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User Resistance to Social Media within Organizations

Master Thesis

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Abstract

Web 2.0, popularly known as social media is gaining attention from organizations as a tool for capturing the tacit knowledge of employees. Social media has been highly successful in the internet which has gained it this attention. However, organizations, which employ social media inside have faced many hurdles to making them a success in meeting their goals. This does not mean that social media is not relevant or useful for organizations; just that its success/failure needs to be studied more and strategies employed to help them succeed. While there is a lot of talk about social media, there is little research into its use and success. The idea of user resistance to social media itself is a concept we have introduced for the purpose of understanding the reasons behind the failure of social media within organizations.

In order to theoretically base our study, we have drawn from the extensive literature on user resistance to information systems. Social media is after all a type of information system. Nevertheless, the characteristics of social media also make it distinct in several ways. We have tried to understand both the parallels and the differences.

We conducted the study in a medium size telecom company. The organization had a number of disjointed internal wikis. These were the focus of our study.

The study revealed that some of the user resistance factors, like felt need, perceived usefulness, perceived costs versus benefits, perceived ease of use, system characteristics, management support and management control, that we had selected from our theoretical foundation, do contribute to user resistance to wikis. We could not get substantial evidence to support resistance to change and co-worker behaviour. We have introduced some factors like size of group and nature of tasks after the empirical findings. We were also able to gain insight to the way in which wikis were being introduced and spread, and this has helped us to create a model.

Keywords: User Resistance, Social Media, Wiki, Information Systems, Qualitative Research

Acknowledgements

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Thank you!

Mohammed Raad & Sudha Padmanabhan

Contents

List of Tables and Figures

1. Introduction

Our study focuses on Web 2.0 technologies, popularly known as social media. McAfee (2002) states that the popularity of Web 2.0 tools in the internet space, has triggered the desire to use such technologies inside organizations. He states that current technologies do not do a good job of capturing knowledge within organizations. The technologies referred to here are e-mail, instant messaging, corporate websites, intranets etc. McAfee (2002) divides these technologies into two categories, channels and platforms. Channels like e-mail and instant messages allow only the recipients to view its content and are not available to all. Whereas, the content of platforms like websites and intranets are widely available to all.

McAfee (2002) cites a Forrester research which indicated that most users do not find what they are looking for, in incorporate intranets. He states that only a few people are involved in creating the content of corporate intranets and websites, and other users do not get the chance to contribute. Also, most of the corporate internal communication takes place through channels and they are not visible to the others who are not the recipients. Hence, these technologies have inherent limitations to capturing the knowledge of workers. The desirability of Web 2.0 technologies can be understood in this context.

O'Reilly (2005) presents the defining characteristics of Web 2.0. We believe that defining Web 2.0 is tricky, since it is not any particular technology and as mentioned by O'Reilly (2005), has no hard boundaries. It is a concept with a set of principles and practices. Abilities like linking, tagging, extension and facilities for searching and authoring make up the core components of Web 2.0, according to McAfee (2002). The Web 2.0 technologies offer mediums for interactive sharing of knowledge. Where in traditional platforms, users can only view information, in Web 2.0; users can collaborate with other users and participate in producing the very information that they use (McAfee, 2002). While traditional knowledge sharing tools are static with a single/group of owner(s) producing the content before publishing it, the Web 2.0 tools are dynamic with contents changed over time by the users (McAfee, 2002).

Thus, Web 2.0 platforms capture the knowledge and interests of the users and help to produce contents which are most likely to be useful to the users of those platforms (McAfee, 2002). It is an environment conducive to harnessing collective knowledge (O'Reilly, 2005). Hence we can say that the very nature of Web 2.0 makes it suitable for capturing tacit knowledge.

While considering the different Web 2.0 technologies, we note that Hasan and Pfaff (2006) explore the case of the corporate wiki. The authors note that for corporations, wikis are an ideal collaboration environment. They explore four cases of corporate wikis. Kane and Fichman (2009) argue that wikis have begun to influence knowledge capturing practices in many organizations. We found wikis to be the focus of studies by Fuchs-Kittowski and Köhler (2005). We believe that wikis are a dominant Web 2.0 technology in the corporate setting. And we have chosen to focus our study on wikis.

We believe that social media technologies have the potential to play a vital role in the knowledge and information management challenges faced by organizations. However, the success of a Web 2.0 solution within an organization depends heavily on the degree of contributions it attracts from the users (McAfee, 2002). The very nature of the platforms is to evolve over time and requires input from the users to grow and take shape.

McAfee (2002) cites instances where users stayed away from Web 2.0 technologies after introduction in organizations. Hasan and Pfaff (2006) also note that there are issues that prevent the easy uptake of wikis in organizations. Both studies point to several causes that might prevent corporate wikis from becoming successful. We infer that while Web 2.0 has been highly successful in the internet, its use is not as spontaneous in organizations.

1.1. Purpose of Study

Use of social media inside organizations is still a relatively new phenomenon and empirical research about its success and failure are limited.

The purpose of this study is to investigate the reasons behind the failure of social media in the corporate world. For this purpose, we have introduced the concept of user resistance to social media, in parallel to user resistance to other information systems. Understanding the causes for user resistance to social media in the work place, will hopefully help organizations to form strategies to elicit participation and bring about success.

We hope this study to be a contribution to the literature on social media with a focus on wikis.

1.2. Research Question

The basic question for this study is the following.

What are the factors contributing to user resistance of wikis within an organization?

1.3. Target of Study

Our target group for this study would be the employees of an organization which has implemented wiki to capture tacit knowledge.

Our audience constitutes any person interested in using social media in the work place or capturing tacit knowledge through social media and the management of social media. It is also relevant to any person with a general academic interest in social media within organizations.

1.4. Approach

We use the qualitative approach and conduct a mini case study of an organization. Semi structured interviews have been used as the data collection method.

1.5. Delimitations

The available time for this research being limited to ten weeks, we conducted the study in a single organization.

Web 2.0 presents a vast array of technological solutions and we cannot undertake to study them all in the limited time that we have. All those solutions are not likely to be present in a single organization as well. Considering the dominance of wikis in the Web 2.0 tools, we focus on usage of wikis to capture knowledge inside organizations.

We have used theories of user resistance to information systems as the base and make a selection of a number of factors for the study. The other theories remain unexplored.

1.6. Thesis Outline

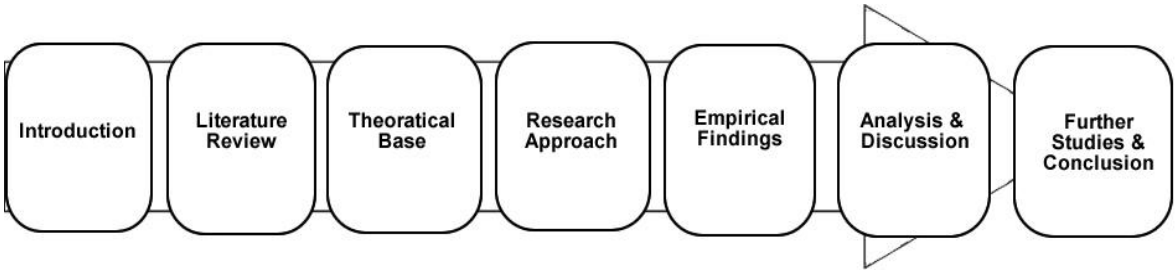

Figure 1.1: Thesis Outline

Chapter 1: Introduction

This chapter introduces the reader to web 2.0 or social media technologies and their role in creating knowledge, the purpose of our study, target groups and limitations of the study.

Key Features: Web 2.0 and its role in creating knowledge, purpose of study, research question, target of study, research approach, limitations

Chapter 2: Literature Review

In this chapter we detail what we mean by user resistance, why we have chosen to review the literature on user resistance to information systems, major user resistance theories and models with a grouping of theories at the end.

