existed I tried blogging to make people share between different departments, but it was very hard, because people said it took a lot of time to write down a blog post. With microblogging it is so intuitive and simple. It is a low threshold tool to stimulate conversations within teams. The building of trust is also very much connected to the notion of private vs. public tools. And some people are very critical saying that Web 2.0 is about open and if you have a closed wiki for ten people it is not really in the spirit of social media that should be open to everybody. But I disagree there, because I think this can work very well for knowledge sharing, especially private tools because of the trust.

Q: Do social media tools (microblogging) influence not only trust, but also work awareness?

A: Yes, we have our own group of consultants around social media. We have set a Yammer group. Some people read each others' blogs, but not all of us have blogs. But since we have set up this yammer group, we quickly discovered that we were invited by the same client and we help each other. If people are open to sharing and can process a lot of information, it helps to avoid communication problems. If you are aware of what others are doing and the way they are doing this, then you don't forget about colleagues, you don't forget to inform them, etc, and collaboration can really improve.

Q: Do you think that social media tools can address the issues of knowledge visibility?

A: Sometimes database can also work, but there is a huge danger that people fill in their profiles once and then they never get updated. I do believe in the property of social media that you are in constant contact. And that is true when reading blogs, microblogs, in social networks discussions. Then you can see who is an expert in what. You are able to network, identify people who know a lot about certain topics, or that you know that somebody did similar job not too long ago.

Q: What from your experience could you name as costs for a person, for employee?

A: A very important barriers of face-to-face communication are also social barriers. This is because of group dynamics, which also can prevent people from sharing. Plus face-to-face there is usually a time limit, because only one person at a time can talk. I think that very clear thing is time. If you have trust and you think you will have something in return, so that sharing is still a reciprocal process, then you will invest in it. It costs you time and energy, but if you get a lot of energy and ideas back, you will invest.

Q: and how can social media tools address this problem?

A: Like I said for me personally it can be quite difficult, if I decide to go to meeting, With social media online it is much lighter, I can decide to receive a newsletter and it costs me only five minutes to scan it. So the threshold to enter, the first step of becoming a member is much easier with social media. It is easier to network, with Twitter you can follow a lot of people, If I had to meet them one by one, it is a big decision. I can only network with one or two people per week and on twitter I can add even twenty people in a week. So it makes it easier to test and to see what is interesting. The threshold to connect is much lower.

Q: Have you observed such situations in organizations and teams? That social media make sharing, connecting, collaboration easier.

A: I think the whole concept of networking has changed and now you can network with much larger number of people online and you don't have to invest in one to one contact. You can decide to collaborate and then it is a matter of choosing the right tools in teams. And social media offer you easy connections and so when you decide to work closely on projects, a lot of normal project team challenges apply, like dividing tasks.

B3. Interview 3 Summary

April, 13 2010

Q: I would like to ask you to describe the main area of your expertise and experiences?

A: I help non-profit organizations in projects to use social media in knowledge sharing between people who are not working together in the same place, but share the same actions or goals. One example is quality managers in health care.

Q: What trends can you see in the knowledge management, can you compare to several years ago?

A: I think that in the past people found quite a lot of contacts in real life, in symposium, training. I see more and more people finding resources online that they can contribute to; they find out that they can also network around the information.

Q: What are the main barriers to knowledge sharing inside organizations from your experience?

A: Sometimes it is the paradigm that people think that knowledge has to be guarded for themselves, because it is the main asset. People are sometimes scared to ask questions, because they are not completely confident. They don't know who is working on what, so it is not really the knowledge that they need, but they need to know who knows about it.

Q: Can you give some examples how social media effects the visibility of knowledge?

A: Traditional knowledge banks in organizations or in intranet separate knowledge from people. And social media, because it is social, sees the people first. Then knowledge is always connected to somebody

Q: Have you encountered situation when the visibility of authors and knowledge contributions are perceived as building reputations?

A: Yes, but sometimes it is fuzzy. You see someone a lot and you think they are knowledgeable, but they are just very active. It does not say anything about the quality of a person's contributions. But on the other hand, it is really transparent, visible in comments, if somebody is not adding value, knowledge.

Q: You said that one of the barriers is the perception of knowledge as an asset and the fear to lose the competitive advantage. How can this barrier be addressed from you experience?

A: It is scary to show what you know, especially in the area which you are not very certain about. On the other hand, if you show what you know, then you can compare your knowledge to the knowledge of other people and find out how knowledgeable you are in fact. In sharing your knowledge you can learn from somebody else and you can show your talent, so that next time when somebody asks you a question it is closer to your area of your expertise. And then you don't have to answer that you don't know, because people know what you know.

Q: And what happens with the organizational cultural, does it change change?

A: What I see is that people who are using social media are becoming more independent. They don't except the boundaries of the IT that is given to them by the organization.

Q: Does this also effect communication?

A: yes, I think this is quite destructive for an organization. But as long as people have open mind toward the generated changes, it is ok. It is an old-fashioned thing that there should be a separation between all those departments and this makes organizations scared and chaotic. For a lot of people who are conservative it is also scary.

Q: What are the facilitating factors of organizational culture for knowledge sharing?

A: I like to see it as a culture you can find in a group of six year old children, creative, fun, experimental, explorative, curious, transparent, and open; the environment where there is applause for successes.

Q: In what kind of organizations this can be possible or you worked with such organizations?

A: I think they are the small organizations. Big organization can look like lots of small organizations. Organizations that are about innovation, or that need to innovate in their processes, or when their goal is bigger than they can handle by themselves, so they need to cooperate with others organizations together will force the culture of experimentation. One of the organizations I work for has its goal to make higher institutions to make sustainability a part of the curriculum. So they have to work together with all the different educational organizations. They are all about knowledge sharing, it is their business. And they have the right culture. They organize the trainings, workshops and meetings to gather all those people together and now they add an online component to their traditional way of working. So they use social media to help people work together when they are not in the same place and time with the help of wikis, blogs, others.

Q: And how is the collaboration occurring in this project?

A: There is a need to share knowledge because they cannot do it themselves. They are facilitated by the tools which are very easy to use. It is really curious that we find it hard to ask a question to somebody because we think that we impose on their time and energy. On the other hand, if somebody asks us a question, we are happy to be able to help out. People find out that when they start using tools for sharing, it generates more energy, they see how fast it works, how much time it saves and how many contacts you can have with other people around information than before, when you were doing your job in isolation and tried to invent everything yourselves.

Q: You have mentioned that for some people speaking on public can be difficult, for others writing a solid piece can be a time and effort consuming task. Can collaborative writing technologies address this problem, make perceived costs less significant?

A: yes, I think some people are good at starting a story, others are good at finishing, some are good at fact checking, others are good at checking grammar or checking the structure. Sometimes there is a need in a video camera to do a story. There is an example of Hagatube, they have flip cameras in hospital. It is good to look at your co-workers doing their jobs and how patients are experiencing their staying in the hospital. It is also have a lot of knowledge management, because you learn from seeing people doing the same stuff that you have to do, sharing experiences by accident.

