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## Creating and sharing knowledge through a corporate social networking site: the impact of employees' perceptions on effectiveness

MMIM592

by

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## **Executive Summary**

This research investigates the perceptions of employees at South Winds (the pseudonym), a software engineering company, about using a corporate social networking site for sharing and generating knowledge. It focuses on understanding and explaining how the perceptions of employees from different organisational levels impacted on the usage of the social networking site.

Methods of data collection included interviews and focus groups with C-level managers, middle managers and software engineers. Qualitative methods were used for analysing the collected data. Analysis drew on an extended Orlikowski and Gash's technological frames theory (1994) to identify five categories of perceptions relating to technology implementation and use. Applying the concept of framing in this study helped to surface specific areas within which divergence of perceptions occurred.

Results showed significant divergences in perceptions about the corporate social networking site in 4 out of the 5 categories across the different levels of the organization. These divergences were found to have arisen largely as a result of information deficiencies. Furthermore, little understanding about the nature of the technology led top management to decide to use an adoption approach that discouraged knowledge sharing and creation through this tool. As a consequence, this study found that there appeared to be little likelihood of creating or sharing knowledge through the corporate social networking site under the observed implementation, although the corporate social networking site was widely perceived as a useful technology for sharing and creating knowledge.

Recommendations for realizing potential benefits from using a corporate social networking site include developing plans for aligning organizational perceptions about the corporate social networking site and developing a suitable reward plan based on group performance in order to encourage the employees to create/share knowledge.

The findings of this research suggest an extension of the Orlikowski and Gash's (1994) technological frames theory for knowledge management systems. This research also suggests that perceptions about different aspects of a technology may be arranged in a hierarchical chain. This would bring significant implications in designing and implementing technologies.

## **Preface**

The author wishes to acknowledge the following people for their support:

1. My wife Loreto who makes my life much happier.
2. Jocelyn Cranefield who constantly guided me with an evident genuine interest.
3. All the participants, for whom I deeply hope that this study help them to achieve their goals.

## Table of contents

Executive Summary .....	2
Preface.....	3
List of Figures .....	6
List of Tables.....	6
Chapter 1. Introduction .....	7
Chapter 2. Literature Review .....	9
2.1. Knowledge Management Strategies.....	10
2.2. KM Strategy within software engineering firms .....	11
2.3. Social Network Sites .....	12
2.4. Technological Frames .....	14
2.5. Summary .....	16
Chapter 3. Research objectives and methodology .....	17
3.1. Epistemological Approach .....	17
3.2. The research setting.....	18
3.3. Research Method.....	18
3.4. Theoretical Considerations: Technological Frames .....	21
3.5. Data Analysis .....	22
Chapter 4. Results .....	25
4.1. History of the Project .....	25
4.2. The ESN artefact: Flowr.....	26
4.3. Overview of how the ESN was used.....	27
4.4. Overview of Perceptions across South Winds.....	29
Chapter 5. Discussion .....	45
5.1. Perception about Technology Strategy.....	45
5.2. Perception about Nature of Technology.....	47
5.3. Perception about Technology in Use.....	49
5.4. Perception about Personal Success Criteria .....	51
5.5. Perceptions about technology adoption.....	52
Chapter 6. Implications for Practice .....	55
6.1. Aligning perceptions about Technology Strategy .....	55
6.2. To get understanding of nature and consequences of using an ESN.....	55
6.3. To switch from a ground up adoption approach to a top down one .....	56
Chapter 7. Implications for Future Research .....	58
7.1. Proposed frames .....	58
7.2. Explanatory hierarchical arrangement of perceptions.....	59

Chapter 8. Limitations .....	61
Chapter 9. Conclusion.....	62
References .....	64

**List of Figures**

Figure 1: Social media taxonomy.....	13
Figure 2: Data collection iteration diagram.....	20
Figure 3: A user home page on Flowr.....	27
Figure 4: Summary of the perceptions across South Winds.....	30
Figure 5a: Zipf distribution (adapted from Whittaker, et al., 1998).....	48
Figure 5b: On the right actual level of individual participation within South Winds' ESN .....	48
Figure 6: Summary of the impacts of the people's perceptions about the ESN.....	60

**List of Tables**

Table 1: Set of generic technological frames proposed by Orlikowski & Gash (1994, p. 183).....	15
Table 2: Set of inductive frames used in this research .....	21

## Chapter 1. Introduction

There have been a lot of claims that corporate social networking tools might improve business effectiveness and performance (DiMicco, et al., 2008; Gartner, 2010; Miller, Marks, & DeCoulode, 2011; Steinfield, DiMicco, Ellison, & Lampe, 2009). Moreover, it seems likely that organizations may start receiving significant pressure for adopting these kinds of tools. For example, the younger generation finds the social networking sites natural and studies suggest that they expect this technology to be available in their workplace (Gartner, 2010; Levy, 2009). Furthermore, technologist research specialist Gartner has predicted that by 2014 social networking services will replace e-mail as the primary vehicle for interpersonal communications for 20 percent of business users (Gartner, 2010). Nevertheless, there is no consensus about the actual value of social networking sites for organizations. On the one hand, several authors claim that there is no evidence that these tools are useful for business performance (Baltatzis, Ormrod, & Grainger, 2009; Miller, et al., 2011), furthermore authors like Miller et al. (2011) stated that most early adopters have not demonstrated business performance impacts. On the other hand, some authors have found potential benefits (Riemer, Richter, & Seltsikas, 2010; Steinfield, et al., 2009).

Several authors have suggested that corporate social networking sites are suitable for supporting the creating and sharing knowledge as part of a knowledge management systems (Michailova & Gupta, 2005; Raman & Jennex, 2010). This is of significant interest for knowledge based organizations such as software engineering firms. Software engineering firms operate in a competitive environment where knowledge is the most valuable asset (Lindvall & Rus, 2002). Indeed, their livelihood depends on efficiently applying their knowledge, so “reinventing the wheel” is highly inefficient (Pearlson & Saunders, 2005). Therefore, it is critical for these organizations to effectively and efficiently manage their knowledge, and it is important to successfully implement any technology that is chosen to support knowledge management.

The lack of success of a social networking system implementation provided the motivation for this study. This report presents a case study of a software engineering firm that launched a corporate social networking tool with the purpose of collaboratively creating and sharing knowledge, but which had realized no concrete benefit one year after implementation. It critically analyses the perceptions of three different stakeholders group: the C-Level, middle

managers and staff, with the goal of understanding how these perceptions impacted on the utilization of the ESN.

The concern with understanding stakeholder perceptions and their impact relates to the concept of IS success: the success of an information system implementation “*is achieved when an IS is perceived to be successful by the stakeholders and other observers*” (Myers, 1995, p. 65). Perceptions are created within personal frames, which are people’s mental structures that are the vehicle for understanding and acting. Orlikowski and Gash (1994) coined the term Technological Frames to explain “*the subset of members’ organizational frames that concern the assumptions, expectations and knowledge they use to understand technology in organizations*” (Orlikowski & Gash, 1994, p. 178). They suggest that significant divergences between technological frames of key groups in organizations may result in difficulties and conflicts around the use of technology. Their concept offers an analytical perspective to understand people’s frames of the technology, and thereby understanding their subsequent perceptions towards it.

This research uses and extends Orlikowski and Gash’s Technological Frames theory to answer the question, “*how do the perceptions of different stakeholders affect the use of an enterprise social networking site as part of a knowledge management system within a software engineering firm?*”.

This report begins by presenting a literature review. It then presents the methodology used for analysing the case study. Thirdly, this research shows the normative basis of the situation that was leading the social order at the research setting. Fourthly, it shows a critique of the social order that led no realizing concrete benefits. Fifthly, it presents suggestions that would have potentially helped them to improve their situation. Finally it shows implications for researchers.



## Chapter 2. Literature Review

Sharing and creating knowledge are routine activities within the software engineering context. Enabling processes that support a fluent and efficient flow of knowledge between organizational members may be the difference between succeeding and failing. Enterprise social networking sites promise supporting processes for enabling organizations to efficiently create and share knowledge between members by providing a collaborative platform. Nevertheless, conflicting views can be found in the literature regarding its actual value. On the one hand, several authors claim that there is no evidence that these tools are useful for business performance (Baltatzis, et al., 2009; Miller, et al., 2011), on the other hand, some authors have found that these tools may be productively used and furthermore, they may increase social capital, interest in connecting globally and sense of corporate (Riemer, et al., 2010; Steinfield, et al., 2009). Others have said that organizations should develop a set of new skills for delivering profitable social media solutions (Gartner, 2010).

In a broad sense, knowledge has been defined as a *“fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”* (Davenport & Prusak, 1998, p. 5). For the purpose of this research, the term knowledge refers to professional knowledge, which has been defined as *“a mixture of profession-specific understandings, practices and values used by members of a profession to perform and think about their work”* (Cranefield, Yoong, & Huff, 2011, p. 2). From the organizational point of view, the potential value of knowledge in organizations is its ability to create competitive advantage. Then, *“knowledge Management (KM) is about applying the knowledge assets available to your organization to create competitive advantage”* (Davidson & Voss, 2002, p. 32). This view treats knowledge assets as an organizational resource that that is not diminished by its use, unlike capital, land or labour (Davidson & Voss, 2002)

In this century, economic competition is often related to the quality of organizational knowledge and how it is applied in doing business (Davidson & Voss, 2002). In the mid 80s, individuals and organizations started appreciating the increasingly important role of knowledge, and hence the need for its management (Wiig, 1997). As a result, many organizations design organizational processes for facilitating the codification, collection, integration and dissemination of organizational knowledge. The overarching set of processes

is referred to as Knowledge Management Systems (KMS) (Alavi & Leidner, 1999). Various purposes have been argued for implementing KMS. For example, some organizations pursue increasing competitiveness (Von Krogh, 1998) or others expect from them being led to greater innovation and responsiveness (Raman & Jennex, 2010). KMSs should not be confounded with technologies, KMSs may or may not be supported by IT (Alavi & Leidner, 2001; Davidson & Voss, 2002; Mohamed, Stankosky, & Murray, 2006).

### **2.1. Knowledge Management Strategies**

Depending on the way that an organization serves its clients, the economics of its business and the people it hires, it has been suggested that organizations should choose between two KM strategies: the personalization and the codification strategy (Greiner, Bohmann, & Krcmar, 2007; Morten, Nohria, & Tierney, 1999). The codification strategy focuses on codifying and storing explicit knowledge in databases, making knowledge independent from the originator. On the other hand, the personalization strategy recognizes that knowledge is closely tied to the person who developed it and thereby knowledge is shared mainly through the socialization mechanism, which is the mechanism that transfers tacit knowledge through sharing experiences or mentoring relationships among others (Nonaka & Takeuchi, 1995). The codification strategy typically involves using IT for databases and information repositories (Greiner, et al., 2007; Morten, et al., 1999), whereas the personalization strategy uses IT for helping people to communicate knowledge, not to store it. KMSs that support the personalization approach should therefore encourage socialization processes. Some Web 2.0 technologies can support these KMSs, for example, social networking tools (Michailova & Gupta, 2005).

However, implementing these technologies is not enough for making knowledge transference fluid. This is because sharing knowledge is not something natural, in fact “*people rarely give away valuable possessions (including knowledge) without expecting something in return*” (Davenport & Prusak, 2000, p. 26). Then, trust plays a key role in transferring knowledge. The fundamental elements for making knowledge transference fluid are: trust among members; and a knowledge friendly culture, which means that people are intellectually curious, free to explore and motivated to create and use new knowledge; and people are not resentful of the company and do not fear that sharing knowledge would cost them their jobs (Albers, 2009; Cortada, 1999; Davenport & Prusak, 2000; Guptara, 1999)

The following section considers the nature of knowledge in the software engineering industry and the implications for KM strategy.

## **2.2. KM Strategy within software engineering firms**

Software engineering knowledge is highly contextual (Desouza, 2003; Lindvall & Rus, 2002; Papadopoulos, et al., 2009). Software design “*is a complex psycho-socio-technical process embedded within organizational, cultural, and social structures*” (Papadopoulos, et al., 2009, p. 11). In general, successful software engineering solutions require broad knowledge about many domains, such as systems design, coding and testing. Furthermore, each area has many sub domains, for example, coding expertise may be categorized based on different programming languages, like C++, .NET or Java to name just a few (Desouza, 2003) or programming paradigms such as object oriented or functional. Decisions about how or when to use a particular technology or technique are highly contextual. This context is not made up by only technical aspects, but by sociological and psychological factors as well (Papadopoulos, et al., 2009). For example, some software engineers may consider that is unethical to use proprietary software instead of open source software. Furthermore, decisions might be strongly influenced by aspects at social level. For example, Borchers (2003) found that American software engineering organizations are culturally suited for iterative development and prototyping software development processes, whereas Japanese software engineering organizations are more suited to waterfall development processes. Hence the software development process, and therefore the way in which knowledge is applied, may be strongly influenced by cultural aspects rather than purely technical ones. Therefore, it is evident that designing and implementing software engineering solutions requires a significant amount of knowledge that is not possible to codify. Then, software engineering knowledge can be considered as highly tied to the author, and therefore socialization processes are key element for successfully sharing their knowledge (Nonaka & Takeuchi, 1995). This suggests that the personalization approach to KM in software engineering firms offer better benefits than the codification strategy. However, the personalization strategy is not the most popular within software engineering firms (Desouza, 2003).