Key Features: Define user resistance, user resistance to Information Systems, theoretical mélange, user resistance theoretical models, summary of theories.

Chapter 3: Theoretical Base

Develops the theoretical base for our study; it details the profile of the organization and characteristics of wiki to define our context. This chapter also includes the most relevant theories and the framework for our study.

Key Features: Theoretical base for study, profile of the organization and users, wiki compared to other information systems, theoretical synthesis, summary of framework.

Chapter 4: Research Approach

This chapter elaborates the research methodologies in our study. It provides a description of the research strategy as well as a more detailed description of the steps taken in conducting the study. The chapter also includes an explanation regarding data collection techniques and data analysis methods; as well as, a discussion on how we reach ethical and scientific quality.

Key Features: Choice of method, investigation plan, qualitative analysis, discussion how to reach scientific and ethical quality.

Chapter 5: Empirical Findings

Here, we present the empirical findings from the study. The participants of the interviews are introduced first, and then the information gathered from the data collection in the research is presented.

Key Features: Participant presentation, interviews.

Chapter 6: Analysis & Discussion

In this chapter, we provide the analysis of the empirical findings in a more detailed fashion. It presents the conclusions on the factors from our framework; as well as, the discussion and the model based on our empirical findings.

Key Features: Analysis of user resistance factors, summary of findings, discussion.

Chapter 7: Conclusion & Further Studies

This chapter summarizes our research study by presenting a conclusion of our empirical findings and analysis. This chapter also presents suggestions to the company, evaluation of our work and further studies.

Key Features: Conclusion, suggestions, evaluation, further studies.

2. Literature Review

2.1. What is user resistance?

Literature on user resistance to information systems, reveal resistance defined in different behaviours and degrees. These can be summarised using four levels of resistance (Lapointe & Rivard, 2005), namely, apathy, passive resistance, active resistance and aggressive resistance. Apathy is characterised by lack of interest and inaction. Passive resistance is mild and includes employing delay tactics, excuses etc. Active resistance is stronger and may include voicing dissent and organizing oppositions. Aggressive resistance is characterised by more destructive behaviour.

The outlook to resistance also varies in that it may be seen in a positive, negative or neutral light. For example, Markus (1983) holds that resistance can be positive or negative. According to her, if resistance results in lost time and resources, it is negative. On the other hand, if the resistance by users actually prevents the implementation of a non-performing system, it is a positive result. Marakas and Hornik (1996, as cited by Lapointe & Rivard, 2005) see resistance as the means by which users communicate their dissatisfaction with a system which might be flawed. This might be a cue to improve the system or other conditions, and the view of resistance is neutral. We adopt a neutral outlook to resistance where we see resistance as an indication of user dissatisfaction. And we also believe that as Jiang, et al., (2000) state, resistance is not necessarily an irrational response. We believe it to be an indication of flaws and a call for change.

According to Martinko, et al., (1996, pp 322), "Resistance behaviours are characterized by low levels of use, by a lack of use, or by dysfunctional, e.g. harmful, use". In this context, we assume lack of use or low levels of use to be the defining characteristics.

2.2. User Resistance to Information Systems?

Hasan and Pfaff (2006), point out that the field of information systems (IS) emerged due to a necessity for scientific methodologies for building organizational computer systems and that the IS field is characterized by its concern for human elements in organizational and social system. The author also states that advances in the IS field has to come from an understanding of latest type of applications including wikis. Hence, considering wikis as belonging to the field of IS, we hope to build upon theories of user resistance to information

systems in order to explain user resistance to corporate wikis. We believe that the introduction of wikis in organizations are analogical to introduction of any other IS technology in organizations. Hence, we assume that theories of user resistance to IS in organizations are applicable and are potential reasons for resistance to social media as well. Moreover, since the conceptualization of resistance to social media within organizations is new, there is scant literature on the subject. Hence, for this study, we have to draw from literature on user resistance to information systems. One of the expected results of the study is that either, this assumption and the theoretical base used following this assumption would be found valid or invalid.

We have to also note that social media systems possess distinct characteristics and coupled with the uniqueness of the context may give rise to differences along with the parallels. Hence we expect that there would be different factors relevant to user resistance to social media, which are not part of the theoretical base drawn from user resistance literature.

2.3. Theoretical Melange

An accepted objective of system implementation is user acceptance (Ginzberg et. al., 1984, as cited by Joshi, 1991). Failures of information system implementations have been noted by different researchers (Lucas, 1978; Zmud, 1983). And accordingly there are several theories pertaining to user acceptance and resistance of information systems, which we go though in this section.

From our study of literature on user resistance, we found a number of theories which are potentially relevant to this study. We have grouped the theories into Personal/Psychological, System/Design and Organizational/Environmental, for better categorization, understandability and manageability. It is also our intention to uncover if these theories can be used to explain user resistance in our context of study.

2.3.1. Personal / Psychological Theories

Markus (1983) details the people-oriented theories in which, resistance is a product of factors internal to individuals, for example, the theory that people resist all change. Cognitive styles of individuals are also said to affect the resistance to information systems. These factors may be unique to an individual or common in many. People are the driving force behind information systems and the psychological/personal reasons for non-use of information systems cannot be under rated.

While trying to understand the factors behind personal reactions, it is critical to understand some of the theories by Zmud (1979) through which he goes deep into the personal perspective, to explain personal differences and their relation to information systems. According to Zmud (1979), the area of individual differences includes various factors that are believed to impinge upon the success of information systems in an organization. Personal reasons are one of the important aspects that can direct the success or failure of any system. The individual differences that are believed to be the most relevant to the success of an information system are grouped into three classes: cognitive style, personality, and demographic/situational variables (Zmud, 1979); and in order to be able to define the various aspects of those three classes, we believe it is critical to proceed further and provide a better understanding of them.

1 Cognitive Style

Zmud (1979) describes cognitive style as characteristic modes of functioning shown by individuals in their perceptual as well as their thinking behaviour; and he focuses on mainly three dimensions: Simple/Complex – low analytic/ high analytic – systematic/ heuristic. What is of relevance in the three dimensions is the extent to which an individual is interested in seeking and searching for information is much dependent on whether the individual is simple or complex, high analytic or low analytic, and whether he is systematic or heuristic.

2 Demographic/Situational

The demographic/situational variables which contain a wide range of different personal characteristics are found by several researchers to affect a user's reaction to information systems. Zmud (1979) states that both general intellectual abilities and knowledge of specific content areas are found to influence system use, and they include attributes such as sex, age, experience, education and professional orientation. According to Zmud (1979), older individuals were found to participate in more information search, to choose information more effectively, to require more decision time, and to exhibit depressed long-term memory capabilities. Also, younger users tend to accept new changes as they are more flexible and adaptable than users who are older (Lucas, 1973). Coming to educational level, Zmud (1979) states that individuals with high educational level and general intelligence have proved to process information faster, select information more effectively, retain information better, make decisions faster, and better organize information in their minds. Those theories to some extent define the reason behind the concept which theorizes that higher educated people are

more willing to accept new changes and challenges for the purpose of broadening their knowledge and improve their experience (Lucas, 1973). Lucas (1973) also states that sufficient and good training courses will lead to more comfort and easier acceptance of the information system newly introduced.

Finally, taking the experience level into consideration, experienced decision makers were proven to adopt information more effectively but to integrate it less effectively and to be more flexible but less confident (Zmud, 1979). Individuals in higher management levels, however, were found to require less decision time (Zmud, 1979).

3 Personality

Personality refers to the cognitive and affective structures maintained by individuals to assist their adjustments to the events, people and situations encountered in life (Zmud, 1979). Personality variables that are proved to strongly affect the contribution to the knowledge management systems include:

Locus of control, dogmatism, ambiguity tolerance, extroversion/introversion, need for achievement, risk taking propensity, evaluative defensiveness, anxiety level and user attitude.