Q: We have discussed trust, culture, collaboration. Did you have any experiences with using and implementing microblogging in the organizational settings?

A: There is tool that my network uses, they are all individual entrepreneurs and working for a lot of different kinds of customers. So every time we find a new customer we have to know something about their business, their markets. We use the network to share information about that. It is not deep knowledge; it is just discovering people and discovering hints to the different areas. And within organizations you see the use of Yammer. The biggest problem that my clients state they have with knowledge management is, first of all, that they don't know what they know as a whole, second, they don't know who knows it. And in this second area, about who knows what, and who is doing what, is where microblogging comes in, because it is all about "What are you doing right now?".

Q: May I ask you to conclude the topic of barriers to knowledge sharing and how they are addressed or are not addressed by social media tools and principles?

A: The tools are just the tools, they are easy to use, they are free, and there are no big risks involved, if you start experimenting. You need to find within an organization or network highly visible people who everybody wants to be like and get them use it, to set an example. And it also sometimes puts people who are not visible normally in very visible positions, so that they are discovered as talents. And there are quiet types of people in organizations, they have expertise or they are very advanced with technology, and when they start using it, they are discovered. They are turned more to network of the organization, because they find a way to be visible. If there is no technology, the visible people are always the same kind of people, people who have a lot of confidence in themselves. And I think social media creates a stage to more different kinds of people.

B4. Interview 4 Summary

April, 15 2010

Q: Could you please describe your main areas of expertise and experiences.

A: I work for a large hi-tech company; I've been working there for more than nine years. I am at the position of Information Architect. I am responsible for the information management and knowledge management programs; how do we improve information management and knowledge management within our organization.

Q: I have read that recently you have implemented a number of social media tools. Could you please tell about this with some details?

A: If you look at the organizations from information perspective or knowledge perspective, there are two types of information in an organization: more structured information processes and the more unstructured ones. Information management usually has lots of money and focus on the structured side of the organizational information (e.g. product data management systems). And on the other hand you have unstructured information and information processes and tools to support it - e-mail, file-shares, collaboration tools, and social media tools. Those two information types are related to each other. And what you see is in the outside world is that it is usually not related; you have structured world and you have unstructured world, which have nothing to do with each other. And social media can fill those gaps, it helps people to share the information that does not fit in e-mail, does not fit in a formal report management system. It is a context to all the other information going around in e-mail, document management tools and supporting product data management and ERP tools.

Q: Did this gap become visible when social media initiatives started? What was the beginning of the introduction process? Was it bottom-up or top down?

A: The process is definitely bottom-up, it is not top down. For instance, we had a problem with project information. It was done in lots of different ways and we could not find a good tool to manage project information, and somebody in organization said "May be we should try wikis for project information". And from there this grew further; and all the things that we are doing, like blogging, microblogging, social bookmarking come from bottom-up. Even our SharePoint roll out came from bottom-up. And eventually what you always see is that if the success of such a tool, as wiki, has been proved over time, then there is always a moment when the formal organization, management in business and IT says that this has real value to the organizations, and proposes to formalize, accept and approve the tool.

Q: Is it right that there is no pushing of technology, but there is an organizational need and people start using some tools.

A: Mostly yes, most of the time that is the case, although lots of initiatives started in R&D, not in IT. They are engineers, technology focused people. There is business need, but sometimes there is also some idea of new interesting technology, "let's just try it and see where it goes". But there is always a moment when the experimentation mode of trying new tools somewhere after a couple of years or a couple of months, has to become official in form.

Q: Why the bottom-up approach was possible?

A: Business does not want to wait for its IT department to bring a solution and people just start trying things. And within our organization we have a very flat organization, it is not hierarchical. The way we do this definitely has to do with our culture. Another issue is that we are still going through a very rough time. Then all of a sudden social media becomes very interesting, because it is cheap and easy to set up, and the value you get from those tools is very easily proven usually.

Q: How does knowledge sharing occur in your organization?

A: Information management and knowledge management for me is about improving productivity of business as a whole, but also of people. If you are good at organizing your own knowledge, then the organizational knowledge management will also be very easy to organize.

Q: What difficulties in the process of introduction and adoption of social media tools have you noticed?

A: We are still in the first early adoption phase and still learning heavily about how to use this technology in a correct way. There are lots of people who are willing to be open and transparent, but we also find other kinds of people. We have typical questions of security, and people asking if it is too open. We have people who just say: "Why do we need social media?" We have also people who think that people in the social media are only those people who want to show off. We get that kind of reaction and in that sense we still have a lot of convincing to do. We do presentations and explaining, and showing examples of other companies, but also internal examples of what social media can mean for our organization internally, but also externally. We give people personal advice which tools to use and how to organize personal knowledge management. We organize workshops to tell people about the general trend of the Web 2.0, what is going on there.

Q: Was trust in your case a barrier for social media adoption?

A: Social media is about being open and transparent. And there is tension there. I know people who say: "I am not going to be open about the things that I am doing or not doing, because may be this leads to problems". With social media we are not forcing people to use it. In general, we don't hear lots of people saying that because there is no trust in the organization, they are not going to use it. And one of the things we also do to help people learn, collaborate and communicate in a more open and transparent ways is, for instance, in the Yammer microblogging platform we moderate it.

Q: One more barrier is complexity of the task of writing. For example, can the wiki way of collaboration reduce the complexity?

A: What we see is that there is a barrier for some people in using a technology. But people take different roles. Say, you have trouble with publishing something in a wiki, then I can help you with publishing your content. and there is also a third person coming and seeing some typos and correcting them. You see people not wanting to blog, for instance, but they do comment, they do read. What they do is take that link and say "This is interesting". And all these different types of usage of social media are interesting and are essential to the success of social media.

Q: and what about the barrier of the loss of competitive advantage?

A: We came from the area of "Knowledge is power". And now we see that sharing and connecting, and, of course, knowledge is power. If you don't have anything to say, but you share a lot, then it is not interesting. And people are slowly starting to understand that this is a new way to go, but some people find it difficult to be open about the things they do, because they think "If I share, then somebody else can use it." I think it is not an issue, because as soon as you share it in social media you name, date and time are there. So you can always say that your idea was there before somebody else's idea and somebody else used your idea to make it an even better idea.

Q: Do you notice that contributors use social media for reputation building? For visibility of knowledge?

A: yes, definitely. Lots of people use social media for this. People have a blog for that reason internally; people participate in microblogging just to show that they are experts in certain area.

Q: Knowledgeable people can be different, not open types of personalities, not communicative, for example. How would you deal with such a case?

A: For a start you can always see if you can help such people to open up more and ask them to tell others what they are good at, so that people could find them and then they will be acknowledged as experts on a certain topic. In such a situation a connector can help people find each other, even when the person who is an expert does not have a blog, twitter, whatever, he is still a knowledgeable person, because I know him as a knowledgeable person.