Most of the software engineering firms’ KMSs are supported by technologies that support the codification strategy, such as bug tracking system, document management systems among

others. Even though they provide real benefits, they have serious limitations (Desouza, 2003). One of the most significant limitations of pursuing the codification strategy within the software engineering field is that software engineers have to make a great effort to articulate their tacit knowledge into explicit knowledge. As it was described earlier, software engineering knowledge is highly contextual; hence a solution for one scenario may not fit in any other one. As a consequence software engineers may feel that the cost of doing so on average outweighs perceived benefits (Desouza, 2003). Hence, KMSs within software engineering firms should encourage dialogue between members and through this conversation knowledge can be created and/or shared (Desouza, 2003).

There are technologies that support the personalization strategy that may fit within software engineering contexts. Gupta and Sharma (2004) divide technologies that support KMS into seven categories: expert systems, groupware, document management systems, decision support systems, semantic networks, databases and simulation tools. This taxonomy was enhanced by Raman & Jennex (2010). They extended this list with two categories: social media and geographical based systems.

This research focuses on KMS that are supported by social media based systems, in particular, social networking sites, which according to Michailova & Gupta (2005) they support the personalization strategy. It is important to highlight that even though IT generally plays a key role in KMSs (Alavi & Leidner, 2001), IT is no more important than any other aspect of KM: leadership, organization and learning (Davidson & Voss, 2002; Mohamed, et al., 2006).

### **2.3. Social Network Sites**

Social network sites (SNS) belong to the social software category of KMS (Avram, 2006; Raman & Jennex, 2010). Social software is characterized by providing a platform for conversational interaction between people or groups; social networks regardless of the distance; and social feedback (Avram, 2006). Researchers have stated that reputation and trust are crucial for interactions within SNS (Avram, 2006). However what really makes SNS unique is that “*they enable users to articulate and make visible their social networks*” (Ellison & Boyd, 2007, p. 211).

SNS can be categorized into two different sorts: public social networking tools, like Facebook or MiGente, and Enterprise social networking (ESN), like Flowr or Yammer. ESNs refers to the phenomena of social networking in a enterprise context (Richter, Riemer, & Brocke, 2011). It is important to differentiate those because people's behaviours within one site and the other are significantly different. Therefore, studies on one context are not fully applicable in the other context (Richter, et al., 2011; Riemer, et al., 2010). There are two sorts of ESN: intranet social networking platforms, which are technically the same as SNT but only accessible in the enterprise Intranet; and ESNs that use a public SNS. For example, using LinkedIn for recruiting (Richter, et al., 2011). Figure 1 shows this taxonomy.

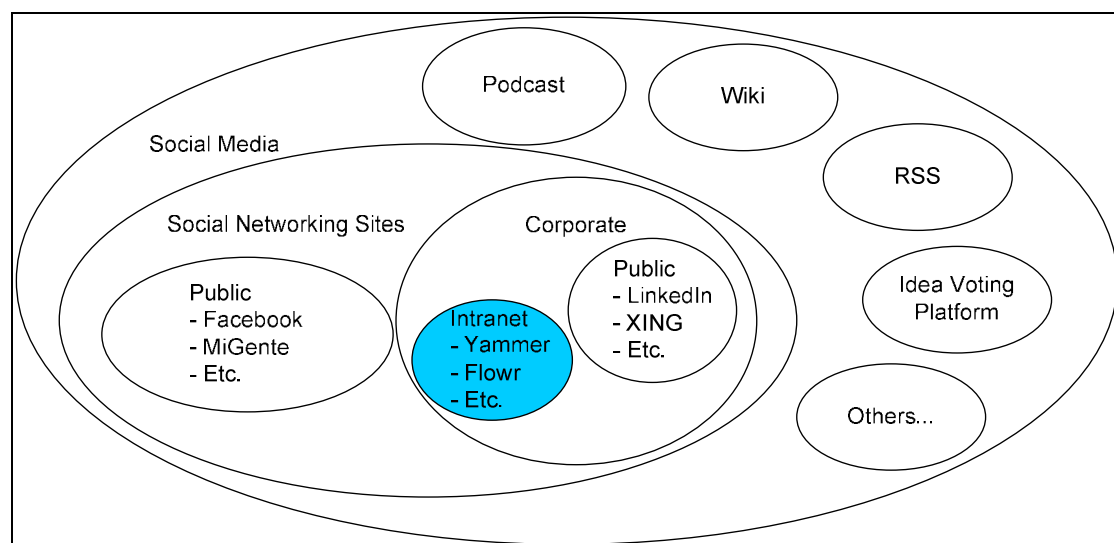


Figure 1: Social media taxonomy

For the purpose of this research ESN refers to only intranet social networking platforms. Figure 1 highlights them in blue.

According to Miller, Marks, and DeCoulode (2011) ESNs' capabilities enable organizations to easily identify expertise and improve cross-boundary communication. For example, there are organizations that mainly use ESN as a medium for providing updates about activities and events to the rest of the organization (Riemer, et al., 2010); others use ESN as a mean for indentifying experts and knowledge bearers, building personal context and fostering existing relationships (Richter & Riemer, 2009); or other companies have implemented the technology in order to enable users to connect with their colleagues in personal and professional way (DiMicco, et al., 2008). The evidence suggests that ESN has a variety of uses depending on the organizational context.

Individual motivations for using ESN at work are different depending on the individual. DiMicco, et al. (2008) identified three individual motivations: users use ESNs for deliberate promoting themselves and connecting strategically; for gathering support for their projects; and for keeping weak ties with colleagues. The last motivation is also held by Ellison and Boyd (2007). They found that people do not use ESNs for connecting people unless they have some kind of connection in the offline/real world.

ESNs are seen as having potential to support KMSs that pursue the personalization knowledge management strategy (Michailova & Gupta, 2005). Nevertheless, significant different perceptions about the ESN might represent major barriers that may lead workers stopping using the ESN (Orlikowski & Gash, 1994). For example, younger generations hold very different practices than older generations using SNS. For instance, 48% of 18 to 34 year old Americans say they found out about news through a social networking tool, furthermore, about 28% of them check their Facebook on their smart phones before getting out of bed (OnlineSchools.org, 2011). This kinds of practices has created a massive generational gap only compared with the hippie movement in 70s, where older generations did not completely understand communications practices and beliefs of new generations (Dretzin & Maggio, 2008). As a consequence, it is fair to assert that age groups of people may have significant different assumptions, knowledge and expectations about ESNs. Moreover, not only generational differences may be a source of different perceptions, but hierarchical position within the organization as well. For instance, due to corporative SNS exposes employees' personal aspects (Begel, DeLine, & Zimmermann, 2010), a manager could find an ESN as a useful tool for finding and connecting people with a knowledgeable and helpful colleague, while from the employee's point of view the corporative SNS could seem a corporate spyware (Begel, et al., 2010). In order to understand how these divergent perceptions about ESNs may make the difference between a successful initiative and an unsuccessful one, the following section briefly explains the technological frames concept, which involves people's perceptions about technologies and the consequences of divergent perceptions between them.

#### **2.4. Technological Frames**

Orlikowski & Gash (1994) defined an analytical approach centred on the concept of technological frames. Their objective is to understand how organization members make sense of information technologies and how their interpretations shape subsequent actions towards

IT. Technological frames were defined as the “*subset of members’ organizational frames that concern the assumptions, expectations, and knowledge they use to understand technology in organizations*” (Orlikowski & Gash, 1994, p. 178). Technological frames not only refer to the technology itself, but also include local understanding of specific uses in a given setting.

In practical terms, analysing stakeholder’s technological frames may assist IS designers and implementers in bringing to the surface the incongruent technological frames. The notion of congruence in technological frames refers to the alignment of frames on key elements or categories (Orlikowski & Gash, 1994). This notion involves the extent and nature of differences among frames. Significant incongruence between different groups within an organization may lead to certain action and inaction that hamper the implementation of a new technology. Furthermore, incongruence may be difficult to change later when they are formed through the initial exposure to the technology. Therefore, early identification of incongruence may avoid difficulties during IT implementations. When identifying incongruence, it is important to distinguish its nature. Incongruence might exist due to political differences or due to information deficiencies. Interventions plans for dealing with a particular incongruence should be different depending on the extent and nature of it.

Orlikowski & Gash (1994) suggest using three frames for understanding people interpretations’ of a particular technology. They are described in table 1.

<b>Frame</b>	<b>Description</b>
Technology in use	Refers to people’s understanding of how the ESN will be used on a day-to-day basis and the likely or actual conditions and consequences associated with such use.
Technology strategy	Refers to people’s views of why their organization acquired and implemented the technology. It includes their understanding of the motivation or vision behind the adoption decision and its likely value to the organization.
Nature of technology	Refers to people's images of the technology and their understanding of its capabilities and functionality.

**Table 1: Set of generic technological frames proposed by Orlikowski & Gash (1994, p. 183)**

Even though these three frames presented in table 3 fit several technologies and contexts, they should be complemented with others if a particular kind of technology and particular context requires it for getting better understanding (Orlikowski & Gash, 1994).

The technological frames theory has been widely used and has formed the basis for a genre of studies on processes related to IT in organizations (Davidson, 2006). For example, Puri (2006) drew upon the technological frames theory for analysing the perceptions held by different stakeholders in the context of the development of the National Spatial Data Infrastructure (NSDI) in India. Puri found significant divergences between stakeholders' perceptions. Based on that analysis, Puri suggested guidelines for making policies that may help improving the design and implementation of the NSDI.

In addition to a large number studies using the technological frames theory, critiques of the theory were found in the literature. Davison and Pai (2004) argued that merely becoming aware of divergent frames is not sufficient to improve either design or user acceptability. Then the theoretical frame theory lacks of mechanisms to resolve issues relating to structural aspects of incongruence. Furthermore, they argued the theoretical frame theory tends to be used as a post hoc explanation of unsuccessful IS implementations. Therefore, the theory offers limited value to IS practitioners Davison and Pai (2004). However, Davidson (2006) presented suggestions about how to use the theoretical frames theory for practice, such as looking for incongruent frames before implementing the technology through, for example, surveys or focus groups, and aligning them. Although she recognized that further theoretical development is needed to reach its potential contributions to knowledge.

## **2.5. Summary**

The reviewed literature does not show conclusive evidence whether ESNs provides benefits to organizations or not. However, the reviewed literature shows that different factors may be leading people to perceive ESNs in different ways. Assuming that divergent perceptions about a technology may lead conflicts in using it (Orlikowski & Gash, 1994), it is fair to think that this conflicting views about the ESN's usefulness are due to different perceptions about what the ESNs are.

There were no found studies about the impact of different perception about ESNs as part of a KMS. This study is aimed to fill this gap within the software engineering field.



## Chapter 3. Research objectives and methodology

This study aimed to examine and understand how the perceptions of managers and workers affect the use of an ESN as part of a KMS within a software engineering firm. According to the literature reviewed presented in the previous chapter, this is an area where very little is known. This section starts by explaining the epistemological approach that framed this research. It then describes the research setting. Thirdly, it presents the theoretical framework that was used for analysing the issue. Finally, the research method used and how the data was analysed is explained in detail.

### 3.1. Epistemological Approach

The researcher decided to frame this research using a critical research approach. The critical research approach is not content with simply predicting or explaining the status quo as others epistemological approaches, such as the positivism or interpretivism (Orlikowski & Baroudi, 1991), but emphasises the understanding of prevailing beliefs and social practices that may stop realizing benefits around the object of study (Myers & Klein, 2011). This is aligned with the researcher's professional view and goal as a researcher-practitioner.

Using a critical research epistemological approach implies three fundamental beliefs: (1) a belief that people are able to change their material and social circumstances, although this capacity to change is constrained by existing systems of economic, political, and cultural authority; (2) a belief that there are inherent contradictions in existing social forms, which tend to lead to inequalities and conflicts, although these conflicts lead to the appearance of new social forms; and (3) implies a belief that knowledge is grounded in social and historical practices (Myers & Klein, 2011). Therefore, a "*critical research aims to transform these alienating and restrictive social conditions*" (Myers & Klein, 2011, p. 19). This goal is intended to be achieved through its three elements: insight, critique and transformative redefinition (Myers & Klein, 2011).

The insight element is concerned with gaining deep understanding of the current situation before engaging in critical analysis (Myers & Klein, 2011). This is presented by showing the history, motivations and perceptions behind the initiative showed in the case study. For building this element I used the technological frame framework, which has been previously

used as a diagnosis tool (Davidson, 2006; Davidson, et al., 2004). The second element, critique, focuses on revealing the normative basis of the current situation found in the research site (Myers & Klein, 2011). This is presented in the chapter 5. The third element, transformative redefinition, presents suggestions in order to improve the existing social arrangement (Myers & Klein, 2011). This is presented in the chapter 6.

The following section describes the research setting where the study was performed.

### **3.2. The research setting**

This study was performed in an American software engineering firm with 1400 employees with operations in the Americas, Oceania, Africa, Asia and Europe. The pseudonym South Winds is used for the firm. South Winds has three R&D centres geographically dispersed in different continents. South Winds' headquarters are located in the Silicon Valley, California, USA. They produce a suite of live systems made up of hardware and software. They compete in their market as innovators and provide some product and services to some niche markets. The design and development of those systems are managed by project lifecycle managers.