Individuals having an internal locus of control, low degree of dogmatism, and high risk taking propensity have been proven to participate in greater information search activities and thus they are willing to contribute more to information systems (Zmud, 1979). On the other hand, with respect to user attitude, Zmud (1979) stated that organizational members hold preconceived attitudes, i.e., beliefs, values and expectations concerning the role and objective of the information system within the organization, and this user attitude is one variable that is critical to consider as it is highly related to the extent of IS usage. Zmud (1979) further states that the attitudes found in an organization are established from:

- Perceptions of the capabilities of and need for an information system
- Perceptions of the organizational environment for an information system
- Perceptions of the IS staff and the need for user interaction with this staff
- Perceptions toward organizational change in general.

Other researchers also discuss the importance of attitude. Lucas (1973), for example, states that attitudes and perceptions are expected to affect the extent of use of systems; attitudes have a behavioral component and favorable or positive attitudes are consistent with the high

levels of usage of an information system. Keen (1981), states that the perceived value of a system is a basis for resistance. If the perceived costs/efforts of learning and using a system exceed the perceived benefits from it, users will be inclined to discard the system. However, Keen (1981) states that a general weakness of the cost-benefit approach is that it requires to some extent knowledge, accuracy and confidence about issues in the information system and these variable might be absent in the judgment of users if they don't follow the right approach in analysing the system by following a proper methodology. Traditional cost-benefit analysis is not well suited in some information systems, as the benefits they provide are sometimes regarded as qualitative, such as stimulation of new ideas, examination of more alternatives, and improvement of communication analysis (Keen, 1981). This fact leads us to conclude that, some users actually mislead themselves in their view of the perceived value of a system, stimulating their negative attitude and resisting a system that can actually be of benefit to them.

Theories falling into the category of psychological factors also include fear of computers (Davidson et. al., 1985, as cited by Martinko, et al., 1996), fear of unknown, tension (Joshi, 1991) etc.

2.3.2. System / Design Theories

The system oriented theories hypothesize that user resistance is induced by factors inbuilt in the different aspects or characteristics of the system. Markus (1983, pp.431), states, 'there is always a tendency for people to resist systems, but, other things being equal, they are less likely to resist ones that are well designed'. Lucas (1973) introduces the quality of information as a system-oriented theory related to resistance, and he states that the quality of information is one of the most important factors behind user acceptance of an information system depending on the output, contents, input, problem solving capability and system stability. Another theory introduced by Dickson and Wetherbe (1985) is the data problem theory, which states that users tend to resist using the system if the data in the system is felt to be inaccurate or incomplete I.e. Information found in a system that is most likely out of date will motivate the users to resist such a system. Dickson and Wetherbe (1985) introduce the theory of previous system experience as another theory that explains the reasons behind user resistance to systems. There are cases where bad experiences with previous systems lead the users to carry over a negative outlook to the new systems (Dickson & Wetherbe, 1985). Nevertheless, Dickson and Wetherbe (1985) state the system response and reliability as a

major factors affecting the usage of a system. A situation in which the systems reacts too slowly, crashes, or is unavailable when required has been known to create user dissatisfaction with the system thus leading to resistance of the system (Dickson & Wetherbe, 1985).

Along with different characteristics of a system such as reliability and system response time, defined by Dickson and Wetherbe (1985) and Lucas (1973), we believe it is also of relevance to discuss the design of the system or the technology being used. Such factors include user interfaces and different system's characteristics related to usability and user-experience. The design and usability of systems have been extensively researched, which has resulted in branches of study devoted to usability. Preece, et al., (2007) have provided several theories that define the issue of usability and user-experience. There are several factors that are to be taken into consideration when providing a system with good usability measures and they include: efficiency, effectiveness, ease of use, easy to learn, easy to remember and utility (Preece, et al, 2007).

Jiang, et al., 2000) explore the effect of system type on user resistance. They found statistically significant difference between the reasons for resistance to decision support systems (DSS) and transaction processing systems (TPS). The study indicates that, given similar conditions, different types of systems will encounter different resistance reactions.

2.3.3. Organizational / Environmental Theories

Leavitt (1978, as cited by Keen, 1980), visualizes organizations as a complex social system of mutually adjusting and inter-related functions of task, technology, people and structure. These components are said to maintain an equilibrium state and any new system or technology is a change which may be resisted. The change brought about by technology will require tasks, people and structure to adjust to this change. Hence, all big changes are resisted. This posits a non-discriminatory resistance to all change.

Keen (1980) observes that the management literature assumes a commonality of purpose within organizations. This is according to the rational theory of management where the goals of a system are understood and shared by all (Markus, 1983). The goals themselves are rational. For example, goals can be, to enhance managerial decision-making and planning, to control and motivate the performance of employees toward agreed-upon goals, to improve communication etc. In a rational environment, resistance is least likely.

However, Keen (1980) favours a more political representation of organizations. Political science views organizations as groups of actors, often with conflicting priorities, objectives and values (Allison, 1971, as cited by Keen, 1980). In this environment, there are other motivations present, like, gaining control over or reducing dependence on members of an occupational group (Markus, 1983). When there are political motivations present, the likelihood of resistance increases.

We have to also take the possibility of a mixed scenario where there are both rational and non rational motivations contributing to resistance.

Other organizational theories mainly look at the role of the management in contributing to or alleviating resistance. If new technology is planned and implemented by 'insiders' rather than 'outsiders' it has been found to reduce resistance to it. (Coe & Barnhill, 1967, as cited by Martinko, et al., 1996). Management support was found to be more important than technical support to prevent dissatisfaction among users in a study by Cheney and Dickson (1982). Lack of management support is cited as a reason for resistance by Hirschheim and Newman (1988, as cited by Martinko, et al., 1996) and, more management support has been shown to increase the intention to use a technology, by Leonard-Barton and Deschamps (1988).

2.4. User Resistance Theoretical Models

While the theories of resistance discussed so far, provide causes that are individually explained, there are also attempts to connect a number of causes with a theme, providing a model. We believe that these attempts stem from the inadequacy of individual or stand alone theories to explain resistance in a context and that each theory ignores the effect of other factors. And in each context, the reasons contributing to resistance is likely to be a unique set. The models, however, try to tie together a number of factors with a logical connection or relationship in a particular context and explain their combined effect.

Keen (1980) details the theory of social inertia. It is explained as "no matter how hard you try, nothing seems to happen" (Keen, 1980, pp 24). This inertia could be a result of passive or active forms of resistance. The context is change happening in a complex pluralistic organization. Into the complex environment of organizations, information systems are introduced, intending as coupling devices that co-ordinate planning and improve management control (Galbraith, 1977, as cited by Keen, 1980). Keen (1980) maintains that information is a political resource and the control over information often translates to power. Hence,

formalized information systems, introduced for planning and control, are often seen as threatening and not useful, resulting in resistance. Also, organizations have homeostatic behaviour tending to maintain the status-quo (Keen 1980). Hence radical change is often resisted while incremental changes take place more easily. Moreover, change is most successful when it is self motivated and based on a 'felt-need' **(**Keen, 1980), otherwise resisted. All of these are cited by Keen (1980) as causing the social inertia which results in system failures.