Q: We have just one minute left, could you please wrap up our conversation with three most important lessons learned from your experience.

A: Barriers to try new things are very low. That is one: experiment, try and see what works for you or for your organizations. Two is culture. Social media is typically about telling a bit about what you know and asking questions, saying "I need help, I want to learn, I want to interact". There should be a conversation, a dialog. Another lesson learnt is that it is cheap and the whole position of IT is totally different. In knowledge management, social media there is lots of technology, but it hardly has anything to do with the IT department. That is also a big change going on there, and connecting to the IT world is also a lesson learned. In any way you have to try to keep IT on-board in some way and keep relating to them.

B5. Interview 5 Summary

April, 15 2010

Q: Could you please describe your main areas of expertise and experiences?

A: Out company tries to bridge the gap between IT, business and employees, help people optimize their success in organizations with the aid of effective information. Effective information means sharing, structuring, organizing information in a way that it is accessible and available whenever you need and in whatever form you want to have it, documents, content management, online and offline. We are looking at processes from an information perspective and we do this in three areas. One of the areas is how you can use innovative technology in a proper way. Another area is knowledge processes, looking at how people act in processes and interact with each other, create knowledge, share knowledge, store knowledge, whether that knowledge is tangible or it is inside people's heads, whether it is in documents or in discussions - those kinds of aspects. The third area is about visual thinking and it is basically visualization of information, knowledge, social networks, eco-systems, and so making complex information accessible through visualization.

Q: Could you give some examples of the projects you worked in? Are they big or small, of what type?

A: Some projects are very big, others are very small. Examples of projects are for large engineering consultancy firm, we are now almost three years working to improve their knowledge sharing capabilities. That engineering consultancy firm is working in the industrial markets and they have various expertise, and the problem they had was that they had a department with 25 people and they had to grow to about 75. In order to be able to grow they needed insight in who knows what in what market. They also have a very experienced, but old people and engineers working with them. They wanted to know if they were vulnerable by having that knowledge only inside those people's heads. And what we did there was, at first, to identify the problem areas, and they were in quality management area – doing the work we have to do in a proper way, structured way, having document management in place, IT systems in place, the fundamentals of doing your work like you should. And second track was purely focusing on knowledge management. Within that track we looked at apprentice scheme. We mapped all the employees of the company into the matrix that was structured in expertise in markets. And we also mapped desired knowledge for the business plan. And that

was a driver for hiring or training people. We made explicit the gap between the current knowledge and the knowledge needed to achieve the goals of the company.

Q: What were the main difficulties in making people share or use the tools?

A: The most difficult thing was to allow people spend time on it.

Q: Is it possible to say that in that project there already was the culture of sharing and willingness?

A: yes, right, because the group was very small – at first it was only 25 people. It is very easy to share knowledge when you are with 25 people and all those people you know. You know who is interested in certain documents, for example.

Q: Were there initiatives in establishing collaborative processes, for example, wiki, shared documents, collaborative content creation?

A: There are some pilots now in the SharePoint environment in working in this way, collaborating on the information that is put into SharePoint, also working across organizational boundaries. What we do see it that this kind of working, real collaborative working on documents happens more and more within our own company. Especially because we are part of multiple communities, and communities tend to be more global.

Q: Why do you use collaborative tools?

A: Because otherwise collaboration does not happen. If I make a presentation and send it via e-mail it ends up in a pile of hundred other e-mails that need attention. And if you globally arrange a timeslot for a conference call or skype each other, and collaboratively work on a document, then you're much more effective.

Q: Is it possible that such a collaborative way of creating content is less time of effort consuming?

A: It definitely is. But it depends on the task you have, because if you need to do that in a group of like 20 people, it is not effective, because you cannot find a time slot, it is very hard to moderate it. But in one-to-one or one-to-three kind of setting, a collaborative way is much more effective, because in one hour you'll have more results them when a person #1 works for half hour, sends it to two others, then they read it, then they don't have context and cannot ask questions. Based on assumptions they give feedback, the feedback is half of time correct and half is based on wrong assumptions. So it is a long process. Real time collaborative working is effective. I don't have measures for that, but the feeling is that it is definitely more effective.

Q: Is it possible that any kind of tools (software) can stimulate knowledge sharing?

A: yes, it depends on the amount of time a person should spend to learn to use a tool, to become confident with it. People should really be confident in using a tool, and then there should be the feeling of safety – to feel safe when saying that this is my knowledge and I shared it.

Q: Is it related to trust issues?

A: you always have to be sure that you have your back covered.

Q: Can you see the ways to improve the trust in collaborating groups?

A: I think this is possible, because what I see is that, for example, Google Wave addresses it from the communication point of view, SharePoint - from a document point of view, addressing same type of

behavior, they are merging. Also LinkedIn in their discussion and groups is also pending towards knowledge sharing, discussion facilitation. All areas are blending and I think, if you look at this eco-system there are a couple of things that are important to address the question of trust, credibility and who is who (the LinkedIn kind of profile), and feeling safe within those people you know in real life and online. Looking into eyes is really important. But also a nice thing in collaborative environments is microblogging, for example. It does the same as looking somebody to the eyes, more or less. If you have people you know for a long time on Twitter for example, you feel that you know them better than in a more formalized forum or a collaborative environment, because people share also non-professional things, like how they feel or what they see, what they do and enjoy.

Q: And how does microblogging work in the organizational environment?

A: Yes, you have some restrictions compared to Twitter, people are conscious over microblogging in organizations and their work. Looking at knowledge sharing - of course, 140 characters can't really be knowledge, it is not much you can put in there, and you can put a question or an answer. But it still facilitates conversation, makes knowledge visible.

Q: So microblogging or personal pages, can create knowledge visibility. Can such tools be also used for reputation building? Is reputation an important factor for sharing knowledge?

A: What you see happening is much more explicitly personal branding, inside organizations. Anything that people can find or can see based on the post of links, stories, something interesting by other people is used for reputation. The first thing people do is look at the profile, try to get as much reputation information as they can get. People do not create balanced image of your reputation, but everything that is there helps and contributes. In the end the basic knowledge sharing question is what is the content of knowledge and how can I rate it. And rating of the content of knowledge is done taking into account who the source is, what is the context of that source – is it academic, based on specific example, case study; is that someone's personal experience and if it is who is that person, what is his status?

Q: For conclusion, may I ask you to state most important lessons learnt in facilitating knowledge sharing from your experience?

A2: The first is to decide on tooling, make sure that the tool you use is in right shape. If you through something into a group of people and they don't like it, they will not use it and your efforts are wasted.

What my another learning would be is that people often treat knowledge sharing like it is a self sustainable process once you start it. I don't see it like this. I think it is a thing that you will have to support explicitly all the time, keep it in the action list.