This organization was selected because the researcher worked in this organization during the period this research was conducted. The topic was chosen because he found the opportunity of contributing in the implementation of the ESN within South Winds and because of a personal curiosity on how ESNs drive significant social practices modifications. This may create some subjectivity, which was partially mitigated using mainly triangulation techniques: 1) two different instruments were used for collecting data: interviews and focus groups; and 2) triangulation of subjects were pursued when participants were selected. Participants belonged to different levels and departments of the organization searching for a triangulation of subjects, and thereby avoiding group biases (Myers, 2008; H.J. Rubin & Rubin, 2005). In addition, the researcher aimed for objectivity and uses their insider view to enhance interpretation of result.

### **3.3. Research Method**

This research used the structured case methodology (Carroll & Swatman, 2000). This is an iterative methodology that focuses on building theories from a systematic analysis of data

collected; and comparing and contrasting outcomes with existing literature. Structured-case has three main elements: the conceptual framework; the research cycle; and the literature-based scrutiny of theory built. The conceptual framework shows the researcher's current understanding of the research themes. It may be mainly made up by existing knowledge that was gathered from the literature and insights. At the end of each iteration, the conceptual framework is refined with the acquired new understanding that arises from the research cycle.

The research cycle stage is conceptualized in four stages: plan, collect data, analyse and reflect. Even though they are graphed as four sequential activities, in practice "*they are ill-defined, allowing much iteration between adjacent stages*" (Carroll & Swatman, 2000, p. 236). The reflection stage implies building a theory from exploring ideas, linking concepts, noting patterns and examining tentative themes from the data. The final element, the literature-based scrutiny of theory build, implies a critical reassessment of findings or re-examination of the data with new insights. It may lead to an "*extension of existing literature and reconciliation with conflicting literature*" (Carroll & Swatman, 2000, p. 240), which indicate the end of the research process.

The first iteration was based on communication practices, because the researcher tried to describe how communication practices change when an ESN is adopted. However, during the first reflection, the researcher realized that the initial research question was not going to be answerable in the research setting. During the second iteration, it became evident the significant differences between people's perceptions about the ESN within South Winds. Then the third iteration aimed to refine the conceptual framework to understand how people's perceptions had impacted on the usage of an ESN. That was the fact that triggered using the Technological Frames Framework (Orlikowski & Gash, 1994) as a basis lens for this research. The following iterations were building the understanding about people's perceptions about the corporate ESN. It was just in the last reflection when the two inducted frames, Personal Success Criteria and Technology Adoption arose from the collected data. Once the findings were consolidated, the researcher socialized them with one middle manager and one leader software engineer in order to enhance the reliability of the results.

The researcher applied different methods: key informant interviews during the first iteration; interviews during the second and third iteration; and focus groups during the fourth iteration.

By this means it was possible to apply methodological triangulation seeking for convergence and corroboration of the results of these methods and thereby increasing the credibility of the findings (Johnson & Christensen, 2008). This study performed four iterations that are presented on figure 2.

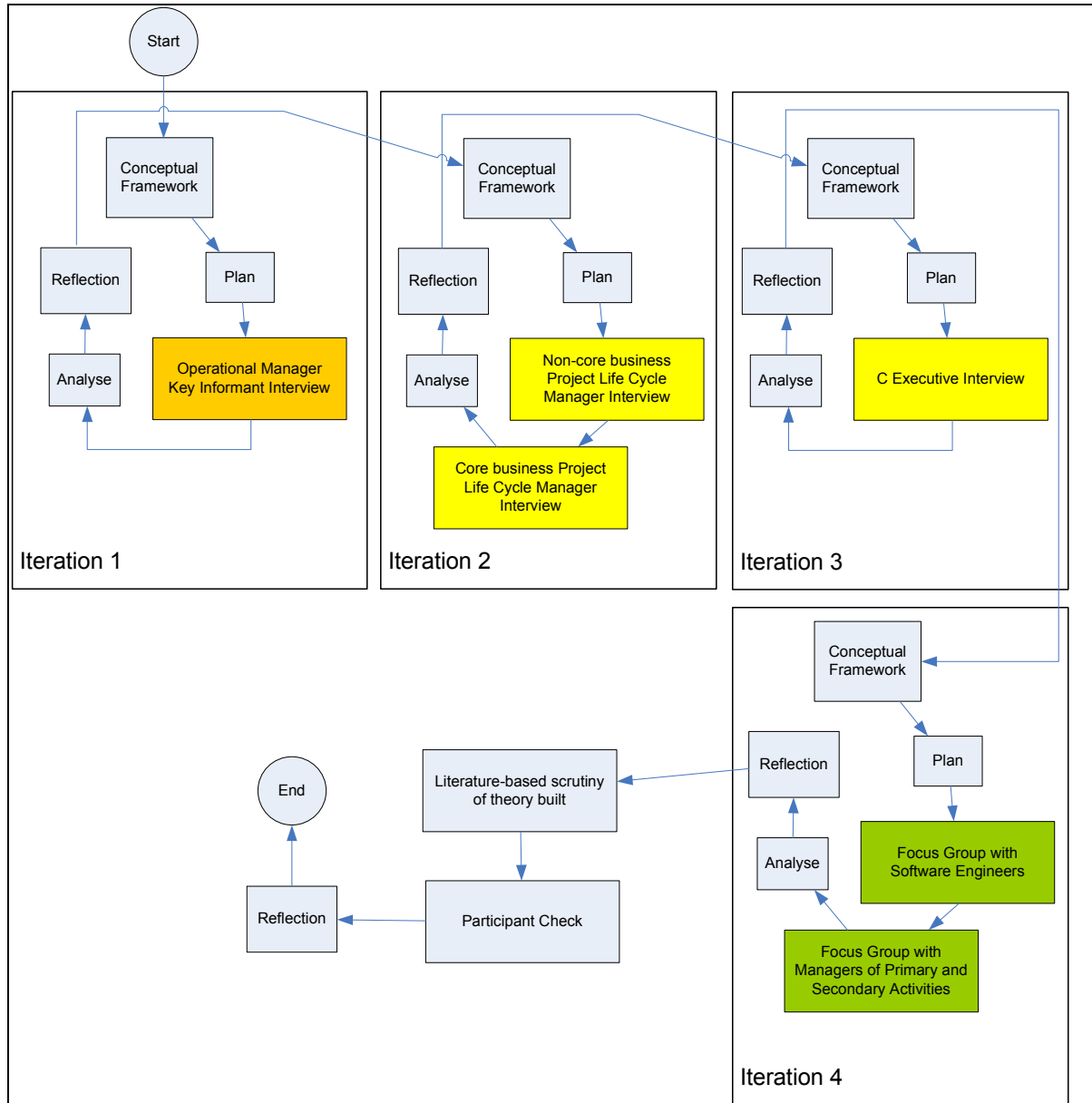


Figure 2: Data collection iteration diagram

Figure 2 highlights the data collection stages. The key informant interview is shown in orange, interviews are shown in yellow and focus groups in green. Participants of interviews and focus groups were selected using purposive sampling. This selection was performed through different levels and departments of the organization searching for a triangulation of subjects (H.J. Rubin & Rubin, 2005), and thereby avoiding group biases (Myers, 2008). During the first iteration the researcher completed one key informant interview with an

operational manager. During the second iteration two in-depth interviews were conducted with project life cycle managers. The third iteration involved conducting an in-depth interview with one C-Executive. The interviews were conducted in offices of the studied organization and one on Skype because of geographical reasons. All interviews were digitally recorded and transcribed. Then the interviewees had the opportunity for reviewing and checking the transcriptions before being analysed. During the last iteration two focus groups were conducted. One focus group was conducted with on a group of software engineers, while the other focus group were applied on a group of managers from different areas of the organization. All of the participants had an active account within the ESN.

### 3.4. Theoretical Considerations: Technological Frames

This study aimed to examine and understand how the perceptions of managers and workers affect the use of an ESN as part of a KMS within a software engineering firm. As was discussed earlier in the literature review section, Orlikowski & Gash (1994) suggest using a theoretical framework for understanding people interpretations' of a particular technology. They are described in table 1.

This research deductively used these three frames, showed in table 2, for comprehending people's understanding of the ESN. Even though these three frames presented in table 3 fit several technologies and contexts, they should be complemented with others if a particular kind of technology and particular context requires it for getting better understanding (Orlikowski & Gash, 1994). Hence, in addition to these three frames, two frames were inductively developed from the gathered data: Personal Success Criteria and Technology Adoption.

Frame	Description
Personal Success Criteria	Refers to the people's understanding of how the ESN would be considered as beneficial to them regardless of the perceived organizational benefits.
Technology Adoption	Refers to the people's understanding of what strategies the organization should display in order to implement the ESN.

Table 2: Set of inductive frames used in this research

Frames about Personal Success Criteria and Technology Adoption arose while data was being analysed. The Personal Success Criteria frame matches with the critical assumption that information systems success or failure is a matter of interpretation. Then an “*information systems success is achieved when and IS is perceived to be successful by the stakeholders and other observers*” (Myers, 1995, p. 65).

The interest in taking this theoretical perspective grew out of researcher’s realization, early on the interview process that people had totally different views on the ESNs success and purpose. This led the researcher to shift the study away from an early focus on how communications practices changed to the issue about the impact of perceptions, making this the focus and selecting the theoretical frames framework as a key theory to inform the interpretation.

### **3.5. Data Analysis**

For analysing the data, the researcher used both inductive and deductive strategies. Inductive strategies followed the principles of grounded theory, which allows the researcher to inductively develop a theory that is grounded in data systematically gathered and analysed (Strauss & Corbin, 1990). The researcher also used deductive strategies from the technological framework theory before explained in the theoretical framework section.

During the first iteration, a set of deductive codes were developed from concepts found in the literature and from the researcher’s professional and personal experience. Communication practices description code was a deductive code that arose from researchers’ experience. This code applies to people’s description about how they communicate. However, this code was absorbed by other categories when preparing the third iteration. This happened when the original research question changed, due to the impossibility to answer it in the research setting. The third iteration included the deductive codes detailed in table 1, which were extracted from the Technological Frames Framework (Orlikowski & Gash, 1994).

Data were coded using the categorization technique described by Rubin and Rubin (1995). Concepts, stories and themes were coded. Concepts refer to ideas or concepts that represent the interviewed view of the world. Concepts are not always explicit but they might be

expressed by a specialized word or a particular tilt to a more common word. Stories are polished versions that may have been condensed to make a point. These are important because they show cultural aspects. Themes show descriptions of how people do or should behave according to the interviewed (Herbert J. Rubin & Rubin, 1995). This process was assisted by NVivo (qualitative analysis software).

Codes were registered and described in a codebook in NVivo software before creating a thick description. A thick description implies a description of the action or behaviour including its context (Geertz, 1973). This task helps to understand how issues are interlinked. After describing the codes, in order to further explore issues and to understand the variety of perspectives the comparison task was applied (Hennink, Hutter, & Bailey, 2011). Three comparison strategies were applied: “Cross-case comparison” strategy; “comparison by deductive groups”; and “comparison by inductive groups” strategy. The “cross-case comparison” strategy implies the comparison of single codes across interviews and focus group. the “comparison by deductive groups” involves comparing codes across different previously defined group, which were C-Level, middle managers and software engineering staff; and the “comparison by inductive groups” strategy implies comparing codes across groups that arose from the research field (Hennink, et al., 2011).

Then, the categorizing task was applied. This is a both deductive and inductive task where codes were grouped into broader categories (Hennink, et al., 2011). Initially categories were inductively created by identifying similarities between codes. Later, a deductive refining process was applied to the categories. Categories were refined a consequence of concepts acquired from the literature and through the social interaction with the supervisor.

A few strategies were used for conceptualizing the data. Conceptualization refers to the process where the researcher moves the data to a more abstract level (Hennink, et al., 2011). Two strategies were used: “big picture” and “writing presenting”. The first strategy looks for discovering the core issues, key linkages and overarching explanation. This strategy aims to identify “*the central story of the data involves stepping back from the data to gain a broader perspective of the issues*” (Hennink, et al., 2011, p. 248). The challenge of this strategy relies on summarizing a situation without losing its complexity and nuances that provide a comprehensive understanding of it. The “writing presenting” consists on presenting the

findings while they are discovered instead of presenting them only at the end. This strategy helps to clearly conceptualize the data, and in addition, “*audience comments and queries can also refine and strengthen your conceptualization and spur further analysis of the issues to more fully conceptualize your data*” (Hennink, et al., 2011, p. 256). When applying this strategy the audience was the research supervisor.

Once the findings were consolidated from the concepts, they were verified through two strategies: return to data and participant check. The first strategy consisted of checking that the findings fit with data collected through the focus groups and interviews; and also with logs collected through the ESN. The second strategy, participant check, refers to check findings with participants, which is useful to mitigate researcher’s subjectivity. These findings were checked with one middle manager and one lead software engineer. Because of time frame limitations, it was not possible to check results with a C-level representative.