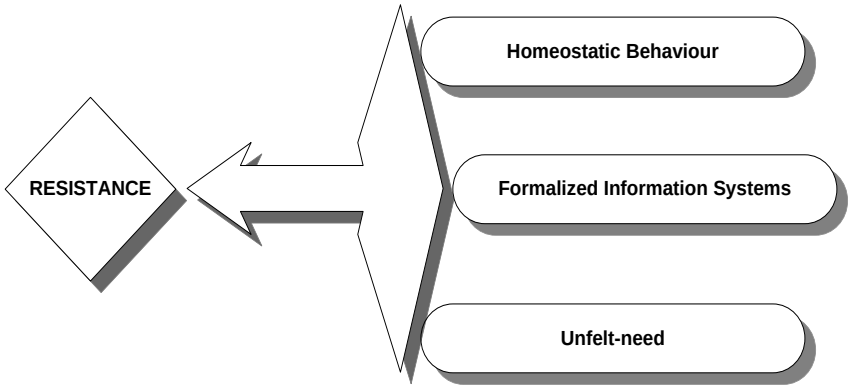

Figure 2.1: Our Summary of Keen's (1980) model

Markus (1983) proposes that it is the interaction between the system and the organization setting that causes the resistance. In this view, a set of either personal or system related causes cannot explain the resistance in every organization. Each environment is unique with its own dynamics which causes the resistance. For example, 'systems that alter the balance of power in organizations will be resisted by those who lose power and accepted by those who gain it' (Markus, 1983, pp.431). Markus (1983) looks at the power relations in organizations as a chief cause of user resistance. The focus of this explanation is on the group level interactions when an IS is implemented.

Joshi (1991) uses the equity model in which users evaluate their gains and losses. The context of this model involves a change in the equity status following system implementation. Users are said to first evaluate their inputs (effort, skills, ability) and outputs (working condition, recognition, salary, marketable skills) and if the net gain is negative, the change is perceived as unfavourable. Further, users also compare their outcomes with that of the organization and other colleagues and expect the share of benefits to be fare. This model focuses on the individual, to explain resistance.

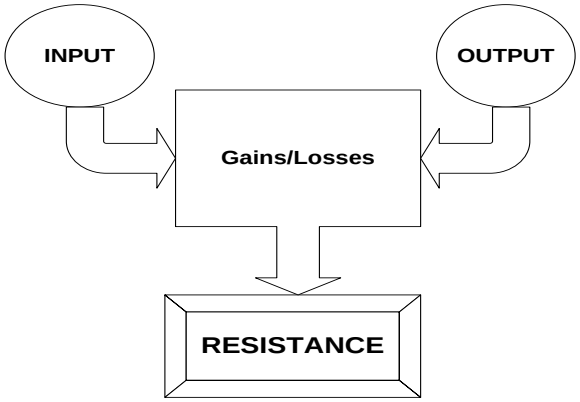

Figure 2.2: Our Summary of Joshi's (1991) model

Krovi (1993) puts forward levels of organizational change as the underlying cause of resistance. For example, if the change introduced by a system in the organizational environment is minimal, it results in lesser commitment from the management. This in turn could lead to user resistance to the system. Or if the changes have medium levels of impact, like a new job automation system, it may create perceptions of threat to job security. This in turn leads to resistance of the new system. Changes may also be radical, which could create power asymmetries within the organization and resisted for this reason. In this model, the context is described by the different levels (low, medium or high) of organizational change, producing different resistance reactions, like lesser management commitment, job insecurity, power struggles etc.

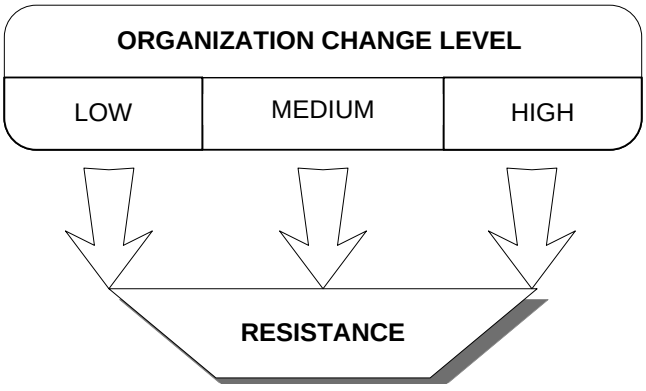

Figure 2.3: Our Summary of Krovi's (1993) model

Martinko, et al., (1996) propose the attributional model to explain individuals' resistance to technology. The way, individuals think about their success or failure, referred to as

attributional style, is the determinant of resistance. I.e. Individuals' experience of outcomes, namely, success or failure, creates causal attributions, which influence the individual's expectations of future outcomes and these expectations drive their behaviour toward new technology. Martinko, et al., (1996, pp. 315) provides this example, "individuals attributing failure to lack of ability are unlikely to exert effort in future situations". In other words, prior failure can cause people to reject all new technology. Martinko, et al., (1996) also state that there are external influences on how individuals' attributions and expectations are formed. The three main influences are said to be work environment (co-workers, supervisors), characteristics of IT, and management support. A supervisor or co-worker positively inclined to an IS will influence the behaviour of others in a positive manner. If co-workers are successful at mastering a technology, even initially-resistant individuals are likely to believe that they too can master it. Another factor is the perceived usefulness of systems. If people think that the systems are easy to learn and use, the adoption and use is higher. Lack of management support is found to negatively influence individuals' use of technology. The context for this model is the introduction of new technology and focuses on the individual and individuals' expectations of outcomes from the new technology.

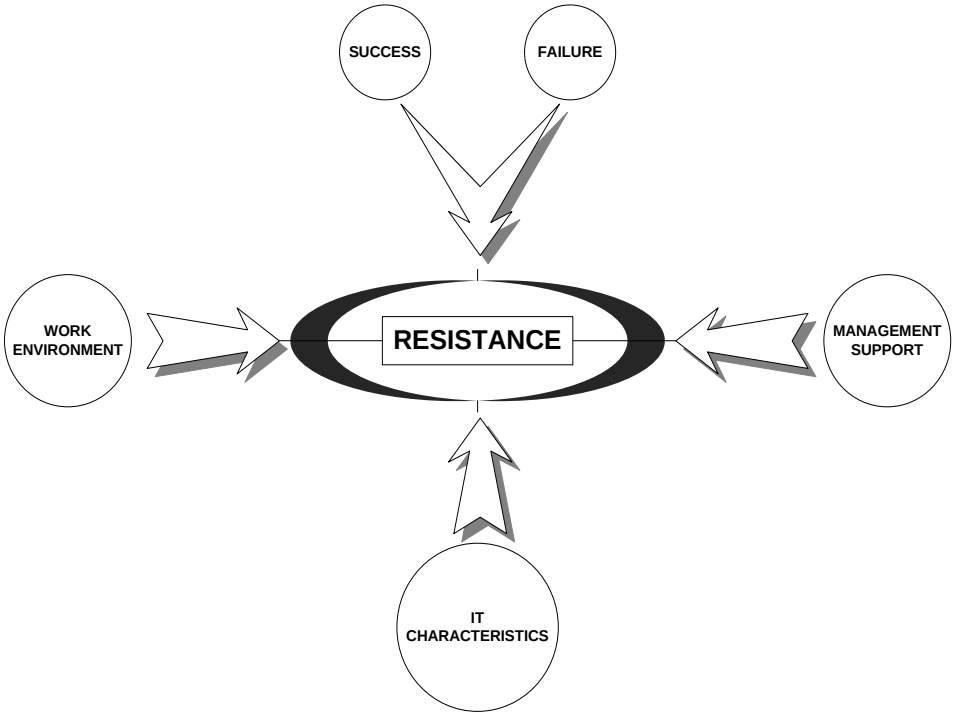

Figure 2.4: Our Summary of Martinko, et al.'s (1996) model

Marakas and Hornik (1996, as cited by Lapointe & Rivard, 2005) provide a situational model for resistance. The context is the intrusion of a new system into a stable environment. The

uncertainty caused by a new system, coupled with individual traits like rigidity and resentment create threatening or stressful situations. This leads to resistance behaviours.

Lapointe and Rivard (2005), point out the need for an integrated framework to explain user resistance to IS. They argue that previous models (Markus, 1983; Joshi, 1991; Krovi, 1993) ignore different aspects of resistance while concentrating on a single level, for example individual or group level. The study by Lapointe and Rivard (2005), however, is longitudinal with a multiple level model. To make a multilevel study, a bottom up approach where group level resistance is expected to emerge from individual level resistance is used. The role of time is also given importance. The study reveals that perceived threats at the individual level gave rise to passive resistance whereas at the group level, it resulted in more active forms of resistance.