The third is trying to combine top-down and bottom-up approaches. Top-down you identify vision, objectives, then bottom-up you try to meet those objectives with activities and then top-down again you force. Based on the bottom-up input you set up guidelines and business matrix, and you stick to them. But only bottom-up does not work, because then you miss the context in a proper way and only top-down does not work, because you miss the connection with employees.

B6. Interview 6 Summary

April, 26 2010

Q: Could you please describe your main area of expertise and experiences?

A: I did my PhD here in this company together with Delft University. I tackled a problem, a technical issue with design process, which was really knowledge intensive and time-consuming. The idea was to capture the knowledge of the experts that were available in such a way that you can program it, so that the process was automated. Then we found that was quite interesting for industry. During my work on different projects I found that knowledge capturing is not always there in a design process. I found that we needed knowledge management, because we do a lot of repetition over projects. You see a lot of products, process steps that could be reused. But somehow everybody starts to reinvent a wheel once they have a new project. That is why I got involved in knowledge management, how to capture and share knowledge from other projects for new projects. Knowledge reuse is an important aspect of our focus.

Q: Can you please tell about the knowledge management in the company, what is the history, what were the main actions?

A: After the realization of the need in knowledge management, the first step was to start spread the news, saying that we have a problem here. I needed to get everybody's attention that that was a serious issue. We thought of a quick win. I have used the model which says that on the one side there is corporate knowledge, and on the other side there is the reuse of this knowledge (see "Learning to Fly" book). And somehow you need to mobilize this corporate knowledge, so that it is being reused in practice. And then what you learn you have to integrate again. We have now lessons learnt database. You can search for your discipline, see all kinds of topics, and if you click on them you get lessons learnt, or documents or a person details who knows a lot about it. We also have a lot of handbooks, aerospace engineering has a lot of handbooks.

Q: What are the activities from the organizational side?

A: From the organizational point of view it is a big challenge, because you can think of all these nice initiatives, then the initiatives are only done when they are being used. We have a big change project going on in the organizations, it is directed to improving our ways of working and it starts with more communication, and knowledge sharing one of the parts. I visit different teams to get them motivated to do it. It is spreading like a wave. It starts with two teams who use it and people get enthusiastic, I get feedback, I can make it better.

Q: What does the process look like? What are the initiatives?

A: Each initiative is different; because the lessons learnt initiative has a separate process of capturing lessons learnt which we, for instance, do with workshops at certain stages in a project. And the knowledge navigator is more directed. We have our functional departments who are in charge of the content. It is not really working that well, some departments share content, but not all.

Q: And what are the reasons?

A: mainly time. One of the biggest barriers that I encounter "What's in it for me?" Somebody has to start. And in that sense everything that has to do with knowledge sharing is about somebody investing some time, so others can learn. But if everybody does, then everybody can learn from each other. The biggest barrier is in middle management. The top management says we must do knowledge management, and our engineers want to do it. But middle management has to make sure that the core projects are in time with correct deliverables.

Q: And how would you describe the general culture in the company, is it favorable for sharing knowledge? Or is there a competitive feeling between teams?

A: I think everybody wants to, they express this, and they are in favor of doing knowledge sharing. What I see that engineers are not used to asking for help. Until now I think everybody older than me is from a generation that was being taught to solve problems themselves. This is one of the biggest barriers in terms of culture that engineers, this current generation is not used to asking for assistance. The first thing they think of when they have a problem to solve, is not who has done this before, who could help me with this. They just start doing their work and only when they get stuck they think that perhaps somebody wrote something down. To solve this perhaps we should trigger the need, but you should have a need for knowledge to start searching. But if you don't see the need you will never search. And then I can offer the best initiatives available, but if nobody starts searching it is useless.

Q: For capturing the lessons learnt is there an official task or it is up to every team to decide?

A: It used to be obligatory that in the end of the project you write down your lessons learnt. But what I found that projects last at least three years, and then a lot of lessons are forgotten. There were a lot of improvements; we recently have defined a new lessons learnt process. In general capturing lessons is a collaborative process. An individual also can write down a lesson learnt. So if an engineer has an experience with a certain product configuration, he can write a lesson learnt saying "do it again because it works very well". Then you have a team effort. Our teams meet several times a week and issues that arise during these meetings can be captured and stored. And we have mandated workshops. We do one workshop with the entire team or perhaps there are specific topics, technical topics, management topics, then we do a workshop separately on this topic.

Q: Trust can be an important factor in knowledge sharing? Is it so in your company?

A: This is an engineering company and trust is not an issue here. I have not experienced that this is a barrier. You can just see the name of the author of some piece of content, and if you have more questions you can ask him. And so if the author's name is visible there, he is the owner. It is an engineering company, so there is no real competitive feeling in that respect. If you talk about the technical issues, everybody in this company from engineer to top managers digs in discussions. They love it. But if you want to talk about process there is almost nobody.

Q: What can you name as costs and benefits of knowledge sharing?

A: It is a question of investments. That is what we try to use when somebody says that they have to spend time and money on it – we say that you invest now and will see the payback later.

Q: How can you motivate people to document knowledge, to write down?

A: Some documents are mandated. What we also mandated for some discipline at the start is that every project can only start if they have some kind of guidelines; guidelines that are used during the project for everybody describing how to do certain tasks or where to find certain information.

Q: What about the reasoning about certain decisions, design choices?

A: That is documented there. But it is not at the level that you really need to reuse the knowledge. Those are guidelines, but they don't really describe how to do the work. And when the engineering starts and there are guidelines, kind of a framework you have to stay within, and then an engineer does the work. But how he does it is not captured.

Q: Is it a goal for you to capture this kind of knowledge or not?

A: The goal is to somehow to capture the design rationale. That is the decision making part, actually. You have the framework to stay within, and in the end there is a point solution in a context. And the question is how you got from the generic description to the point solution, why does it look the way it does, because it is necessary for the reuse of the solution, but also for the reuse of the rationale, the decision making.

Q: What do you do with knowledge that is not written down yet, how to save experiences? How to make this knowledge visible for others?

A: The idea behind this is that out company is very small, we have three hundred engineers. Currently if you have a question you can either ask your colleague, who knows somebody. But then still you don't always get the expert. When it is written down and you have a question on a specific production process, you know definitely that "the person" is the expert. And it is used by younger people, because they don't know the organization. The older people they use their network or they just know who to turn to.

Q: In the beginning of the interview you mentioned the change project. Does it have as its aim to improve communication between networks, generations?

A: Yes. The aim is to make sure that in a project all disciplines communicate, because for a lot of product development (and aerospace design) the process is multidisciplinary. We have introduced measuring tools to measure progress and to see if there are issues within the progress, where do they originate, some root-cause analysis, to be a bit more proactive.

Q: What reaction do you see on these new measures, activities? And how do you act?

A: As any change process you have the resistance, then you accept it, you start participating in the change and finally you promote it. There is a curve everybody goes though. But you see now that most of people are in the stage of acceptance or using it, some are even promoting it, but they have to invest some time in it, then they see the benefits of the meetings and measuring, the KPI dashboard, we call it. But the main goal is culture; we want people to be aware of the fact that they need knowledge. That is why we make them communicate, they need to share knowledge.