## **Chapter 4. Results**

This research aimed to understand and explain how perceptions of different stakeholders affected the usage of the ESN as a part of a KMS in a software engineering firm. In order to answer this question, this research has deductively grouped South Winds's employees into three groups: C-Level, middle managers and software engineering staff. The C- Level group refers to the top executive management. They were the individuals who hold the largest amount of power within the organization. The middle managers group refers to the employees with operational responsibilities. They had influence deciding on budget and strong influence on product outcomes. They had also some level of power to shape organizational structures, because they were responsible for designing local processes. This group was made up of project managers, marketing managers, project life cycle managers and HR managers among others. Finally, the software engineering staff group refers to the employees who designed and coded software based on the requirements that they receive from their direct managers, who belong to the middle managers group. They were the powerless group within the organization.

The purpose of this section is to provide a broad insightful understanding of the current situation. This section is organized as follows: first a description of the history of the project is presented. Second, a description of the usage of the ESN within South Winds is exposed. Finally, a description of the perceptions about the ESN of the three groups above described is presented.

### **4.1. History of the Project**

South Winds is a software engineering firm that searches for differentiating from their competitors through innovating rather than focusing on a particular niche or competing by lower costs. Most of their innovations arise from brainstorming sessions that the company regularly run with key decision members from different departments such as engineering and marketing among others. However, during recent years, South Winds has also been trying to collect ideas from all the staff members. One of the company's first attempts was implementing a competitive innovation process following other innovators in Silicon Valley such as CISCO or HP. The process implied that employees posted their ideas in a free format within an Idea Voting Platform (Bright Idea), which was a web system that worked as a forum where other employees could support or comment on ideas of their peers. The author

of the winning idea won a monetary or technological reward. After running a couple versions of these competitions, the organization decided to stop doing it because it was not considered fully successful. As one C-executive commented “*it was mildly successful, we didn’t seem to capture the total population [of the organization]*”. After this experience, South Winds’s executives stated that they thought a more collaborative process, rather than a competitive one, would be more beneficial for capturing ideas from staff. Under this reasoning South Winds decided implementing an ESN. The technology selected was Flowr, which was chosen without any formal selection process. As an executive said “[*We chose it*] *for its reputation. I can’t say that we did a deep study on selecting a tool*”.

#### **4.2. The ESN artefact: Flowr**

Flowr is a web based application. From a technical perspective, this application resides on external servers. In the South Winds implementation, Flowr was almost completely isolated from the corporate IT infrastructure. In fact, the only link between the IT infrastructure and Flowr was the email notifications that Flowr sent. As a consequence, users had to log into the ESN using different credentials from what they used for the corporate network. As a consequence, some Flowr features did not work properly. For example, posts that involved internal links were not properly displayed within the website. To join the site, employees had to receive an invitation from an employee who was already a member. Once a user received and accepted an invitation, the user was able to create a profile. On the date that this report has been written, about 20% of the South Winds’s population was registered within Flowr.

Once a user opened an account, they could manually set some basic information such as name that they wanted to use, title position, their own picture, contact details, gender, among others. In addition, they could publish links to public social networking sites such as LinkedIn or microblogs like Twitter. Users were also able to add a short description about themselves, show their expertise, interests, language skills and hobbies. Figure 3 shows how this user’s attributes were presented in a typical Flowr’s user home page.

Users interact within the tool by posting messages, ideas, files, questions, among other options. Posts could be published in the corporative stream or within private groups. Posts published within the corporative stream were visible to all the members, while posts within private groups were visible only to the group members. A user could join a group by

receiving an invitation, which could be requested or sent by other group members. An example of the user's posts can be seen in figure 3.

Flowr made visible social networks of users through the public comments/replies, group memberships and through showing who was following who. Users could follow and was followed by other users. This feature was similar to microblog tools, such as Twitter, and users could see follower's colleagues by looking at their Flowr's home page (see figure 3). In practical terms, to follow someone meant that the follower received emails from Flowr notifying them about a post from the followed user. This implied that users who were not followed by no-one were not read until other users logged into the platform or the weekly summary was sent. The weekly summary was an email that Flowr sent every Monday. This summary included: posted messages, new members among other activities within the platform.



Figure 3: A user home page on Flowr

#### 4.3. Overview of how the ESN was used

This section briefly shows South Winds' employees description about how the ESN was used by them. It mainly shows that middle managers were the most active publishers; software engineers were mostly readers; and C-Level staff did not regularly use the ESN.

The middle managers group was the only one where people considered themselves as active publishers. Mainly two drivers were argued for publishing: sharing knowledge and promoting projects that they led. Regarding sharing knowledge, they stated they mainly posted about information industry news and information about the product development that they were leading. Sharing industry news was justified with the intention of sharing knowledge. For instance, one manager said: *“I posted some stuff on [the] competitors [group]. It’s just to let everyone know”*. On the other hand, others managers posted information about the products for which they were leading developments. They stated they posted to increase the knowledge about their projects across the organization and thereby some opportunities could have been grabbed. This last driver was explicitly supported by some executives, however, there was no specialized neither dedicated human resources leading these initiatives. These drivers for using the ESN were consistent with other case studies found in the literature (DiMicco, et al., 2008).

Software engineering staff described themselves as readers. They stated they did not regularly post within the tool. Within a focus group with software engineers one of them said: *“I just read it”*, this was endorsed by the rest. It seemed that this was because they did not perceive benefits on doing it. They also stated that posting on the ESN may hamper their professional reputation. However, they were willing to participate if processes were dictated for doing it.

Only just a few executives had an active account within the ESN. There was no significant participation of the executives during the time this research was performed. One executive said: *“I haven’t used it a lot much”*. However, some level of monitoring was being performed. Furthermore, there was no official internal communications within the tool.

At the end of the second half of 2011 about 20 percent of the company had an account. There were 3542 successful logins into the platform, 305 posts (i.e., initial posts and answers) and 100 “Like This” interactions.

#### **4.4. Overview of Perceptions across South Winds**

Figure 4 presents a summary of the perceptions towards the ESN across the three different organizational groups. The perceptions are grouped within five categories: technology strategy, technology nature, technology in use, technology adoption and personal success criteria. The perceptions between the three organizational groups were significantly divergent in 4 out of the 5 categories. Some level of congruence was found on perceptions about Personal Success Criteria. It was also found some minor level of congruence on perceptions about the nature of the technology between technical managers and software engineers.

This section describes the South Winds employees' perceptions about the technology. People were grouped into three groups: C-Level, Middle Managers and Software Engineering staff. The perceptions are grouped into five categories, two of which emerged from the inductive data analysis and three of which came from Technology Frames theory (Orlikowski & Gash, 1994). Divergent perceptions between the three groups were found in every studied perception, however, some level of convergence was found on the perceptions about personal success criteria.

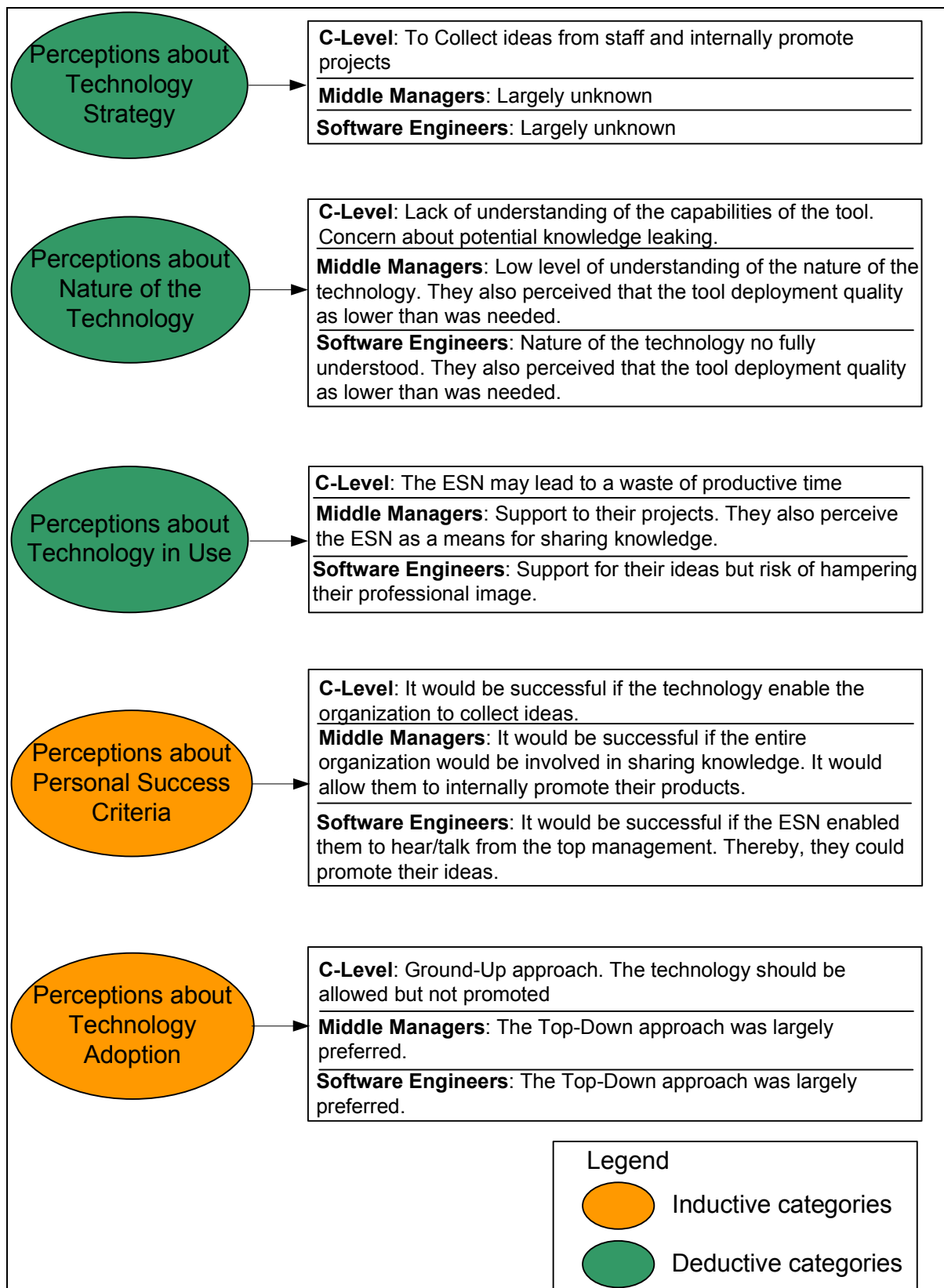


Figure 4: Summary of the perceptions across South Winds

#### 4.4.1. Perceptions about Technology Strategy

This perception refers to people's views of why the organization implemented the ESN. It includes their understanding of the motivation or vision behind the adoption decision and its likely value to the organization (Orlikowski & Gash, 1994). The perceptions of C-level executives, middle managers and software engineers were significantly divergent. The C-Level stated that motivations behind adopting the ESN were collecting ideas and internally promoting products, while the rest of the organization was unaware of the organizational motivations.

##### 4.4.1.1. C-Level Executives: Perceptions about Technology Strategy

The C-Level stated that they wanted to collect ideas from the organization through the implementation of an ESN. This motivation behind the ESN adoption decision matches with the organizational strategy of competing through innovating. One year after implementing the ESN, although the organization had not been able to systematically collect ideas from the staff, they still expected that the ESN would enable the organization to collect ideas, but also they were open to other purposes. For example, the C-Level considered the ESN as a mean for promoting services and products that were not the core of the business. A C-executive indicated:

[That is] when you have a product [or] a technology that is very good and the customer likes it. But we don't know [about it] or we don't talk enough [about it or] we are not aware enough of how to market it. I think [promoting products and technologies through the ESN] is a very good example of how this tool could help us.

However, the executive stated that more people should be engaged for realizing benefits: "*we need more and more people in that*". In particular, they think it is necessary to put together people from different fields in this. Nevertheless, there was no any formal plan ongoing for encouraging people to join the ESN.

##### 4.4.1.2. Middle Managers: Perceptions about Technology Strategy

Only one out of the seven managers that participated in this research was fully aware of the strategy established by the C-Level. It is important to consider that this manager worked closely with the C-Level. He was leading an initiative around the ESN that was aimed to

spread knowledge about the product. His motivation for start using the ESN was taking advantage of the perceived opportunity of making more effective the communication “*with our broader team*”. That refers not only to the people who worked in the development stage, but also to the entire set of people that was involved in selling or marketing the product. Thereby, the manager expected to improve the “*overall effectiveness of the team*”. This was explained as follow:

There is a community out there which have some knowledge about the product [from their contact with the customer] and [at the same time they] lack knowledge about the product. So together, [the community and the development team] there is a combined knowledge which is not shared.[...] I think this tool can assist that.

On the other hand, other managers were not aware of the organizational technology strategy. In fact, they claimed they did not have idea about what for or why the organization decided implementing an ESN. For example an HR manager of a region with about 100 people explained that she was invited from a junior software engineer. In fact, it was so high her unawareness about the ESN that she thought the email invitation was spam. So, she called the person who invited her in order to check what that invitation was about. Paradoxically, many of them perceived potential value from using this tool. For example, the HR manager perceived the ESN as a “*great tool for HR, it just leave us [the HR team] to see what is doing the rest of the organization*”. Similarly, a product line manager was not aware of the organizational strategy. However, they consider the ESN an useful tool for performing his job. In his words: “*[the ESN] appeals to me because it could cut across several groups*”. Another manager from the engineering area argued that the ESN may deliver some value by being a mean of stimulation:

There is a belief [that] there would be some benefits, [from using the ESN. For example,] stimulations for engineering, we would be able to know what’s happening in the regions with local accounts on the product just in an informal way [...] [This would allow us to] get some kind of recognition knowing that we solved a problem and someone loves what you have created. Why are we engineers? It’s not purely because of the salary.