We can see that while the models explain user resistance in particular contexts, they may not be applicable to other contexts. As Markus (1980) suggests, each organization and the setting is unique. And we need to define the setting of a particular investigation in a number of ways, in order to capture the context as accurately as possible. At the same time, the theories and the models shed light on the phenomenon of user resistance which can be used to guide our investigation.

2.5. Summary of theories

Tables 2.1, 2.2 and 2.3 provide a summary of the theories that have been used to guide our inquiry.

Table 2.1: Summary of Personal / Psychological theories

Personal/Psychological
• Demographic and situational variables: Age, Sex, educational level, experience, professional orientation, organizational role (Zmud, 1979; Lucas, 1973) • Cognitive Styles (Zmud, 1979; Markus 1983) • Personality traits**:** Locus of control, dogmatism, Risk taking (Zmud, 1979), rigidity, resentment (Marakas & Hornik, 1996, as cited by Lapointe & Rivard, 2005),Innate Conservatism (Hirschheim & Newman, 1988, as cited by Martinko, et al., 1996), Attributional styles (Martinko, et al., 1996),

- Preconceived attitudes (Zmud, 1979; Keen, 1981)
- Resistance to change (Keen, 1980; Markus, 1983)
- Self motivation and felt-need, Perceived costs and benefits (Keen, 1980)
- Cognitive Styles, Loss of power (Markus, 1983)
- Perceived usefulness (Zmud, 1979; Davis, 1989; Martinko, et al., 1996)
- Negative net gains / Change in equity status (Joshi, 1991)
- Job insecurity (Krovi, 1993)
- Uncertainty (Marakas & Hornik, 1996, as cited by Lapointe & Rivard, 2005)
- Fear of computers (Davidson, et al., 1985, as cited by Martinko, et. al., 1996)
- Fear of unknown, tension (Joshi, 1991)

Table 2.2: Summary of System / Design theories

System/Design
• Cost of learning, formalized systems (Keen, 1980) • Poor design (Markus, 1983; Martinko, et al., 1996, Preece, et al, 2007) • Lack of user-friendliness, Poor human factors of systems (Markus, 1983) • Perceived ease of use (Davis, 1989) • Type of system (Jiang, et al., 2000) • Quality of information (Lucas, 1973) • Inaccurate/Incomplete data, Previous System Experience, System response and reliability (Dickson & Wetherbe, 1985) • Usability: efficiency, effectiveness, ease of use, utility (Preece, et. al., 2007) • Characteristics of IT (Martinko, et. al., 1996)

Table 2.3: Summary of Environmental / Organizational theories

Environmental / Organizational
• Change of equilibrium state / status quo (Leavitt, 1978, as cited by Keen, 1980) • Political nature of organizations / power struggles (Keen, 1980; Krovi 1993) • Management control (Keen, 1980) • Management support (Hirschheim & Newman, 1988, as cited by Martinko, et al., 1996; Krovi, 1993; Martinko, et al., 1996) • Interaction of system with division of labour, Interaction of system with distribution of intra-organizational power (Markus, 1983) • Fair sharing of profits / benefits between users and organization (Joshi, 1991) • Co-worker behavior (Martinko, et al., 1996)

3. Development of theoretical base

The theories discussed in Chapter 2, form the crux of the literature on user resistance to information systems. However, we have also noted that, not all are applicable at a single context. Hence, it becomes necessary to explore and define our context in order to be able to make a sound selection of relevant theories.

The context of the study can be defined by different factors. From the study of information systems literature (See chapter 2), we note that the characteristics of the users, the organization and the system must be used to define the context of study.

3.1. Profile of organization and users

We have undertaken to study a medium sized telecommunication company. The setting of our research is the company's research and development unit. This department has around 2000 employees, most of them telecom engineers.

In order to understand our context, we conducted an initial interview. The information from this interview has been used to detail the context.

The unit has internal wikis used for the purpose of capturing tacit knowledge and spreading information, and these wikis are being used by the engineers to aid in their information needs of daily tasks.

The company has no organization wide, official wiki. The wikis have been introduced by the engineers or section/department managers to meet their information needs and goals. The goal of wikis, as expressed by the managers and users, is to have a common place where they can store and look up task related information to aid their work.

Since there is no organization wide wiki, the different departments or sections use different wikis which are disjointed. In some cases, a single wiki is used by different departments. Not all departments have wikis.

There is one instance of wiki which is widely considered as successful. The departments in Lund that use this wiki have employees at offshore locations. And the wiki enjoys contributions from about 300 users, located not only in Lund but oversees as well. We define this instance of wiki as the successful wiki in the study. Other departments have introduced wikis which have not attracted much contribution and usage.

This scenario presents us with successful and non-successful cases as well as cases where the wiki is in the initial stages and it is too early to pass a verdict on its success. Hence we were given the opportunity to study the use of wikis in its different levels of success and stages of development.

A user does not need technical expertise to add, delete or edit in a wiki (Hasan & Pfaff, 2006). Coupled with that, all users in this context are technocrats and we assume are not afraid of computers (See 'fear of computers' in 2.3.1). The systems have been introduced by and large by the users or mid level managers. Their use is not critical or strictly mandatory. We say this, since wikis are not connected to their role related tasks, but as information aids. In most cases, users have other options to get their information. This includes a document management system (referred to henceforth as DMS, real name is masked to protect privacy), an official collaboration tool (referred to henceforth as X-Coll, real name is masked to protect privacy), e-mail, instant messaging and direct person to person communication. In some cases, users told us that they have been asked to put information in the wiki, by managers, but still, we believe, this does not make it mandatory. The user maintains autonomy on when and how she wants to contribute content or use the wiki.

As information aids, a failure to fully realize wiki's potential will not disrupt any organization functions or the users' tasks. However, users of the successful wiki mentioned that it increased their efficiency and saved time.

3.2. The Wiki

O'Reilly (2005) defines wikis as content management systems. And he notes collaborative editing as its main capability. A Wiki is a web-based application that allows participants to contribute content collaboratively (Hasan & Pfaff, 2006). It is a collection of web pages which are added by users. Users can add, edit and delete content continuously. O'Reilly (2005) cites Wikipedia as an example and also that it is one of the top websites.

Markus (1983), points to the purpose of the system as an important aspect in the study of user resistance. She also points out that purpose can be defined from many angles, that of the management, the designers of the system or the users. We have noted the goals of the system as expressed by the users. We have chosen to adopt this goal, and hence the goal of the system under research is to store and spread information to aid the work related information

requirements of the users. It is assumed that this goal is understood by all users or potential users of the system.

The use of wikis can be categorised into content contribution and content consumption. i.e writing content and reading/consuming content. We primarily focus on content contribution.

Most users are expected to be familiar with wikis as a result of Wikipedia; however, this does not mean that users have contributed content to wikis before. Hasan and Pfaff (2006), state that the central concept of a wiki is that users do not need technical expertise. We expect the technological learning curve to use wikis to be small.

3.3. Theoretical Synthesis

Continuing from our theoretical base and definition of context we look at the plausibility of the theories in our own context. Also, since the time available to conduct this research is limited to ten weeks, we decided to focus on a number of factors that we believe to be most relevant from our literature review of user resistance to information systems and the insights available about social media in organizations. In each of the three categories, we focus on the most relevant variables which have been explained in detail. We have used our understanding and interpretation of the factors from the theoretical review, in order to construct the base for our own study and to select the factors for study.

Also, in order to select factors from our theoretical review in the study of wikis, we have looked into limited literature available on social media as well. Wherever, such literature points to issues of adoption of social media or wikis, or factors influencing their use or success, we have drawn upon them to guide in the selection of factors. But since we would like to focus on user resistance, and factors arising from study of user resistance to IS, we do not undertake to add additional factors from this literature.