B7. Interview 7 Summary

May, 10 2010

Q: Could you please describe the main information processes and how they are managed?

A: It is an information company and the essence of what we do is that we collect sports data, results, people's attributes data - all factual information about sports. We put it in a data base and process it and feed it as quickly as we can to the worlds. So if there is a goal in a match we try to get as fast as we can the goal information to our clients which are TV stations, web-sites, TeleText, mobile sites or media like newspapers, news agencies. But we do also work for federations, for events. But it is all sports information driven. In this building there people who watch it on TV or we have correspondents on the phone and then they enter the event information to the entry application, database and then it goes everywhere.

Q: And how do you manage information, what the tools are, how quality is defined?

A: The tools are all more or less developed by us. We have quite a bit of maintenance tools where you can see what we should do for a particular client and when. For instance, we maintain TeleText pages of TV stations and then we know that every start of the week a certain page needs to be there and we make sure it is there. It is partly an automated process. In terms of quality of information we have rules, where we specify that you can't enter data from one source, but there need to be a second or a third source. After that there is a process that data is printed and there is a cross-check with other sources. So there are a few processes to organize information before you actually release it. We have levels and functions, like with a certain level of maturity you can do certain tasks.

Q: You said that the company deals with many different sports. Do you train people to handle information for specific sports or do people share their experiences between each other?

A: In the company we have a "Football" department and we have "All sports" department. Football used to be much more important in terms of revenue, etc. But within all sports department everybody has several sports as a specialty. But essentially in the work of all editors there is economies of scale, because we have divided the sports world in basically three types of sports: team sports (football, handball, etc), time-judge sports (cycling, speed skating, swimming), head to head (tennis, badminton, all fight sports). And then you have three ways of maintaining sports, three ways of organizing an editor's work.

Q: Do you have specific guidelines for those groups?

A: Yes, there books and documents on every sport, group. And there are user guides and procedures what to pick. If you see the manuals, how they are written, there formulas and check lists and people follow the check lists, because they want to be sure that their work is proper. There are many things that can happen in sport and there are many things you need to take into account before really go live.

Q: Is there room for some learning process or experience sharing? For instance, an experienced editor can see that a certain piece of information can be captured in a more effective way. Is it possible that this results in changes in guidelines?

A: It is possible, I think so. Only thing is this may not always be in our top priority list. We are sometimes busy with so many clients that we don't really organize that part well, but I guess organizing that will certainly need attention, because it can improve performance.

Q: I investigate the use of social media tools, such as wikis, blogs, microblogs for this. Do you use such tools in your company?

A: We do quite a bit with those tools, internally we have a company blog and we have Twitter, but it is for external communication. There we share information about new clients, event, new products, etc. To have a corporate blog is essential, because otherwise our employees in other countries have no clue where we are going and now it is very important to share of what we are doing. People always feel a little bit left out. But this is something you can try to solve with those blogs. We started a few months ago, I think this really helps. The main staff is here, we have in Australia 15 people, and one person per Sweden, Norway and in England, Denmark is five people and we have people in different places for events, also in Paris. So blog is the best way to communicate.

Q: You also mentioned Twitter?

A: Yes, it is an external Twitter, for external communication. We have a LinkedIn group – also just started – where talk with outside world - the outside clients who are interested in our company. We have a Ning community for our sport society, for our staff, freelancers and correspondents. And Twitter is a microblogs on sports for the outside world. And we have an internal corporate blog for our own community and then we have a photo site on Flickr and videos on YouTube that is internal. We have hired a person, who has started a month and a half ago to organize these things. All these things create tremendous opportunities, but they also require a lot of work to be done as well.

Q: So can you say that the use of social media is more successful when a person has an official specific task to do with it?

A: Yes, otherwise it is not working. In the old days I did it. First, we had an internal newsletter, we would ask everybody to give a contribution and that took always weeks to complete before everybody was done. Then I started almost a year ago with an e-mail newsletter, where I just try to round up everything what happened. Sometimes I did this every week and sometimes every six weeks, because I also need to find my time to write the stories. And now we have the person to organize everything in a blog. So if you put an effort in it of one person with one responsibility, it really works. All the social media tools are managed by him.

Q: You have also mentioned Ning community. Do you use it for your employees?

A: We use Ning software for what we call a sport society. When we work for event organizers, we hire a lot of freelancers. And for those freelances we want to give a community where they know what we are doing, what all this is about. But also we want to have their help if we have a question related to their expertise or area. So it is a family so to say, people who we work with. But we want to have them as advisers for our process. But also be a little bit close to them so we know what they are doing and where they are. We need often some historic in-depth content and they can find ways to get it, etc.

Q: Thank you. To wrap up our conversation I would like to ask you to name some your personal lessons learnt about the use of social media.

A: First, there should be an official time and task for people to use it, you better hire a person to manage this social software, or part time employee, than ask somebody to devote half of his working time to it. Second, software is just software, it is much better now and is constantly developing, but you should have rules, guidelines for people to use it properly (security, privacy issues).

B8. Interview 8 Summary

May, 12 2010

Q: I would like to ask you to describe the knowledge management (KM) initiatives and strategies in Getronics.

A: As a Business Unit director of a Business Solutions department I am responsible for innovation of our services portfolio. This encompass several subjects: *thought leadership*, which is making noise in the market by sharing our knowledge regarding subjects we have expertise in; *portfolio innovation* - creating new services that are in line with new trends in the market; *presales services* - enabling our sales force to sale the new propositions that we have developed. An important part of our work is innovation, you can do this by yourself, but most smart people do not work within your organization. So we want to attach ourselves to the outside knowledge in universities, communities, other organizations. We are also trying to innovate together

with our customers, because they are the people who are actually having the real world problems. One more aspect is KM. What we want to achieve in it is that we know what we know and that we know who knows what. The main three goals are: first, to make our corporate knowledge visible for employees, provide them with tools that facilitate sharing and reuse, which can make some states of the work process faster; second, to make the experts who work in our company known and so to benefit from their knowledge; third, to share knowledge together with each other. For this you are thinking about the Web 2.0-like technologies.

However this is important to realize that KM is not an IT subject. In a lot of situations people are only focusing on information part of knowledge, but not on attitude, behavior, cultural aspects of it. However, without a tool is it also difficult to manage knowledge and information, so the answer is probably somewhere in-between. If you look at knowledge management you have to look at tooling, but you also have to look at processes, management and organization, governance and who does what, etc., also people and cultural aspects are important.