#### 4.4.1.3. Software Engineers: Perceptions about Technology Strategy

Some engineers stated that they had no idea why the organization implemented an ESN, while one stated he thought the organization decided to implement this tool in order to collect ideas from lower levels from the organization. He stated that the ESN was implemented “*for innovation, to generate lot of ideas from lower levels*”. It was interesting to notice that he was not informed about it through an official mean, but he got that information through informal conversations. Software engineers stated they would not have posted any idea on it. This aspect is deeper discussed later in the perceptions about technology in use section.

#### 4.4.2. Perceptions about Nature of Technology

This perception refers to people's images of the technology and their understanding of its capabilities and functionality (Orlikowski & Gash, 1994). A lack of understanding of the actual capabilities of the ESN was found. The ESN was recurrently compared with the corporate Wiki, which as was explained in the literature review section, is a comparison between two completely different tools. In addition, the quality standard applied for the ESN implementation was questioned by several participants. The executives were concerned about its negative potential to be a source of knowledge leaking.

##### 4.4.2.1. C-Level Executives: Perceptions about Nature of Technology

The C-Level stated that they considered themselves as mostly ignorant of the capabilities and functionalities of the technology. An executive said: “*To be honest Julio, I don't know much about this tool. [...] I haven't used it a lot much*”. However, they had significant concerns about the risks that involved using this tool under the current technical deployment. Specifically, they said they feared of leaking sensitive information by using this tool. The same executive posited:

[The ESN] is not my favourite tool especially when we found that it is [too easy to access it from outside of the company]. I think that it becomes a potential horror story for us because we spend a good time trying to create a competitive advantages and if you throw it away within [unintelligible] communication then it is a disaster [...] at the moment I see more risks than advantages.

#### 4.4.2.2. Middle Managers: Perceptions about Nature of Technology

Middle managers had divergent perceptions about the nature of the ESN depending on their background. In general terms, managers with an engineering background considered the ESN capabilities lower quality than the expected, while other managers seemed pleased with the ESN's quality standard. These perceptions about the ESN's quality referred to the overall implementation and not only to Flowr itself.

In a focus group with managers from different areas, some perceptions about Flowr were radically opposed. For example, when they were discussing about the ESN's integration with the IT infrastructure opinions were completely divergent. One technical leader stated that the login mechanism led to low participation between employees because it was not properly integrated. He said:

It does not have a domain login, this is an extra barrier to entry and therefore you have low participation. We should not have a system like this. [It should not be] any system at all requires registration because we have company account. So I think Flowr itself is a bit rubbish.

On the other hand, during the same focus group one manager said "*it is one of the easiest accessible things*". Furthermore, a manager from the marketing department said:

So, that's why I am sort of glad with Flowr because is so open. People can get in and they can do whatever they want [to]. Login is a bit hassle but once you set it up, there is no problem.

Similar divergent opinions were found during interviews depending on the background of the manager. Hence, managers with technical background perceived that login to an external site affected their user experience, while managers with different background did not perceive this technical isolation as a problem.

Some perceptions about the ESN were consistent between managers with different backgrounds. A relevant aspect to the nature of technology perceptions was that managers recurrently compared the ESN with the corporate Wiki. This mind model was present in focus groups and interviews. For example, in an interview with a project line manager with technical background he stated "*[Wiki] doesn't have the ability to send email out; it's the*

*things where Flowr can be useful*". This fragment shows the interviewed see Wiki and the ESN as similar tools, where, according to his perception, the ESN has the advantage of sending emails. Furthermore, the ESN was described as a competitor to the corporate Wiki. One manager with no engineering background said "*there are already competing tools out there that people prefer over Flowr like the wiki*". This is interesting because Flowr is an enterprise social networking tool, while Wiki is essentially a collection of Web sites connected via hyperlinks where users can modify its content via a web browser. This aspect is deeper analysed in the discussion section.

It was curious that almost every manager who participated in this research expressed their desire for functionalities that were already provided by Flowr, such as posting on the ESN by sending an email. Nevertheless, they were unaware of. However, when the researcher posited the possibility that a lack of training is leading a sub utilisation of the technology, they rejected this possibility. They do not think that the company should spend resources in training because they considered themselves able to learn this technology. One manager with technical background stated: "*I do find Flowr quite intuitive [...] We have to learn systems like this, we have to be self tutors*"

#### 4.4.2.3. Software Engineers: Perceptions about Nature of Technology

In general, software engineers were not pleased with the Flowr implementation. They expressed several apprehensions about the technical capabilities of the ESN. It is important to highlight that they did not only refer to Flowr itself, but also to the tool's deployment within the IT infrastructure. In particular, most of them described the technology as an isolated tool.

As well as technical managers, software engineers seemed very annoyed about the lack of integration of Flowr with the corporate IT infrastructure. During one focus group, one senior software engineer stated "*the biggest problem is the lack of integration, because it is a separate system from everything else*". This was endorsed by the rest of the participants.

In addition, software engineers consider that the quality of Flowr was lower than the acceptable. One software designer argued "*another problem of Flowr is that it's quite flaky [slang for unreliable]*", Furthermore, others argued that Flowr did not provide key features that would improve the user experience. For example, someone said "*You cannot use it on the*

*phone” or “[it is a problem to have to] log into a site specifically to post a couple lines, an option could be to better interface to Flowr, [for example, posting by] sending an email”.*

However, these features were already supported by the technology. When the researcher told them that these features were already supported by the technology, software engineers stated that they would value some training because they may be wrongly assuming that Flowr is like any other social networking tool. Their attitude towards training was notably different from that of the managers.

As well as managers, some software engineers perceived the ESN as a competitor tool of the corporate Wiki. For example, during one focus group one software engineer stated:

The format of Flowr limits the content. You can't write like a massive tutorial in Flowr and a lot of the documents are pointed out somewhere else. You get diverged somewhere else. If you compare Flowr with our Wiki, a Wiki contain a lot of more information than Flowr in term of details.

#### **4.4.3. Perceptions about Technology in Use**

Technology in use refers to people's understanding of how the ESN is used on a day-to-day basis and the likely or actual conditions and consequences associated with such use (Orlikowski & Gash, 1994). The C-Level group was concerned about the potential of waste of productive time in using this tool. They also feared that the usage of this tool may lead leaking knowledge. The middle managers perceived that by using this tool they would have been able to promote their projects and thereby taking advantage of hidden opportunities. Finally, software engineers stated that by using this tool, they would have been able to promote their ideas.

##### **4.4.3.1. C-Level Executives: Perceptions about Technology in Use**

The C-Level stated that the ESN would allow South Winds' employees to engage in informal communication around ideas. However, they had mainly two concerns about the ESN's usage: 1) they feared that the ESN may lead time wasting with negative impacts on the organizational productivity, which, according to the literature review, it is an extended perception across C-Levels (Riemer, et al., 2010); and 2) given the importance of the innovation for this organization, the C-Level group feared that the ESN may lead a knowledge leaking.

Regarding to the conditions for realizing benefits, the C-Level did not perceive the ESN penetration rate as a key element. In fact, the C-Level considered that *“it is not nothing wrong with [the 20%]”* of penetration rate. It seemed that the C-Level group was interested on getting involved within the ESN employees with a particular profile: *“you really need to talk to the people in the regions and the key technical guys chat to them”*. On the date that this report has been written, the C-Level was not championing any formal initiative for increasing the level of penetration.

#### 4.4.3.2. Middle Managers: Perceptions about Technology in Use

Most of the managers that participated in this research considered that on the day-to-day basis the ESN would have been used for sharing knowledge. One of them stated that *“Flowr offers broader possibilities in terms of collaboration, sharing ideas and knowledge and stimulating getting people connected”*. Moreover, one of them explained that he was already using it for sharing knowledge *“So, I educated a few [...] I posted some stuff on the competitors [group]. It’s just to let everyone know”*.

As a consequence of sharing knowledge through the ESN some managers considered that the ESN would have helped them to promote their projects. For example, one of them was leading an initiative for promoting the product that he managed using the ESN. He stated that the ESN might be the driver for taking advantage of missed opportunities that were produced from the configuration of the organization. In particular he expected that the ESN would have helped them to overcome the following issue:

There are lost opportunities through what you don’t know. You don’t know what you don’t know. If you don’t know you have product with a certain capability and you may find in a sale situation with a customer, let’s say you are an account manager or a sales guy, how can you best sell that product to that customer if you don’t know aspects about the product.

Another significant consequence that managers perceived from using ESN was that its use was breaking silos. One technical manager stated *“We are a global company. We have offices around the world. [Flowr] is a great tool for just getting people connected”*. A project life cycle manager expressed *“Flowr appeal to me because it could cut across several groups”*.

Another manager elaborated a potential ESN usage based on the capability for breaking silos. He said: *“I see it is being useful: discussions regarding specification gathering, there is a lot of people who feed into that it’s not just engineering and product line managers”*. He told that in the specification gathering, people tended to forget asking the opinion to other areas, such as finance. He stated that Flowr could assist in that. For instance he presented the following example:

In the discussions on components selection, for example, vendor A and vendor B do the same job I don’t care, but vendor A may be 90 days payment terms and vendor B may give as 60 days payment terms. I don’t know, engineering don’t know, finance suppose know that. Flowr can assist in that.

However, there were conditions that these managers consider important for realizing this kind of benefits: processes from upper levels and all the company involved within the ESN.

There was a common perception between managers that an active involvement from all the employees is a condition for effectively using the ESN. Furthermore, they considered the level of penetration at the time that the interviews/focus groups were conducted, was far lower than the needed. In their opinion, this lack of participation was mainly due to lack of rules and no top management participation. For example, one project line manager stated that the ESN would have benefited his job performance, but the lack of clear rules stopped him to use it within his team:

For being beneficial [the ESN] to the company **everyone** [STRESSED ON EVERYONE] in the company has to use it [... but there is] no rules, no one in charge, nobody saying you have to use it.

Furthermore, another manager said:

How would the site changed if people like “John” or “Peter” and those [C-Level] guys would post stuff and encouraging people participating and posting their ideas [...] it would really change how people look at it.

#### 4.4.3.3. Software Engineers: Perceptions about Technology in Use

Software engineers described their role within the ESN as mainly readers. Typical expressions that were captured were *“I don’t post much on it”* or *“I just read it”*. A software

engineer described how he uses the tool as follows:

Every week I get a digest, I don't monitor every single message. In terms of sharing, I don't share quite often. I don't share my own opinion very often. I tend to react more to other people comments and other people opinions.

They presented mainly two explicit reasons for acting as readers: posting on the ESN does not provide them any benefit and they fear hampering their professional image. For example, during a focus group, they said that posts were not directed to them: *"it is not a personal message to people, so you don't feel you should response"*, another complemented

When you send something into a group, the whole people on that are listening to what you sent it. They say: 'I have to reply' [LAZY VOICE] or 'this is not really to me' [LAZY VOICE]. This it no really for me or you wait that an active user who always respond.

In summary, it seemed that they did not feel a responsibility for commenting on other's posts. In addition, they do not post because they do not perceive benefits of doing so.

It seemed that software engineers feared hampering their professional image through posting on the ESN. One technical leader said: *"I would not post something on the public stream unless I talk very carefully about it"*. This risk aversion was present even when they identified potential benefits that would be driven by posting on the ESN. They perceived the tool as a potential mean for promoting their ideas *"[Flowr would help me] if I have an idea or problem that the CEO could support"*. Paradoxically, they would not have done it, because, according to them, some conditions should have been accomplished before start posting ideas.

The main two conditions that they highlighted were: leadership and the ESN should be widely used in the organization. One senior software engineer said: *"it is not pushed.. if top executives start using Flowr. That would lead people start using it"*. On the other hand, they identify the lack of participation as a barrier for using the ESN *"I think the lack of people starting conversation makes people stop using it"*.

#### 4.4.4. Perceptions about Personal Success Criteria

This perception refers to the people's interpretations about what should have been the ESN's outcome in order to consider the ESN as a successful tool to them. The C-Level would have considered the ESN as a success implementation if the ESN would have enabled the organization to generate ideas from a collaborative process that would have involved people from different areas of the organization. Middle managers would have considered the ESN's implementation as a success if the tool would have enabled them to promote their projects. They also consider that the ESN should be widely by employees. Finally, software engineer staff stated that the ESN would have been a success if it would have allowed them to promote their ideas and if it would allow them to listen/talk to the top management.

##### 4.4.4.1. C-Level Executives: Perceptions about Personal Success Criteria

The C executives stated that the ESN implementation would have been successful if the tool would have enabled the organization to generate ideas. They stated that the ESN has the potential for breaking silos, and thereby generating ideas from the informal conversation between different stakeholders. As a consequence, they expected realizing benefits through increasing the revenue. In particular, C-Executives considered that the ESN may have helped enabling conversations between people who work with customers and key technical staff. As a C-Executive illustrated:

People in the field are extremely important to this. [...Using the ESN locally] is good and interesting, but it doesn't help to make more business. You really need to talk to the people [who work in the field] and the key technical guys chat to them.