3.3.1. Personal or Psychological theories re-visited

Wikis are mediums that depend heavily on the users, to essentially ‘create’ the system, by contributing content. The more the content contributions come in, the higher the effectiveness; and vice versa. In other words, wikis become more useful as time goes on and content is accumulated (See 1.2). This scenario makes users a critical factor for success of wikis. If there are no contributions, there is essentially no system. Hence the users’ attitudes and reactions to the system, is of paramount importance.

While other variables like personality, cognitive styles, individual traits and demographic factors might be important aspects worthy of study, we face a number of difficulties in this regard. First and foremost, we believe factors such as age, educational level and other demographic should be studied through surveys and large samples in order to find patterns and make any substantial conclusions. Qualitative interviews of a small number of people are not sufficient to reveal such patterns. While we may gain some insights from the interviews, it cannot be used for any conclusions. Again, variables such as personality orientation and cognitive styles are not likely to be revealed through interviews without a psychological base. The lack of time available to consider these complex variables is also a deterrent. Hence, we have decided not to undertake a study of more of the personality related factors.

The variables we have selected to study in the personal or psychological category include resistance to change, felt need, perceived usefulness and perceived cost versus benefits. We believe these factors are not independent, but overlapping and affecting each other.

1 Resistance to change

McAfee (2002) cites instances where users stayed away from social media after introduction. Even though we cannot tell if this is due to resistance to change (See chapter 2), we believe it is worth exploring.

A resistance to change, results in the resistance of new systems or the new ways of doing tasks (See Chapter 2). Starting to use a wiki, when other tools/ways were being used before to achieve some ends; represents a change which may be resisted. If users do not understand the advantages of contributing to social media, they will not put the effort to change from current systems. Hence, resistance to change could lead to resistance to wikis.

2 Felt need

While theories have supported the necessity of a ‘felt need’ to exist, for users to adopt an information system (See Chapter 2), we believe that it is especially so in the case of wikis. The wikis are not mandatory systems, and users are not compelled to use them. In fact, insights point to, having less control and making participants the people in charge, as the keys to creating success (McAfee, 2002). This can only work if those participants feel the need to have such a system. Contribution to a wiki requires initiative from the users and we believe that directly translates to having a ‘felt need’ in a voluntary scenario. Hence, low felt need could lead to resistance of wikis.

A survey of corporate wiki users also notes ‘degree to which the individual believes there is a need for collaboration’ as a significant influencing factor (Majchrzak, et al., 2006, pp 102). Accordingly, when we say, ‘felt need’, it does not necessarily mean that users feel a need to have a wiki in their work environment. The meaning of ‘felt need’ could be defined in different ways. One is to say that, users feel that the systems they currently have; do not meet their information needs, are not easy to use or otherwise inadequate. This could be solved by any number of other systems. Another way of defining a ‘felt need’ is more direct where users want a wiki like solution. But here too, the objective would be to solve the information needs, only that the user believes that the wiki could achieve this.

3 Perceived usefulness

Once, we have looked into ‘felt need’ as a factor, the next logical factor is perceived usefulness (See chapter 2). Since, we have said that the ‘felt need’ is basically to meet information requirements, and not necessarily a need for any particular system, the perceived usefulness of any system comes into focus. I.e. only if the system is perceived to be able to meet the objective of the ‘felt need’, it will be considered.

Hence, only if the users perceive the wiki as a useful system, which will be able to meet their needs, they will be inclined to contribute to it. Otherwise, they are likely to consider contributing to it, as a waste of time. Or, low perceived usefulness could result in the resistance of wikis.

4 Perceived costs versus benefits

The perceived costs and benefits is another interesting factor (See chapter 2). According to this theory users evaluate the efforts required to master and use a system and the benefits from it. Only if the benefits are perceived to be greater than the efforts, users adopt a system. This is especially relevant in a voluntary environment, just as in ‘felt need’ and ‘perceived usefulness’. A survey of corporate wiki users cites ‘degree to which wiki benefits organization’ and ‘degree to which wiki helps make work easier’ as significant factors that determine contributions to wikis (Majchrzak, et al., 2006, pp 103). Also, wikis are not for the main business tasks, but are information aids. Hence, if the benefits are not perceived to be high, users would discard the system. In other words, low perceived benefits compared to the perceived costs could lead to users’ resistance of wikis.

3.3.2. System / Design theories re-visited

The familiarity with wikis in the internet space does not rule out the study of its design aspects and ease of use. McAfee (2002) emphasizes the ease of use of the software as a factor for success. Since there could be different systems which are able to solve the needs of users, the characteristics of the system become an important factor deciding whether it will be adopted and used.

Hence, we have chosen to study in relation to the system and its design, the perceived ease of use and system characteristics.

1 Perceived ease of use

The ease of use of a system is determined by a number of system characteristics. The important characteristics that we have identified from our literature review include the design, user friendliness and human factors which affect the ease of use (See chapter 2).

The ease of use is an important factor to be taken into consideration. In an environment, where wikis are being introduced in a bottom-up manner, i.e. by the users themselves, the users are not likely to choose a system that is not user friendly and easy to use. And, if the 'felt need' arises from the lack of user friendliness of current/previous systems, this is one factor users would try to address in the new system. Moreover users are not likely to expend too much effort trying to learn a non-business critical system. It has to be easy to learn and use, for successful implementation. Hence, we believe the ease of use must be included in the study and lack of ease of use could lead to resistance to wikis.

2 System characteristics

Other system characteristics that have been found to affect usage include quality of information, mostly defined by data accuracy and completeness of data (See 2.3.2). We note that these are extremely important in the study of a wiki. Kittur and Kraut (2008**)** note the complexity of creating content with accuracy and completeness in the Wikipedia. The information in a wiki has to develop through user contributions. Agichtein, et al. (2008) state that user generated content in social media platforms varies drastically from excellent to spam, in quality. Only if the users maintain the quality and accuracy and also provide complete information, a wiki will be useful. Hasan and Pfaff (2006), also note that there are concerns about the quality of content that users contribute. Quality of information is user responsibility. We believe that such characteristics of social media and especially wikis, make these variables important factors to include in the study.

Social media environments also face further issues like fragmentation (McAfee, 2002). This is when the different systems are 'walled' and communication between them is not possible. Or, different departments in an organization keep their content un-joined. This is typically cited as leading to lesser use and growth. Another insight drawn is that an initial structure is important and users are reluctant to start from an empty platform (McAfee, 2002). When a guiding structure and some content is present, users are more comfortable to contribute further. Without some initial structure and content, users may not be sure of how to use the system, even though technical features might be known to them. Planning and creating structures is pointed out as a challenging task in this environment, by Kittur and Kraut (2008). Not being clear on how to use the systems is cited as a reason for non-use by McAfee (2002). However very formalized systems have been found to be rejected by users as well (See chapter 2). Hence, inadequate system characteristics could contribute to user resistance of wikis.

3.3.3. Organizational/Environmental theories re-visited

The organization and environment have been found to influence system use (See chapter 2). Out of the various factors related to the organization, we have chosen to study management support, management control and co-worker behaviour.

McAfee (2002) states that, the use of Enterprise 2.0 technologies is not automatic and depends on management support. He stresses the importance of organizational culture in the success of social media. An open culture receptive to input from employees is essential for the success of social media (McAfee, 2002). The more 'control' there is, the less effective social media will be. The participants need to be in charge, in order for them to freely contribute content and for the wikis to grow. Hence, these factors are important for this study.

We have however, not undertaken to study the political and power factors. According to Markus (1983), irrational goals and the goals of a system introduced by management differing from the goals of the users etc. are causes of power struggles. In our context of study, wikis are being introduced in a bottom-up manner. Hence, the likelihood of irrational goals or differing goals between management and users are less. We believe these factors reduce the likelihood of power struggles and organizational politics resulting from a wiki. Also, we do not wish to widen the scope of the study further, but focus more on some selected factors.