We started a couple of years ago to realize new philosophy in KM. And the first starting point in this philosophy of that we want to increase our knowledge sharing and expertise building, was wiki implementation. For some people it was big success, but some people don't use it because it is too complex. It was intended to create and share knowledge, but with focus on co-creation. One of the traditional pitfalls of KM approach in terms of tooling is to create a wall-guarding approach. A lot of traditional KM systems are closed systems within an organization. Now we are working on a new system - ShaerPoint 2010. We are also now actively pursuing integration of the things that people are already doing, for example, tweetering, sharing photos on Flickr, saving bookmarks on Del.ios.us, and sharing movies on YouTube, into our own environment. So we do not have one closed environment, but combined with the best of both worlds.

Q: How would you describe the general organizational culture?

A: On average I would say there is fairly open culture towards sharing knowledge, but what we still see within some of our units where most our consultants are that there are arguments like this – "if you share your knowledge then you can be afraid that someone else will use this knowledge and knowledge is power". But this argument is addressed by a paradigm shift. It used to be that if a person knows a lot, he was the expert and the rest of the world needed him as an expert, he didn't share what makes him an expert. And now the world is more transparent, and now it is all about creating connections between people and sharing your knowledge, so that people know that this person knows a lot. In order to stay relevant you actually need to share knowledge.

Q: Trust can be an influencing factor to sharing knowledge. How would you describe the relationships between people in the company from this perspective?

A: Trust is really important, and also from a strategic point of view. In the old days we had our Communications Department and if you want to write an article and send it to a magazine, you would write it, and it would be edited by the Communication if it is relevant, good, proved. That is not realistic anymore. So, as an organization you can no longer control the communications with the outside world - open approach is more realistic and beneficial. What you need to do is to trust your people that what they say is good for your organization.

Q: You have mentioned that one of the main goals of KM initiatives is to know what corporate knowledge is and who knows what. What are the activities in this direction?

A: One of the things we are doing is organizing knowledge evenings. These knowledge evenings are for business units. But we also organize for technical people or consultants knowledge evenings that are focused on specific subjects, for example, virtualization or IT Governance. And we have set a coaching structure, everyone can have a coach, somebody who can reflect not in hierarchical way, but more in experience way. And also in terms of performance management we are also trying to assess what was done to share knowledge. You have two mechanisms to motivate people – carrot and stick. So you can reward them and you can punish them. You have to do both.

Q: And if we look at the visibility of knowledge, what tool do you use to make knowledge and people with knowledge visible?

A: In the SharePoint environment that we are currently developing, there are such things as being able to see how many people downloaded a certain document. This is one mechanism to make this transparent. Another mechanism is rating system. We have the number of downloads, rating systems, then also tags. If you upload a document, you need to tag it, to say what kind of document it is, to put it into a right context.

Q: Can it be the case that such kind of reputation building, having high ratings of your documents, a lot of followers, etc. can overweight the fear of losing competitive advantage when sharing knowledge?

A: What is our competitive advantage, is it the documents that we have on our servers, or is it the people we have? And my view is that it is always people, not documents. It needs to be routine to share knowledge. If I share all my knowledge and then I leave the company, knowledge will still be available, in the system. There is a difference between data and information and you need to make sure that a system can capture information, but also some aspects of experiences, expertise.

Q: A question concerning the wiki - Is it really actively used for collaborative content creation and where do you see the benefits of collaborative writing?

A: The idea behind wiki is very good, only I think it is too much tooling there. For example, if you want to insert a table in there, it is fairly difficult. Google Docs or new MS Office version are normal office tools, they can be used to really easily collaborate, collectively develop content. They bring great value. You can really work together on the same document, it is much faster, it makes work more efficient and you really can work together on one document.

Q: To wrap up our conversation I would like to ask you to name a few of your personal lessons learnt from KM?

A: As a summary, I think, "carrot and stick" principle is important; simplicity of tools, making knowledge sharing have a game and fun feeling is important; openness to the outside world should be really important. And it is important to realize that system implementations fail, so it is always difficult to have a business case for KM. But business case of knowledge sharing is really important.

Appendix C - Coding Scheme

Table C.1 Coding scheme for the main codes grouped in families according to hypotheses.

Hypothesis	Code	Related Argument	Explanation
Hypothesis 1	Trust		General code, means mentioning of the importance of trust for knowledge sharing

	User Profiles	A1.1	Mentioning of tools that contain "User profiles" functionality
	User Information	A1.2	Mentioning tools or situations that reveal information about people
	Who Knows What - Visibility		Mentioning or giving supportive evidence of the importance of the visibility of personal knowledge in organizations
	User Information – Social Presence +	A1.3	Mentioning or giving supportive evidence of the statement that availability of information about people leads to establishing of social presence
	User Information – Social Presence -	A1.3	Mentioning or giving supportive evidence of the statement that availability of information about people is not important for establishing of social presence
	Social Presence – Trust	A1.4	Mentioning or giving supportive evidence of the statement that social presence leads to establishing trustful relationships
	Social Networking	A1.5, A1.1	Mentioning or giving examples of the use of social networking tools
	Awareness	A1.4, A1.8	Mentioning or giving supportive evidence of the importance of the mutual awareness about work, interests, experiences, etc of colleagues
	Communication – Trust	A1.8	Mentioning or giving supportive evidence of the statement that more frequent or long term communication results in establishing trustful relationships
	Trust – Knowledge Sharing Behavior +	A1.9	Mentioning or giving supportive evidence of the statement that trust between organizational members lead to more active behavior in knowledge sharing
	Trust – Knowledge Sharing Behavior -	A1.9	Mentioning or giving supportive evidence of the statement that trust between organizational members does not have any effect on behavior in knowledge sharing
Hypothesis 2	Wiki	A2.1	General code, which indicates mentioning the use of wiki tools. It is also used in the code family "Enterprise 2.0 tools"
	Collaborative writing	A2.1, A2.2	Mentioning or giving examples of experiences in creating some content together with other people in one document or in real time, "wiki style of collaboration"
	Easy (less effort and time-consuming) to write – creation	A2.3	Mentioning or giving supportive evidence of the situation that less time- and effort consuming content creation possibilities lead more effective content and new knowledge creation
	Wiki-style- effective collaboration +	A2.3	Mentioning or giving supportive evidence of the situation that collaborative writing in small contributions from several people is an effective way of collaboration
	Wiki-style- effective collaboration -	A2.3	Mentioning or giving supportive evidence of the situation that collaborative writing in small contributions from several people is not an effective way of collaboration
	Collaboration – knowledge creation, innovation	A2.4	Mentioning or giving supportive evidence of collaborative process resulting in new knowledge creation, innovation