From their point of view, they were not completely sure if the tool had been successful. However, they were slightly optimistic because "*a few ideas and projects are around [in Flowr] with reasonable interaction*".

##### 4.4.4.2. Middle Managers: Perceptions about Personal Success Criteria

Middle managers stated that they would have considered the ESN implementation as a success if the level of participation would have been higher. In particular, they expected that the staff and other decision takers share knowledge by publishing documents about their



projects within the platform. However, they stated that it was not happening. For example one manager who, in his opinion, was actively sharing information about the product that he led, said: *“it’s not just [working]. Everyone is not just jumping in and publishing papers”*. Another said *“maybe there is something missing in Flowr that would encourage people to adopt it more”*.

In addition, some managers perceived the ESN as an enabler to promote the products that they were leading. They stated that they felt that this tool may increase the knowledge of their products across the organization and thereby taking advantage of opportunities, such as increasing the sales of the product or as a mean of providing intrinsic rewards to their team. For example, they considered that their team only hear comments from the customers when something went wrong, but hearing from the customer when some feature has solved a problem would be an intrinsic reward. He stated:

There is an opportunity to improve sharing knowledge between team members and better support each other and really the end goal is to improve the overall effectiveness of the team. We hear about issues, we manage and we deal with them, but it would be nice to hear about just customers using the product as well and good experiences [...] to get some feedback.

A third criterion of success was identified as learning about and from other departments. Managers that belonged to support activities departments, such as HR or finances, would have considered the ESN implementation as a success if it would have allowed them to learn about other departments. For example, one HR manager said:

This is a great tool for the rest HR. It just leaves us to see what is doing the rest of the organization [...] you know HR is separate from the business, we don’t understand what everyone is doing... there is an opportunity here.

#### 4.4.4.3. Software Engineers: Perceptions about Personal Success Criteria

The South Winds’ staff would have considered the ESN implementation as a success if the tool would have enabled them to learn from others. Specifically they described themselves as ESN’s readers rather than publishers. Hence, they perceived the ESN as an instance for learning from others areas. In particular, they were interested on getting updates from other organization’s areas, but they did not feel that the ESN was widely used. During a focus

group, a software engineer opined *“I think the main successful point of a good social networking site is that you have a large audience based, you have a large users based that’s what make successful.[...] I think Flowr is limited in that sense”*. Following the same conversation, a senior test engineer explained that he stopped using the ESN because of the lack of participation:

That relies on people putting information on there. Maybe if we have automated content somehow and then so we are no just relying on people to put content in there. I think the lack of people starting conversation makes people stop using it.

In addition, engineers would have expected from the ESN a channel for communicating with the top management. From this communication channel they expected getting updates from the top management and having the chance of reaching them with their ideas, and thereby eventually getting their support. One technical leader stated *“if you have an idea and it could get the CEO, when it is very unlikely that you copy [in an email] the CEO”*. A senior software engineer said *“the CEO may have a look at it [...] you can jump levels”*. In other words, they would have considered the ESN implementation as a success if the ESN would have been able to effectively break silos. However, they would have barely posted an idea because they felt that there was a lack of participation and they stated that their reputation might be hampered. For example, one technical leader said: *“I would not post something on the public stream unless I talk very carefully about it”*. Moreover, they would not post because they did not think that the C-Level was actually using Flowr.

#### **4.4.5. Perceptions about Technology Adoption**

This perception refers to what is the suitable method for encouraging employees using the ESN towards realizing benefits. The C-Level adopted a ground up approach. This means that they allowed the tool, but they did not promote it. They expected that people evaluate how useful would be for them, but they did not implement processes for using it. This perception was shared by only one manager and was not shared at all by software engineers.

##### **4.4.5.1. C-Level Executive: Perceptions about Adoption**

The C-Level decided to allow the ESN but they did not promote it. They decided to apply the same policy that they applied for other communication technologies like Skype. An executive

explained the policy as “*I would say it’s allowed, [it is like] Skype it’s not promoted it’s allowed*”. In practical terms, they made the technology available to the organization, and thereby they expected that individuals opt for using it or not.

#### 4.4.5.2. Middle Managers: Perceptions about Adoption

Only one of the participant middle managers shared with the C-Level’s adoption perception, while others stated that some leadership from upper levels was required. The manager that shared the same perception with executives about the suitable adoption approach argued that the leadership for using this tool could arise not necessarily from top, but from the lower levels of the organization. He stated:

I think the way in which the company has rolled this out is a ground up type model. And where was hoping that everyone individually would see some benefit in start using it, so it would grow. I think it would benefit from some leadership. By leadership I don’t necessarily mean top-down type leadership. It can be ground up leadership from one person.

However, the rest of the managers involved in this research stated that a top-down approach would have been the adequate adoption approach. For example one manager named several potential benefits from using the ESN; however, he identified the lack of leadership as the current gap for realizing those potential benefits:

The gap [for realizing the potential benefits] is someone in ability in the company to pick up the [tool] and make, and cause you get it. Someone who could say: ‘ok, how could make it work for YOU guys?’. Then you make customizations for me, changing company process, all the rules and regulations.

A project life cycle manager considered that the ground-up approach is not effective for adopting an ESN because, in his opinion, people tend to follow formal leadership. Then, activities within the ESN from unknown people would not encourage others to participate. He explained this as

Some people who work with me would probably benefit because they ask me so many questions and if they see me contribute more, then they might also be encouraged to contribute just because they already know me. Whereas maybe, [people] who is not so well known by people as widely and might not have the

same effect. The same is true for executives, often the higher people climb within an organization, the more respect they command which means more people will follow their lead.

In one of the focus groups with managers from different departments, while they were talking about why the ESN was not actively used, one manager from the engineering department stated that other social software tools were only used because it was pushed by someone with formal power within the organization.

The first time I saw [the ESN]. I thought: ‘oh that looks like a badly implemented good idea’. I agree is a lack of leadership. The reason why the software guys use Wiki was because we together decide, but that was led by “Robert” [an engineering director of the company].

#### 4.4.5.3. Software Engineers: Perceptions about Adoption

This group unanimously disagreed with the ground-up approach for adopting Flowr. They stated that upper levels should have led the adoption of the ESN. According to them, this leadership should have been performed through top management’s participation and through establishing processes. For example, one senior software engineer argued: “*The push to use it must come from above not from below*”. They also argue that internal communications should be distributed through the ESN, “*there is no reason why you can’t move [the internal bulletin] to Flowr. Because, if the CEO say: ‘ok right all CEO announcements are moved to Flowr’ that would lead people to use Flowr*”.

## Chapter 5. Discussion

This section critiques South Winds members' perceptions by revealing the normative basis that led the social order in South Winds at the time of this study was performed. This section also highlights the impact of incongruent perceptions on using the ESN as a part of a KMS. Several incongruencies were found across four out of the five frames. It seemed that these incongruencies were leading conflicts around the use of the ESN. Incongruencies were not due to political reasons, but they seemed due to information deficiencies.

### 5.1. Perception about Technology Strategy

According to an executive, the organization had acquired an ESN in order to collect ideas from staff through a collaborative instead of a competitive way. They also perceived that the technology may help them to internally promote some products. Even though there was an incipient consensus about the usefulness of the technological artefact for collecting ideas between the three groups, incongruent perceptions about the organizational strategy between the three groups were found. In general, the organization was unaware of the top management strategy for implementing the ESN.

This strategy of collecting ideas and promoting internal products are easily understandable because of the "professional complex" nature of the organization. Professional organizations are organizations where different groups of specialized people come together to apply their specialized knowledge to the resolution of ambiguous problems (Rangachari, 2009).

Complex organizations refer to the organizations where the parts of them are essentially interrelated (Rangachari, 2009). Within "professional complex organizations", the need of collaboration increases proportionally with the degree of specialty in different areas among the stakeholders. This produces an Asymmetry of Knowledge (or Symmetry of Ignorance), which refers to the extent to which the members involved have different level of knowledge on different areas (Dillenbourg, 1999). This asymmetry of knowledge might produce different descriptions of the same thing or different reasons for the same phenomenon or even different agendas or goals (Arias, Eden, Fischer, Gorman, & Scharff, 2000). This asymmetry might be very beneficial because this heterogeneity of viewpoints can help to discover alternatives and to make visible tacit aspects of problems (Arias, et al., 2000). Therefore, the challenge for professional complex organizations, like South Winds, is to integrate this richness of various perspectives which emerge from the asymmetry of knowledge in order to enhance the creation of shared understanding and then of knowledge. Hypothetically, it

seems that an ESN would support this strategy because of its natural ability to break silos by enabling conversations between people or groups regardless of the distance (Avram, 2006).

Following this reasoning, it seems that the motivation behind the ESN adoption was aligned with the potential ESN's capabilities. However, even though there was an incipient consensus about the usefulness of the ESN for collecting ideas between the three groups, incongruent perceptions about the organizational strategy were found between the three groups. The most significant incongruence was found in perceptions between middle managers and C-Level. Most of the middle managers that participated in this research were not aware of the organizational strategy for adopting the ESN. As a consequence of this incongruence, middle managers were not able to design processes for supporting this strategy. On the other hand, even though some software engineers were aware of the motivations behind the ESN acquisition, they perceived the tool as an efficient channel for sharing their ideas. However, they felt that their voice would not have been listened within the ESN.

Considering that 1) middle managers were largely ignorant about the C-Level's motivations for acquiring the ESN; and 2) software engineers were not posting because they perceived they would not have been listened to, although the C-Level stated they were performing some level of monitoring on the ESN: it is fair to assert that technology strategy incongruencies were due to information deficiencies and not due to political reasons.

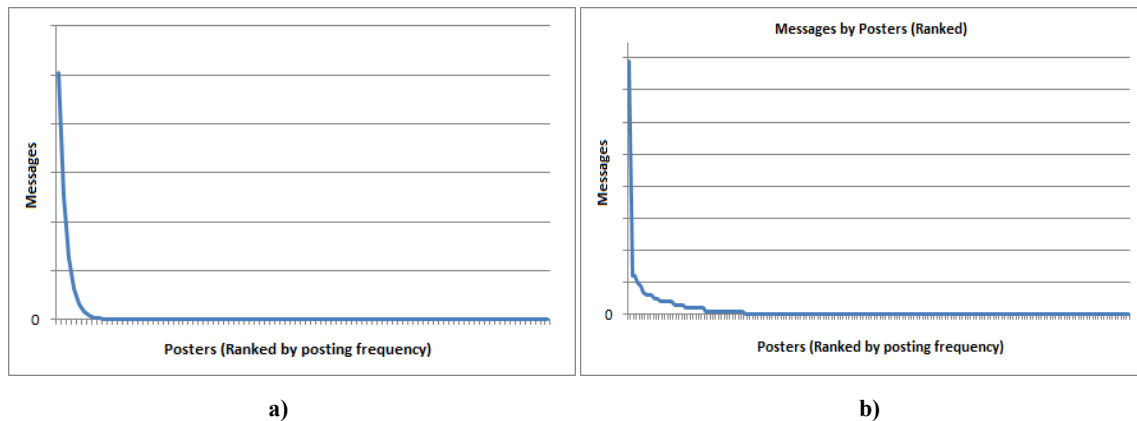
In summary, the existing literature supports the top management's motivation of adopting an ESN for collecting ideas and internally promoting projects. Nevertheless, it was unlikely to realize benefits because this strategy was not properly communicated. This is supported by existing literature: several authors hold that objectives and metrics should be clearly communicated before commencement of KM activities (Levett & Guenov, 2000; Mohamed, et al., 2006). However, even if the strategy would have been well communicated, the high degree of incongruencies about the nature of the technology would have made almost impossible to realize benefits.

## 5.2. Perception about Nature of Technology

There were at least two congruent perceptions about the nature of technology between middle managers and software engineering staff. One perception was related to how the ESN shapes organizational members participation. The second congruent perception was the ESN core capability, which surprisingly was described as a knowledge repository at the same level as the corporate wiki. However, these congruent perceptions were largely misaligned with the actual nature of the technology. On the other hand, incongruence was found between organizational members with strong technical background (an executive, software engineers and technical middle managers) and organizational members with non-technical background. The first group perceived extremely poor the technical ESN deployment, while the second group were pleased with the ESN deployment.

There was a widespread belief amongst middle managers and software engineer staff that a high level of employee's participation within the ESN was key for realizing benefits from adopting an ESN. However, employees stated they thought that people were not participating within the tool. As a consequence, a vicious circle was created. Employees were under the impression that nobody was using the tool, and then they did not use the ESN. Nevertheless, it seemed that people had a fallacious assumption for assessing whether people were using or not the ESN. The general expectation was that people start constantly posting work-related information within the ESN. However, it seemed that this expectation arose from the lack of understanding of the participation inequality characteristic, which is part of the nature of online communities (Whittaker, Terveen, Hill, & Cherny, 1998).

It is unreal to expect that most of the employees would post periodically within the ESN. It seems that the participation inequality is an inherent aspect of online communities like ESNs (Whittaker, et al., 1998). Participation inequality refers to the unequal participation distribution between online communities' members. This user participation follows a Zipf distribution (see figure 5a). This can be explained with the 90-9-1 rule (Nielsen, 2006). This rule means that 90% of users are readers and they do not contribute. 9% of the users barely contribute but it is not their priority. Only 1% is active contributors. This 90-9-1 rule is only a figure for explaining the Zipf distribution.