1 Management Support

McAfee (2002) notes that managers need to encourage and stimulate use of such tools. This includes providing training, being receptive to inputs from users and supporting the use and spread of wikis in other ways. Management support has been found to be more important than technical support (See chapter 2). Hasan and Pfaff (2006), point to a case where the adoption of wiki was abandoned due to lack of management support. Hence, we can say that a lack of management support adversely affects the usage of wikis. In other words, lack of management support could result in user resistance of wikis.

2 Management Control

McAfee (2002), points out that social media affect the ability of management to exert unilateral control over systems. Likelihood of unwanted content to appear is high. This could lead the management to try and exert control over the environment. We believe that in the study of wikis, management control takes new important forms. Hasan and Pfaff (2006), note that there are concerns about protecting intellectual property, which may have to be managed through access controls. Control can be manifested through content restrictions, restrictive usage policies, access controls etc. McAfee (2002) also reckons that management heavy-handedness would result in the rejections of such systems. Management control results in excessively formalised systems, which are shunned by users (See chapter 2). These actions negatively affect the adoption of systems. Wikis require users to contribute content voluntarily, and a restrictive environment is not conducive to elicit participation. Hence, management control could create resistance to wikis.

3 Co-worker behaviour

Co-worker behaviour theories look at the power of co-workers to influence how a person uses a system. A supervisor or co-worker positively inclined to an IS will influence the behaviour of others in a positive manner (See Chapter 2). We believe that in a voluntary use environment, the influence of co-workers is especially important. A survey of corporate wiki users notes ‘frequency with which the wiki site is accessed by others’ as a significant factor affecting contribution (Majchrzak, et al., 2006, pp 103). In the social media setting, we expect that the enthusiasm to contribute, shown by a number of employees will likely encourage others to contribute content as well. The enthusiasm shown by supervisors/managers is also a strong factor. In other words, lesser enthusiasm could lead to discouragement as well. Hence we have undertaken to study the influence to co-worker behaviour and believe that negative co-worker behaviour could result in resistance.

3.4. Summary of selected factors

Our study is bounded by the three categories; personal/psychological, System/Design characteristics and Organizational/Environmental characteristics at the broad level. The factors resistance to change, felt need, perceived usefulness, perceived cost versus benefits, perceived ease of use, system characteristics, management support, management control and co-worker behaviour constitute the focus group of theories.

4. Research Approach

4.1. Choice of method

In conducting our study, we used an emerging qualitative research approach to inquiry; attempting to interpret, study and make sense of things in their natural setting. There are various reasons behind our choice of carrying out a qualitative research. In fact, understanding the issue of user resistance to social media requires a lot of complex and detailed understanding of the issue, and Creswell (2007) states that this detailed understanding can only be established by carrying out a qualitative research where you go directly to talk to people, go to their homes or to their places of work. According to Denzin and Lincoln (2005), the qualitative research involves an interpretive, naturalistic approach to the world; and this supports our choice as it will provide the means to achieve the purpose of our research study. Creswell (2007) metaphorically defines the qualitative research as an intricate fabric composed of many threads with different colours and various blends of material, thus leaving the explanation of the fabric not easy or simple. We used the case study as a method to pursue and support our findings as it is most suited when an in-depth understanding of a program or problem is sought. A case study research involves the study of an issue explored within a bounded system in which the investigator explores this system through detailed in-depth data collection techniques involving multiple sources of information (Creswell, 2007). Rather than using large samples and following a rigid protocol to examine a limited number of variables, we will use case study methods to examine our problem. There are different types of case studies distinguished by the size of the bounded system and the terms of intent of the case analysis: intrinsic case studies, single instrumental case study, and collective case study (Creswell, 2007). To explore and investigate the reasons behind user resistance to social media in the work place, we will conduct a single instrumental case study as we will target a single case to explore and study our research question. However, due to the limited time frame to conduct our research, we believe it is essential to make clear that our single instrumental case study can only be done as a mini case study within a small scale of research interviews rather than a large scale.

4.2. Investigation Plan

In this section, we introduce the investigation plan where we describe the organization and the selection of the different participants, and go on to describing the processes and procedures followed in carrying out the interviews throughout the research.

4.2.1. Case selection

In setting the purpose of our research, our intention was not to make quantifiable findings, but rather, seek out qualitative interviews through which we can make qualitative findings from their context. To remain in the scope of our study, we aimed at targeting an organization where the use of communication channels and knowledge management tools is a critical issue in the success of its working process activities. After several negotiations and meetings, we managed to get an approval to conduct our single instrumental case study in **Y-Company** under the condition of not mentioning the name of their organization in the thesis and keep it anonymous.

The participants for the study will be the employees of this organization. To ensure the flexibility while seeking the information relevant to our study, we were rather diverse in selecting the participants for our research. Thus, we sought out different individuals, who had different roles and functions, of different levels of seniority, and across different departments and lines. We aimed at having different perspectives and approaches in our study; and therefore, our research included nine participants, varying between consultants, line managers, testers and technical users. The participants were at various stages of their careers with a broad range of experience, from very experienced and later-career employees to less experienced and early beginner employees. In our selection criteria of the nine participants, we made sure to seek out the participants that could support the purpose of our research; in relevance, the organization provided us with the chance to interview the participants who fulfilled the following criteria:

From different departments:

- Regarded as an active user and supporter
- Regarded as a non-active user
- A Manager

4.2.2. Interviews

"Qualitative researchers tend to collect data in the field, at the site where participants' experience the issue or problem under study (Creswell, 2007, pp. 37)". To collect the data in the field, we selected the Interview method as the proper instrument to study the participants' experience of the issue under study. Upon attaining commitment from the organization that we could go further in studying its employees, we were asked to contact one line manager in the organization to assist us in organizing the interviews throughout the conduction of our research. Given the nature of the work, the time limitation, and extensive daily task activities at **Y-Company**, we felt it was important for participants to be provided the freedom to choose when to do their interviews. Hence, we provided the organization with a schedule including dates and times of when we could conduct the interviews and asked that each employee sign up for a time slot that suited him (See Appendix L).

The nine interviews were conducted over a three week period as they started on the third week of Aril and ended on May. Given the lack of time that the employees in **Y-Company** had, we had to keep each interview within a duration varying between 30 to 45 minutes. The place of each interview to be conducted was left to the choice of each participant. Some of them decided to conduct the interviews in their private work offices to show us the tools they used and their different features; while the others decided to conduct the interviews in the meeting rooms of the office space the organization shared, which was a closed and in private environment.

While considering the language for the interview, 80% of the interviewees that participated in the research were of Swedish origin and the rest were from different other countries; and we explained that it would be of our interest that the interviews be conducted in English. The interviews were all audio-recorded, as the permission was given by all the participants, and notes were taken by both of us.

To conduct the interviews, we followed a semi-structured approach. We felt this is essential to get the participants to convey their thoughts without too much rigidity. According to Kvale and Brinkmann (2009), a semi-structured interview comes close to an everyday conversation, but as a professional interview it has a purpose and involves a specific approach and technique. Having semi-structured interviews will in fact help us to conduct spontaneous exploration of ideas; however, to maintain the focus, we proposed to create interview guides. Semi-structured interviews are carried on according to an interview guide that maintains focus on certain themes and contains recommended questions (Kvale & Brinkmann, 2009).

The interview guides included open-ended questions and some close-ended questions. According to Creswell (2007), open-ended questions are a common way of formulating qualitative questions. We used open-ended question in our interviews with the intention to receive deeper answers including the respondents' own opinions and explanations. The number and type of questions we asked varied, depending on the specific interests of the interviewees; however, each interview included additional questions that related to the responses given by the participants. Wanting to listen to the participants whom we are studying and go into an in-depth observation, we changed the interview guide's questions throughout the process of the research, reflecting with increasing understanding of the problem.