	Implicit knowledge	A2.5	Mentioning or providing example of dealing with implicit, experiential knowledge in organizations
	Discussion facilitation	A2.5	Mentioning or giving examples of the situation of successful discussions facilitation, either by IT tools or by human facilitator
	Implicit knowledge – collaboration +	A2.7	Mentioning or giving supportive evidence of the statement that making it easier to express implicit knowledge leads to effective collaboration
	Implicit knowledge – collaboration -	A2.7	Mentioning or giving supportive evidence of the statement that making it easier to express implicit knowledge does not effect collaboration
	Discussions-externalization	A2.6	Mentioning or giving supportive evidence of discussions that resulted in externalization, in writing down implicit knowledge
Hypothesis 3	Visibility of Contribution	A 3.2, A3.6	Mentioning or giving examples of the importance to make the contributions of knowledge from every person trackable and visible
	Authoring	A3.1	Mentioning or giving examples of the writing experiences and mentioning authors of contributions
	Ratings	A3.5	Mentioning or giving examples of the experiences and attitudes to the use of rating systems in organizations environments
	Reputation – Intrinsic Motivation	A3.3	Mentioning or giving examples of the statement that building personal reputation can be a motivating factor to contribute knowledge
	Organizational Culture	A3.4	A general code, which means mentioning the importance of the influence of organizational context on individual employees behavior and attitudes
	Culture - Attitude to Knowledge Sharing	A3.7	Mentioning or giving examples of the statement that general cultural settings in organizations have influence on the individuals attitudes to sharing personal knowledge

Appendix D – Code groupings for the second set of interviews

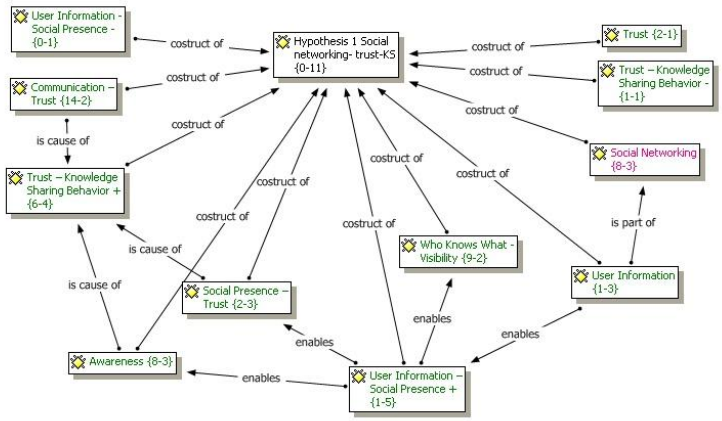

Figure D.1 – View of the family of associated codes for Hypothesis 1 (Set of the interviews with internal companies' KM professionals).

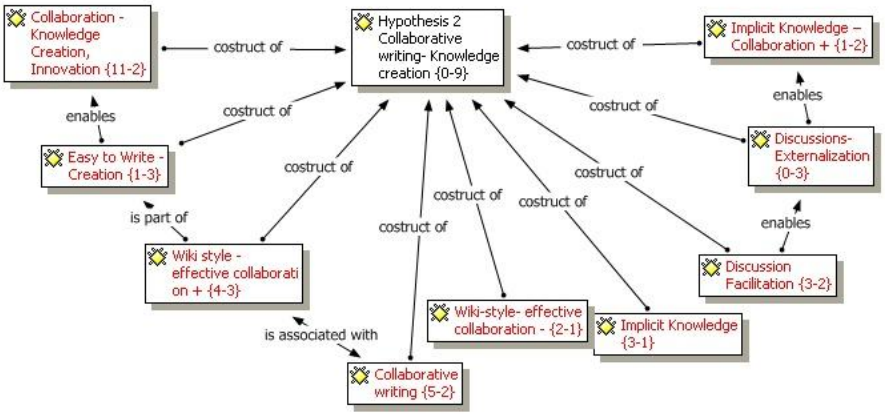

Figure D.2 – View of the family of associated codes for Hypothesis 2 (Set of the interviews with internal companies' KM professionals).

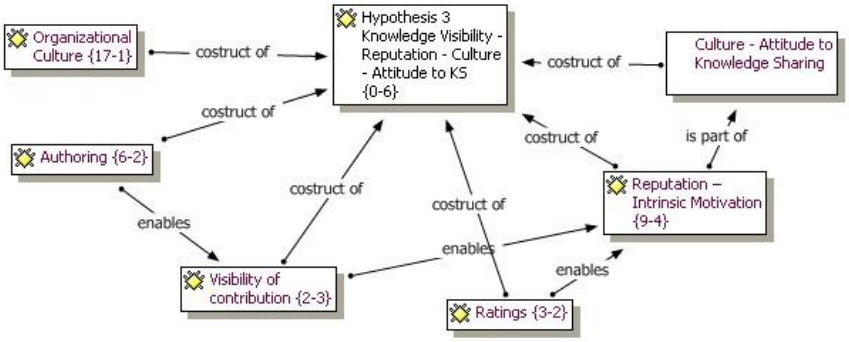

Figure D.3 – View of the family of associated codes for Hypothesis 3 (Set of the interviews with internal companies' KM professionals).

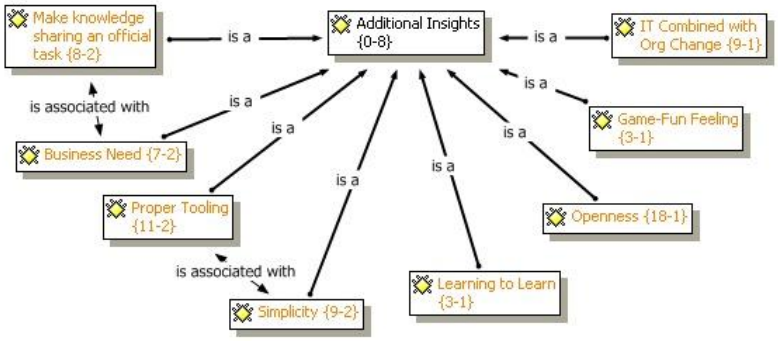

Figure D.4 – Additional insights form the analysis of the expert interviews – View of the family of associated codes (Set of the interviews with internal companies' KM professionals).

Appendix E- Interview results in a form of conceptually clustered matrix

In the table the columns marked with dark grey color correspond to the interviews with consultants (Interviews 1,2,3 and 5); the columns marked with light grey color contain the number of quotes from the interviews with knowledge management professionals in organizations (Interviews 4, 6,7 and 8).

Table E.1 Conceptually clustered matrix of the qualitative Expert interviews analysis.