**Figure 5a: Zipf distribution (adapted from Whittaker, et al., 1998)**  
**Figure 5b: On the right actual level of individual participation within South Winds' ESN**

This pattern can be seen in several online communities. For example, Wikipedia (Wikipedia: The free encyclopaedia, 2004), Amazon (Nielsen, 2006) or Facebook (Oh, 2011) to name just a few online communities.

Figure 5b shows the high unequal levels of participation within the South Winds' ESN during the first half of 2011. The right hand side of the graph presented in the figure 5b shows that most of the people post only a small amount of times. On the other hand, the left side shows that just a few people were the main contributors.

Another congruent perception among the software engineer group and the middle managers group was the impression that the ESN's core capability was storing knowledge. This was expressed by recurrently presenting the ESN as a competitor of Wiki. This perception was mainly captured from the middle managers group and to a lesser degree in the software engineers group. Assuming that an ESN is a social software characterized by providing a platform for conversational interaction between people or groups (Avram, 2006), while Wiki is essentially a collection of Web sites connected via hyperlinks where users can modify its content via a web browser, it is fair to assert that this is a misconception of the nature of the tool. This distortion may produce two outcomes: 1) managers may build processes around the ESN under wrong assumptions and 2) managers and staff may ignore the ESN. It seemed that the second consequence was happening in South Winds at the time of this study.

A divergent perception about the nature of the technology was referred to the quality of the ESN deployment. From the technical perspective, an executive, technical managers and software engineering staff stated they thought that the ESN's quality lower than the



acceptable levels. However, the perceived impacts of these perceptions were different. While some people perceived the ESN as a source of potential knowledge leaking, others perceived the user experience as deficient. It is important to highlight that they do not only refer to Flowr itself, but they also refer to the tool's deployment within the IT infrastructure.

In summary, most of the employees did not know what an ESN actually is. They did not properly understand the functionality of the ESN. This is reflected on their unawareness of how people behave within online communities. Furthermore, they lacked an understanding of the core capabilities of the ESN. These beliefs impacted on the tactics used for adopting the ESN (this will be discussed in the "perceptions about technology adoption" section). Furthermore, technical employees, from different levels of the hierarchy, considered that the quality standards for the ESN's deployment were lower than the acceptable. It seems that within software engineering contexts, technical quality standards should be higher than quality standards in other contexts.

### **5.3. Perception about Technology in Use**

A congruent perception about the potential positive impact of using the ESN for promoting projects was found across all the groups. However, incongruent perceptions about consequences from using ESN were found. Executives feared that the ESN might have led employees wasting time leading productivity losses, while staff would have not using the ESN for leisure.

There was a significant concern among executives of potential productivity losses because of using the ESN, which may partially explained why they did not promote it (this point will be discussed in the "perceptions about technology adoption" section). Nevertheless, the evidence suggests that this risk did not represent a real threat because people do not tend to use ENSs for leisure like they do in public social networking sites (Riemer, et al., 2010). Furthermore, studies have shown that employees may use ESNs in a productive way (Riemer, et al., 2010). In addition, South Winds' software engineering staff would not have used the ESN for leisure purposes because they perceived that doing so may hamper their professional image.

Software engineering staff was concerned about how their professional image might be affected from using an ESN. A few studies show similarities between the impression

management strategies deployed on public social networking sites and in the offline life (Buffardi & Campbell, 2008; Donath & Boyd, 2004; Gosling, Gaddis, & Vazire, 2007).

Impression management refers to people's strategies that are used for influencing the impressions others hold about them (Goffman, 1959). Due to ESNs are a medium that reveals user's knowledge, expertise, activities or availability (Begel, et al., 2010), it is fair to assert that impression management plays a key role in people's behaviours within ESNs.

The concern about professional image was particularly present in lower levels of the organization. In fact, this concern was explicit within the software engineers group: *"I would not post something on the public stream unless I talk very carefully about it"*. Furthermore, operational managers seem aware of this. A project life manager stated:

People don't mind asking me dumb questions because I would always be helpful, but they might not want to dumb question published to 1000 people [...] because it's a professional thing. [Whereas] we [managers] are less reluctant to say things, whereas some people are more reluctant because they are less secure about this topic or wherever.

Nevertheless, this does not mean operational managers were not concerned about their own projected image within the ESN. For example, the same manager said: *"I am not trying to be too professional but I need to be a little bit more professional at work than I do outside of work"*. Hence, the concern of the impression effect is present at all levels organization, with greater emphasis at lower levels.

The considerations about impression management and ESN show mainly two things: 1) C-Executive perceptions about losing productivity because of using an ESN were baseless. 2) Impression management considerations make evident that the ground-up adoption approach is not the suitable for an ESN. This will be deeply discussed in the perceptions about technology adoption section.

Middle managers and software engineering staff perceived that using the ESN would allow them to promote their projects and ideas respectively, which, according to the reviewed literature, seems to be independent on the research context (DiMicco, et al., 2008). Moreover, middle managers stated that the ESN would allow them to break silos and thereby

transferring knowledge that people from other teams may need to better perform their tasks. Furthermore, executives supported using the ESN with this end. However, a significant incongruent perception generated conflicts in using the ESN for systematically sharing knowledge: while the executives considered that the level of penetration was not a decisive factor for realizing benefits from the ESN, the rest of the organization considered that it was fundamental to get involved within the ESN the entire corporation.

In summary, there was some level of congruence in regard of the ESN use. In general, all the employees perceived the tool as means of promoting ideas and projects. This perception is consistent with other case studies found in the literature (e.g., DiMicco, et al., 2008). However, executives feared that the ESN would have led employees wasting time. Nevertheless, that perception seemed baseless, because the evidence suggests that employees would not have used the ESN for non-related work because of the perceived risk of hampering their image.

#### **5.4. Perception about Personal Success Criteria**

Perceptions about the Personal Success Criteria are in large extent congruent across the different levels of the organization. The C-Level would have considered the ESN implementation as a success if the ESN would have supported their strategy for acquiring the technology: generating/sharing knowledge or, in their words, collecting ideas from staff and internally promoting projects. Middle managers would have considered the ESN's implementation as a success if the tool would have enabled them to promote their projects across different organizational groups. This may explain why they also expected that the ESN would have widely used for the entire organization. Finally, software engineering staff perceived that the ESN would have been a success if it would have allowed them to share their ideas about product or to highlight organizational tacit problems. Even though large level of congruence was found in this category of perceptions, some divergent perceptions were found in regard of the actual level of successfulness.

The C-level thought that some incipient level of successfulness was reached. Some middle managers stated that they were already able to reach a larger audience through the ESN, in other words, they felt that the ESN already allowed them to break silos. On the other hand, software engineering staff considered the ESN implementation as largely a failure. They

justified this perception arguing that the tool was not being used and because there were no clear guidelines about how to use the ESN. It seems that perceptions about the Personal Success Criteria directly impacted on the perceptions about adoption and how the knowledge was exchanged within the ESN.

### **5.5. Perceptions about technology adoption**

Incongruent perceptions between different groups were found in regard to the adoption approach that should have been used by South Winds. The C-level group perceived that the suitable model for adopting the ESN was a ground up approach. Ground up approach means that neither promotion, processes nor rewarding schema are applied from higher levels. This was the approach observed at the moment of this study was performed. On the other hand, middle managers and software engineers did not share this perception.

It seemed that perceptions about technology adoption were strongly influenced by perceptions about the technology in use and nature of the technology. In South Winds, the decision of using a ground up approach for using the ESN was taken by the C-Level. However, this approach discouraged knowledge creation/sharing within South Winds through the ESN because of two inherent elements of ESNs, impression management and participation inequality. The knowledge markets theory (Davenport & Prusak, 1998) is useful to understand the impact of the adoption approach on the usage of the ESN considering these elements (i.e., impression management and participation inequality).

A knowledge market is an abstraction to understand how knowledge is exchanged. Focusing only in inter-organizational knowledge markets, it is possible to identify three roles: knowledge buyers, knowledge sellers and knowledge brokers (Davenport & Prusak, 2000). Knowledge buyers are individuals who are looking for knowledge in order to solve a problem that its complexity exceeds its own knowledge. Within an organization everyone is a buyer but not everyone can be a knowledge seller. Knowledge sellers are people with an internal market reputation for having knowledge about a particular matter. Assuming that knowledge is power, knowledge owners may not want to share their knowledge because this may dissipate their power. Finally, knowledge brokers are individuals who make connections between buyers and sellers (Davenport & Prusak, 2000).

The decision for using a ground up approach in South Winds was challenged by the ESN's effect on people's impression management. People search to become a knowledge seller in order to gain organizational power (Davenport & Prusak, 2000). For being a knowledge seller people have to be internally known as a knowledgeable person. Then, if they share misaligned comments or questions on the ESN, which are common things during creative processes, they would dissipate their knowledgeable reputation. Hence, it is unlikely that people voluntarily assume costs without foreseen any potential benefit as the ground-up approach adoption works. This evidence suggests that a top-down approach would have been needed in South Winds in order to either decrease the perceived costs of sharing knowledge or include a reward schema to increase the perception that potential benefits may outweigh the costs.

The second aspect that challenged the decision for using a ground up approach within South Winds was the participation inequality. There was a widely spread belief within South Winds that the ESN was not being used because people were not massively sharing their knowledge. This is an unreal expectation because, as was discussed earlier, participation inequality is an inherent aspect of ESNs. Following the analysis through the knowledge market theory lens, this expectation made people perceive that nobody was buying knowledge. Why should had they post their ideas or their knowledge in a place where there were no one "paying" for their effort? In other words, the ground up approach developed an anomalous knowledge market system price.

Within internal knowledge markets, the knowledge is exchanged for three "currencies": reciprocity, repute and altruism (Davenport & Prusak, 2000). Reciprocity is the currency for knowledge transactions that are based on the seller's believe that the buyer will act as a seller in the future. Repute is the currency used when the seller wants others to know him as a knowledgeable person with valuable expertise. Finally altruism is when sellers do not want any reward for sharing their knowledge. This case can rarely be seen in, for example, mentoring relationships. A knowledge system price is functional only if they are based on trust (Davenport & Prusak, 2000). These intangibles currencies can eventually become in tangible rewards through, for example, performance reviews.

Within South Winds, the lack of processes, lack of rewards and lack of leadership (ground-up approach) had produced a lack of interest in selling knowledge through the ESN. In other words, there was nobody formally paying for the knowledge. This could be seen in two employees' practices:

1. They did not help others through the ESN. This may be explained because they did not perceive any potential reciprocity in helping others.
2. They did not share their knowledge because they perceived that publishing within the ESN may hamper their reputation. In other words, they perceived the cost of publishing their ideas/knowledge overweigh the potential benefits in doing it.

In summary, perceptions about the technology adoption were strongly divergent between executives and the other two groups. While the executives perceive a ground-up approach as the suitable adoption approach for an ESN, the rest of the participants perceived that a top-down approach would have been better. The presented evidence suggests that it is unrealistic to expect that people start sharing knowledge within an ESN without any reward. As a consequence, an imperfect knowledge system price was created that did not enable the organization to share and create knowledge through the ESN.

## Chapter 6. Implications for Practice

Assuming that the success of an information system implementation “*is achieved when and information system is perceived to be successful by the stakeholders and other observers*” (Myers, 1995, p. 65), this section proposes three measures for aligning people’s perceptions about the ESN’s success. Firstly, it suggests communicating the strategy behind the ESN. Secondly, it suggests getting understanding of the actual capabilities and usage consequences of ESN. And finally, it suggests switching from the extreme ground up approach adoption to an approach with some top-down direction that includes a rewarding system.

### 6.1. Aligning perceptions about Technology Strategy

Considering that the incongruence in the technology strategy perceptions were due to informational reasons, the top management might decrease this incongruence by designing and implementing a plan for communicating the strategy. Perceptions about the Personal Success Criteria were congruent across the different groups of the organization. Furthermore these Personal Success Criteria perceptions were aligned with the executives’ perceptions about the technology strategy. Then, no significant political resistances should arise from implementing this communication plan.

### 6.2. To get understanding of nature and consequences of using an ESN

This report suggests that the top management should get better understanding of the actual capabilities and most likely consequences of the ESN’s usage. From this understanding, it is expected that two meaningful paradigms around the ESN change: measuring participation and people’s behaviour within the ESN. On the one hand the paradigm that was being used for determining whether South Winds’ employees were using the ESN should change. This paradigm should not only be based on the number of posts, as they did during this research was performed, but it should also measure number of people reading the ESN. On the other hand, there was a belief that people might have used the ESN for leisure like they do in public social networking sites. Nevertheless, the evidence suggests that people do not act extremely informally within ESN because impression management considerations.

It is also expect that from getting understanding of the nature of the technology, South Winds reassess whether the quality of the ESN’s deployment fulfils the expectations of technical

managers and staff. This research found that, regardless of the hierarchical position, South Winds' employees with technical background were more exigent assessing the quality of a technology deployment than people without technical background. Employees with technical background perceived that the ESN's quality deployment was lower than the acceptable levels. This may be explained because no formal process was used in selecting and deploying the tool. Furthermore, the IT department was not involved in this initiative at all. Hence, it is suggested to reassess if the ESN's deployment fulfils the actual organizational needs.