	Interviews								
Hypotheses and Arguments	Interview 1	Interview 2	Interview 3	Interview 4	Interview 5	Interview 6	Interview 7	Interview 8	**Total № of quotes**
Hypothesis 1									
Trust	2	3	3		1			2	**11**
User Profiles		1			1			3	**5**
User Information		1	1		3		1		**6**
Who Knows What - Visibility	2	1	6	1	2	4		4	**20**
User Information – Social Presence +		2	2		2		1		**7**
User Information – Social Presence -									
Social Presence – Trust	1	2	1	1	3			1	**9**
Social Networking		3	4	3	5	1	2	2	**20**
Awareness	1	3	2	2	1	2	2	2	**15**
Communication – Trust	2	5	1	7	4	2	2	3	**25**
Trust – Knowledge Sharing Behavior +	4	4	1	1	4			5	**19**
Trust – Knowledge Sharing Behavior -						1			**1**
Hypothesis 2									
Wiki	2		1	4				4	**11**
Collaborative writing	1		3	1	4		1	3	**13**
Easy (less effort and time-consuming) to write – creation	1	1			1			1	**4**
Wiki-style-effective collaboration +	1		3	1	4			3	**12**
Wiki-style-effective collaboration -	1		1					2	**4**

Collaboration – knowledge creation, innovation		3	2	2	3	1		8	**19**
Implicit knowledge	2		1		1	1		2	**7**
Discussion facilitation	1		1	3	4				**9**
Implicit knowledge – collaboration +						1			**1**
Implicit knowledge – collaboration -	1		1		1				**3**
Discussions-externalization									
Hypothesis 3									
Visibility of Contribution	1	1	5	1				1	**9**
Authoring	1	1		3		1		2	**8**
Ratings	1		2		1			3	**7**
Reputation – Intrinsic Motivation	2		1	1	3			8	**15**
Organizational Culture	4	4	5	7	4	5		5	**34**
Culture - Attitude to Knowledge Sharing	1			1				1	**3**

Appendix F - Conclusion from the Empirical Study

Table F.1 Conclusions from the empirical study about the Hypotheses and the working influence mechanism.

Hypothesis	Barrier addressed	Mechanism	Research results
Hypothesis 1	Interpersonal Trust	Social networking tools have functionality of creating user pages –profiles (A1.1)	An axiomatic statement (Ch. 3.1)
		User pages – profiles provide personal and professional information (A1.2)	Supported by findings in literature (Ch. 3.1) and arguments from the expert interviews (Ch. 4.3.1)
		Availability of personal and work related information about organizational members create social presence in technology mediated interaction and communication (A1.3)	Supported by findings in literature (Ch.3.1) and numerous examples and reasoning in expert interviews (Ch.4.3.1)
		Social presence in technology mediated interaction helps to create trust between group members (A1.4)	Supported by findings in literature (Ch.3.1) and numerous examples and reasoning in expert interviews (Ch.4.3.1)
		Enterprise 2.0 tool provide the functionality such as chatting (also audio and video), messaging, commenting on contributions or actions (A1.5)	An axiomatic statement (Ch. 3.1)
		The variety of means for interaction	Supported by the arguments in

		facilitates communication (A1.6)	expert interviews (Ch. 4.3.1); Some conditions for this were named, such as the simplicity of use of the functionality and the existence of organizational need for communication (not communication for the sake of communication) (Ch. 4.3.1)
		More frequent communication results in accumulating of mutual experiences (A1.7)	Supported by findings in literature (Ch.3.1) and numerous examples and reasoning in expert interviews (Ch.4.3.1)
		More mutual experiences in communication with colleagues help to establish trust (A1.8)	Supported by findings in literature (Ch.3.1) and numerous examples and reasoning in expert interviews (Ch.4.3.1)
		Trustful relationships between organizational members have positive effect on knowledge sharing behavior (A1.9)	Statement derived from research literature (Ch. 2.1.4.2, Ch. 3.1) and supported by arguments and examples in expert interviews (Ch. 4.3.1)
Hypothesis 2	Knowledge explication	Enterprise 2.0 collaborative tools provide such means for collaborative content creation, which allow creating end results from small contributions from many collaborators (A2.1)	An axiomatic statement found during the literature review phase (Ch. 2.2.2 – 2.2.4) and supported during the expert interviews phase (Ch. 4.3.2)
		The possibility of creating content with small contributions from many collaborators allows each collaborator to invest less time and efforts into writing (A2.2)	Supported by arguments and examples from the expert interviews (Ch. 4.3.2), but a condition was mentioned - simplicity of tools is important.
		Collaborating with investing less time and efforts in writing can engage more people in collaborative, knowledge creation process and make it more effective (A2.3)	Supported by arguments and examples from the expert interviews (Ch. 4.3.2), but a condition was mentioned - number of collaborators is important, in big groups a lot of coordination activities are needed.
		Enterprise 2.0 tool provide the functionality of commenting, discussing, collaborative bookmarking and creating classifications (A2.5)	An axiomatic statement (Ch. 3.2)
		The functionality of Enterprise 2.0 tool (mentioned in A2.5 above) helps and makes easier to codify knowledge and express implicit knowledge (A2.6)	Partially supported by findings in the literature review (Ch. 2.2.2 – 2.2.4); No explicit evidenced found in the empirical phase in expert interviews (Ch. 4.3.2).
		Making it easier to codify knowledge and explicate implicit knowledge can make collaborative process effective (A2.7)	Partially supported by findings in the literature review (Ch. 2.2.2 – 2.2.4); No explicit evidenced found in the empirical phase in expert interviews (Ch. 4.3.2)..
		Collaboration process facilitated by technologies, easier and less time and effort	Addressed and proposed in the theoretical study phase,

		consuming writing process can stimulate knowledge sharing behavior (A2.4)	literature review (Ch. 2.2.4); Addressed in the empirical study phase, a number of new insights were found (Ch. 4.3.2); Not possible to say if it is supported or not.
Hypothesis 3	Organizational culture	The adoption of Enterprise 2.0 result in beginning of use by employees of various communication means, tools for authoring content, creating profiles, etc. (A3.1)	An axiomatic statement (Ch. 3.3)
		The use of the Enterprise 2.0 tools for communication, authoring, creating personal profiles increase the visibility of corporate knowledge and people (A3.2)	Supported by the theoretical study (Ch. 2.2.4); Supported by the results of the expert interviews (Ch. 4.3.3)
		The adoption of Enterprise 2.0 result in beginning of use by employees of various rating, liking and other contribution evaluation functionalities (A3.5)	An axiomatic statement (Ch. 3.3)
		The use of various rating and evaluation functionality increase the visibility of corporate knowledge and people (A3.6)	Supported by the theoretical study (Ch. 2.2.4); Supported by the results of the expert interviews (Ch. 4.3.3)
		Making the contributions and knowledge work of employees more visible around an organizations makes reputation building as intrinsic motivation for knowledge sharing more important (A3.3)	Addressed in the theoretical study (Ch. 2.2.2 -2.2.4); Supported by some evidences in the expert interviews (Ch. 4.3.3); Empirical study showed the influence or organizational culture on this process;
		The importance of reputation building as a motivating factor for sharing knowledge influences positively the establishment of organizational norms and culture favorable for effective knowledge sharing (A3.4)	Addressed in the theoretical study, literature review (Ch. 2.2.4) Addressed during the expert interviews; A lot of other factors influence culture, so it is not possible to definitely say whether this statement is supported or not.
		Establishing of certain organizational norms and culture has positive effect on the attitude of organizational members to knowledge sharing and facilitates sharing behavior (A3.7)	Supported by the theoretical study (Ch. 2.2.4); Supported by the empirical study – expert interviews (Ch. 4.3.3)