### **6.3. To switch from a ground up adoption approach to a top down one**

This study suggests switching the current extreme ground up adoption approach to an approach that considers top down approach elements. This study has shown that an extreme ground-up adoption approach is not suitable for adopting ESNs, because it might lead imperfect knowledge system prices. This study is not suggesting to adopt an extreme top-down approach, but due to sharing and using knowledge are often unnatural acts, it is needed to design policies for motivating employees to share their knowledge (T. Davenport & Harris, 2007). Thereby an adequate knowledge system price would be created. Nevertheless, to design a policy for motivating people to share knowledge could be a challenging task.

Motivation can be classified as intrinsic and extrinsic (Deci & Ryan, 1985). Intrinsic refers to the inherent enjoyment derived from doing a particular task. On the other hand, extrinsic motivation comes from external sources (Bartol & Srivastava, 2002). It is not easy to predict the outcome of extrinsic rewards on intrinsic motivation. Some authors have found that extrinsic rewards could hamper intrinsic motivation (Amabile, 1993)., while others have found that external rewards could have positive effect on feelings of self determination and competence and therefore it is beneficial for intrinsic motivation (Bartol & Srivastava, 2002). In addition, it has been found that extrinsic motivation can combine synergistically with intrinsic motivation (Amabile, 1993). Within knowledge sharing context, it is desirable to keep high intrinsic motivation levels in people because of its direct impact on creativity (Amabile,1993; Bartol & Srivastava, 2002).

The relationship between creativity and knowledge sharing is briefly explained as follows. The focus of creativity is generating ideas, while knowledge sharing is focused on distributing new and relevant ideas. Therefore, due to extrinsic rewards could slow down



creativity by hampering intrinsic motivation, then knowledge sharing may also be reduced because people might not be able to generate creative ideas (Amabile, 1993; Bartol & Srivastava, 2002). Bartol & Srivastava (2002) studied the role of extrinsic rewards in encouraging knowledge sharing in organizations. They conclude that extrinsic rewards based on collective performance are likely to be effective in creating a feeling of cooperation, ownership and commitment among employees. Therefore, due to software engineering is a group activity (Lindvall & Rus, 2002) where the feeling of cooperation is key for achieving the objectives, and their success depends on the quality of the exchanged knowledge, rewards should be planned based on collective performance and combining extrinsic rewards with intrinsic motivation.

## Chapter 7. Implications for Future Research

This section presents two implications for further research. Firstly, it suggests considering to extend Orlikowski and Gash (1994) Technological Frame framework with two extra frames: Personal Success Criteria and Technology Adoption. Secondly, this research suggests perceptions about some aspects of the technology hierarchically impacts on perceptions about other aspects.

### 7.1. Proposed frames

In order to understand how South Winds' members made sense of the ESN and how their interpretations shaped subsequent actions towards the ESN, this research used the Technological Frames framework (Orlikowski & Gash, 1994). This framework provides three frames or categories of perceptions. Orlikowski and Gash (1994) recognizes that these frames may not be enough for understanding all kind of IS implementations. This research suggests adding two extra frames for knowledge management systems: Personal Success Criteria and Technology Adoption.

The personal success criteria frame refers to people's perceptions about how an information system would be perceived to be successful to them within a given context. To use this frame implies believing that an information success is a matter of interpretation (Myers, 1995). Then, only congruent perceptions about personal success criteria would lead the organization to consider the information system as a success. Furthermore, understanding people's perceptions about the Personal Success Criteria may make tacit potential political resistances. Divergent perceptions about the personal success criteria and perceptions about technological strategy among organizational members may be a predictor of negative political attitudes towards the IS. This is because organizational motivations behind the IS (technology strategy) might be perceived as a threat for individuals.

The technology adoption frame refers to people's perception about what is the suitable method for encouraging employees using an information system. Applying this frame to the knowledge management systems domain would mean understanding perceptions about what is the right level top management intervention on the employee's participation. On the one extreme the ground up approach can be found. This means that the technology is allowed but not promoted at all. On the other extreme a top management over regulating people's

participation can be found. The importance of understanding these perceptions relies on their direct impact on the knowledge market system price.

## **7.2. Explanatory hierarchical arrangement of perceptions**

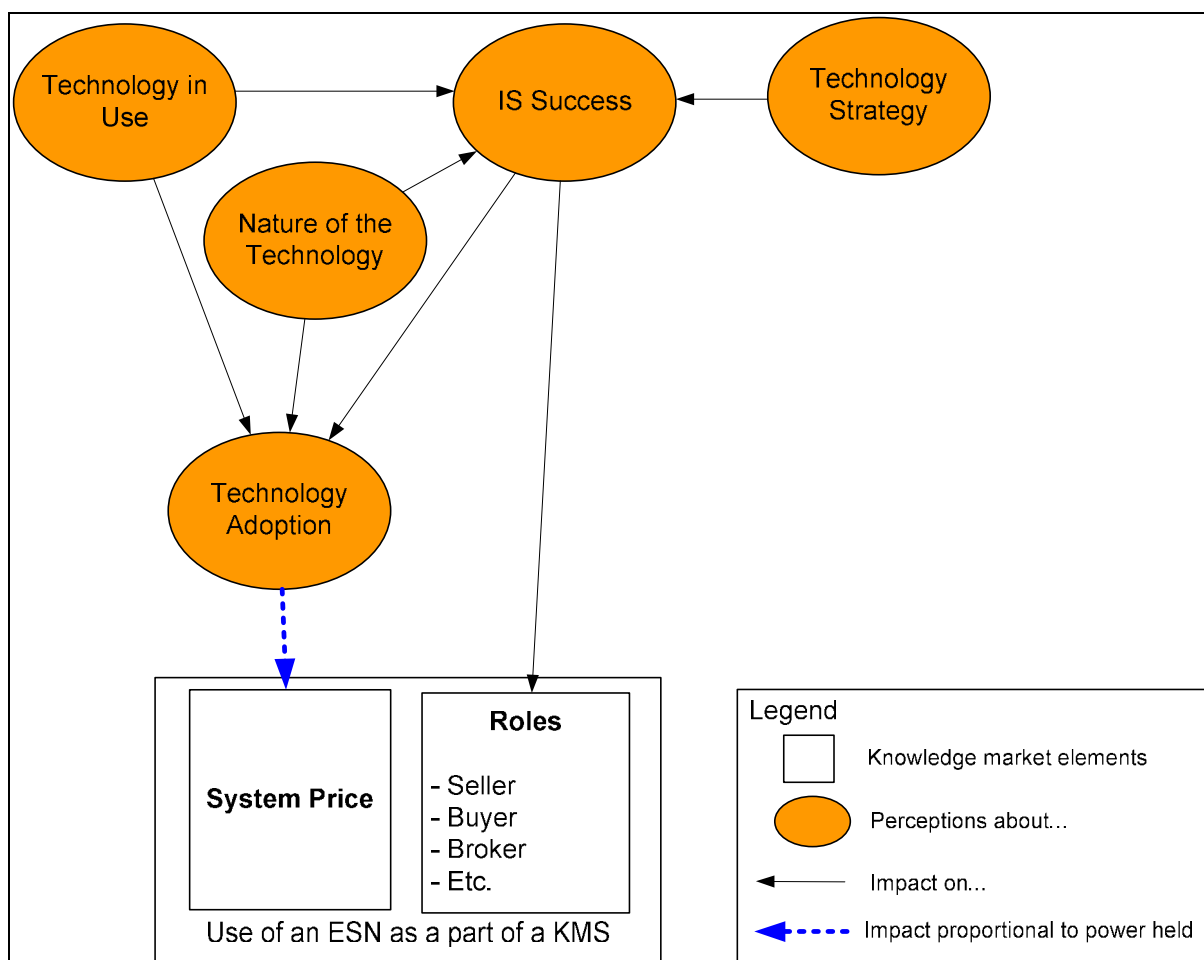
This research suggests that perceptions about a particular aspect of a technology deployment impact on perceptions about other aspects of the technology. This research found that perceptions that impact other perceptions are interrelated but they could be independently treated.

From the analysis of the South Winds' case study a "hierarchical net" of impacts were found between the five set of perceptions. They are shown in figure 6. It was found that perceptions about technology strategy; technology in use; and nature of the technology impact on perceptions about personal success criteria. This means that perceptions about the organizational motivations behind implementing the technology may or may not be aligned with perceptions about personal success criteria in a given research setting. For instance, it was found in the South Winds case study that middle managers were unaware of the technology strategy, however, they built their perceptions based on their perceptions about the consequences of using the ESN (technology in use) and the ESN's technical capabilities (nature of the technology). On the other hand, for example, the C-Level built their perceptions about personal success criteria only based on their perceptions about technology strategy, because they were mostly ignorant about the technological artefact. This highlights the importance of well communicating the technology strategy and also the relevance of getting properly understanding of the actual capabilities and consequences of using a technology.

Perceptions about the nature of the technology, technology in use and personal success criteria directly impact on people's perceptions about the technology adoption. This means that lacking of knowledge about the actual capabilities; actual consequences of the technological artefact; and/or misaligned perceptions about personal success criteria with technology strategy may lead developing dysfunctional perceptions about what is the suitable technology adoption. However, the impact of the perceptions about the technology adoption is proportional to the power held by the individual. For example, in the South Winds case study most of the employees stated that the suitable approach for adopting the ESN was a top

down approach. Nevertheless, a ground up approach was used because the most powerful individuals perceived the ground up approach as the suitable. In other words, powerful people's perceptions weighted more. It seems that in KMS the adopted technology approach directly impacts on the knowledge market system price.

It was found that perceptions about personal success criteria impact on the role that individuals play in the knowledge market. For example, in the South Winds' case study software engineers would have perceived the ESN implementation as a success if the tool would have allowed them to promote their ideas and thereby getting support from higher levels. Software engineer's perceptions would have led them to act as knowledge sellers. On the other hand, some middle managers would have considered the ESN as a success if it would have allowed them to "listen" people who interact with customers in order to get feedback about the product that they were leading its development. These perceptions would have led them to act as knowledge buyers.



**Figure 6: Summary of the impacts of the people's perceptions about the ESN**

## Chapter 8. Limitations

There are three main limitations of this study: results arose from only one organization, results were only checked with two participants and the researcher may have created some subjectivity.

Firstly, this study was performed in only one organization, which was a software engineering firm. Then, results may be difficult to generalize to other contexts. Hence, it is suggested to test the contributions of this research in other settings.

Secondly, the time frame was a limitation. The timeframe allowed the researcher to check the results with only two out of the twelve participants. Furthermore, it was not possible to check the results with an executive, but they were checked with a middle manager and one software engineer.

Thirdly, the researcher was working in the research setting while this study was performed. This may create some subjectivity. However, many measures were taken in order to partially mitigate this subjectivity. These measures are described in section 3.2.

## Chapter 9. Conclusion

This research sought to explore how the perceptions of people in different roles across an organization impacted on/affected the use of an enterprise social networking site as a part of a knowledge management system within a software engineering firm. The study found that C-level executives, middle managers and software engineers held incongruent perceptions about the new technology and that these perceptions impacted on use. These perceptions occurred within five different frames about technology – three frames identified by Orlikowski and Gash (1994), technology strategy, nature of the technology and technology in use and two further frames identified in this study – technology adoption and personal criteria success. It was found that incongruent perceptions were mainly due to information deficiencies rather than political reasons.

As well as identifying two new frames within which perceptions about technology occur, this research proposes an explanatory model for understanding how people's perceptions affect the use of an ESN as a part of a KMS. The model suggests that perceptions have a hierarchical arrangement. Certain perceptions about a particular aspect of a technology can become the foundations for building perceptions about other aspects of the technology. Perceptions about the suitable level of C-level management involvement in the ESN adoption process (Technology Adoption perceptions) were found to have impacted on the perceived potential benefits of using the ESN and on the perceived nature of the technology. On the other hand, perceptions about personal success criteria were built from perceptions about the organizational motivations behind the ESN's implementation and perceptions about the nature of the technology.

It was also found that peoples' perceptions about the personal success criteria led them to assume one of two different roles within the knowledge management system. Depending on the perceived personal benefit that they felt the ESN could provide them, individuals assumed the role of either a knowledge consumer or a knowledge producer. For example, individuals that perceived the ESN as mean of promoting their projects would likely act as knowledge producers. These findings highlight the importance of aligning personal success individual's perceptions with the organizational strategy behind the ESN's implementation, otherwise political resistances may arise.

The explanatory model also suggests that given that decisions about how an ESN is adopted within an organization are made by individuals with formal power, it is fair to assert that the impact of perceptions about technology adoption is directly proportional with the power held by the individual within the company. Considering that technology adoption is built from perceptions about the nature of the technology, low understanding of the actual nature of the technology may lead to develop dysfunctional perceptions about the suitable technology adoption process.

This study supported the findings of other studies (Orlikowski & Gash, 1994; Puri, 2006) that show that different stakeholders' perceptions may lead to conflicts in using a technology. This highlights the importance of performing initiatives for aligning perceptions before implementing technologies. Consideration of the proposed hierarchical perception model may help managers of ESNs' implementations to develop more effective alignment plans.

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