To invite more open and honest responses from the participants, we ensured all the nine participants our confidential treatment of the information they provide us with, as any citation of their responses or comments would be made anonymous; in addition, given the sensitivity of our topics and to avoid any uncomfortable state to the participants, we avoided the use of the phrase "user resistance" in any of our interview guides or conversations.

According to Yin (2008), an advantage over other techniques that provides the researcher with certain unusual opportunities for collecting data, is to participate in a direct observation of the problem being studied. With regards to that, we requested from some participants during the interviews to directly observe the different features of the knowledge management tool being used, thus adding more value to our in-depth understanding of the problem.

4.3. Qualitative Analysis

Prior to the data analysis process, we made sure to transcribe each interview to gather all the required data. In this section, we provide the details of our transcribing procedure followed by the analysis method used to analyze the qualitative data.

4.3.1. Transcribing

"The interview is an evolving face-to-face conversation between two persons; in a transcription, the conversational interaction between two physically present persons becomes abstracted and fixed in a written form" (Kvale & Brinkmann, 2009, pp 177)

By the conversion from oral to written form, transcribing is thus preparing the interview material for the next step of analysis. As transcription is a very time consuming process, in preparing our interviews for the analysis stage, we considered the transcription of the

interview as a top priority to be done after each interview was completed. By doing that, we also ensured that all the themes and issues that have been raised are maintained. According to Kvale and Brinkmann (2009), there is no universal form or code to follow for transcription of research interviews; however, there are some standard choices to be made in securing the reliability and the ethical issues. To ensure a degree of reliability in our transcribing we decided to transcribe the interviews verbatim and word-by-word without containing multiple dimensions such as pauses and expressed emotions.

4.3.2. Analysis Method

After the transcribing of the nine interviews, a lot of information was gathered and it was critical for us to identify and describe the relevant information that could support the purpose of our research. In order to achieve our objective in the process of analyzing qualitative data, we followed Creswell's (2007) data analysis spiral, see Figure (4.1). According to Creswell (2007), the data analysis process conforms to a contour best represented in spiral image, a data analysis spiral.

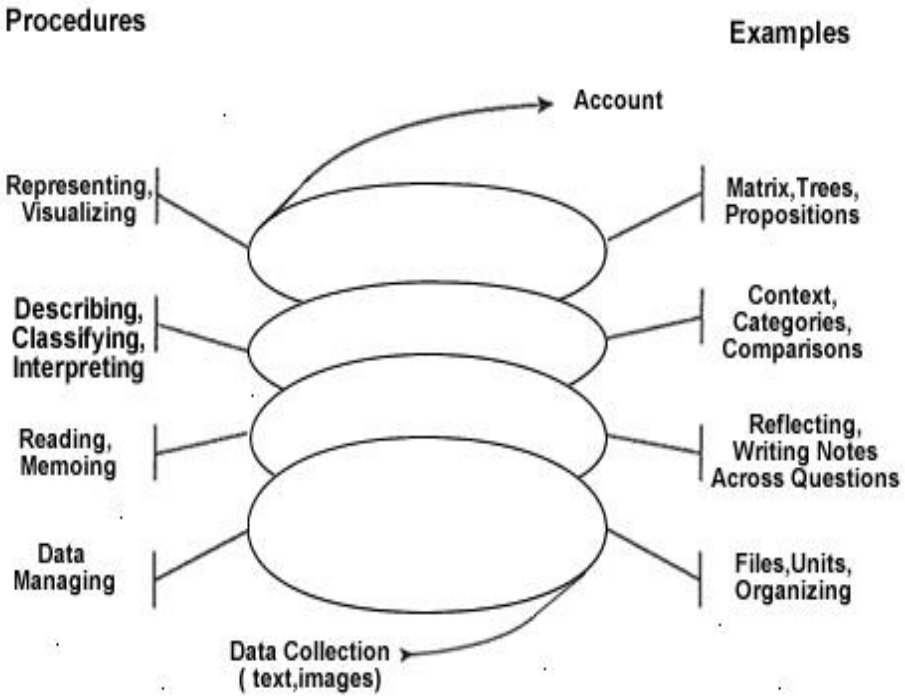

Figure 4.1: The Data Analysis Spiral (Creswell, 2007, pp 151)

The following paragraphs include 4 stages in our analysis process through which we related the different procedures of the spiral to the conducted activities of this research:

- Data managing
- Reading, Memoing
- Describing, classifying, interpreting
- Representing, visualizing

1 Data Managing

Data management is the first loop in the spiral where the researchers organize their data into file folders, index cards, or computer files (Creswell, 2007). After transcribing the interviews, the majority of our data collected was digital data organized in categorized files and folder. This helped us to keep track of all the available and collected information. A collaborative tool (GOOGLE doc) was used throughout the whole process of analysis providing us with different features regarding data managing, storing and teamwork.

2 Reading Memoing

Reviewing the transcripts of each interview was done several times to identify the main aspects and concerns in the issues related to the users' resistance to the wiki. Writing memos in the margin of every interview questions to be later reviewed and analyzed was a major step in our analyzing process. The memos noted down in our interviews included a variety of short phrases, ideas, or key concepts, see table (4.1). According to Creswell (2007), memoing is a critical step in the analyzing process as writing memos helps in this initial process of exploring a database.

Table 4.1: Example of Memoing Procedure during Analysis

	Question: And if you go to the beginning, do you remember, if everyone started contributing to it right away, how did it happen?
	Answer: No, It took a long time, before people started adding things. Took very long time. So, I think if you can win one person, then the next one comes and you need to win each person to Media Wiki, or the wiki. Especially at the beginning, but later on, if you have 10 persons may be, adding information, then the information is more valid, and it's updated. It's very important to update information. If you have a lot of invalid information on the wiki, yeah, then its chaos and its not anything you can use. So it's important that wiki is updated regularly.
Memo Writing after reading a question in Interview 4	**Memo 1**: The success of the wiki was not an easy step to achieve as it required a lot of contribution of the users to add and update the information. He stresses on the importance to have continuous update of information to ensure the success of the wiki else he describes it useless to provide value for the organization. **Memo 2:** There are some initial enthusiasts who feel the need and also are convinced of the usefulness of the wiki – felt need and perceived usefulness. **Memo 3**: Others either don't feel the need or are not convinced of its usefulness or both explore more this area! **Memo 4:** Here, there may be personal differences too; we need to explore this area more! **Memo 6:** Then a wiki with more content and a set of users captures others attention – They may see that it is useful when the content comes in and also others are using it. – Visibility, later increases of perceived usefulness and co-worker behavior influence. Explore more the extent to which content availability affect contribution.

3 Describing, classifying, interpreting

This process consists of moving from the reading and memoing loop to the describing and classifying loop. This loop covered the interpretations of the essential information that has been collected throughout the whole research process. We chose to perform our analysis by applying open coding as it is described by Creswell (2007) to be most appropriate in qualitative data analysis, *"In this loop, code or category formation represents the heart of qualitative data analysis*", (Creswell, 2007, pp 151). The coding procedure was performed on each transcribed interview, and each code represented a theory of relevance to our context of

study. An example of the coding is shown in table (4.2), where the codes shown in the left column represents each of the theories, also found in the interviews (see Appendices).

Table 4.2: Example of the Coding Procedure

	Q: Have you felt that you need a system like wiki, say, to look up on things easily?
FN PCB	A: **Yes, I can see, I can definitely see the benefits. I mean there are pros and cons. Some things are really good to put in a wiki. But other things perhaps are not so good. It also takes a lot of time to write it down and write it down in a good way. So I think a wiki takes a couple of people to get a critical mass, so that people start using it. I mean, one person writing down what he thinks is important, is not enough. You need three or four people who help out together. So that has to be something that is decided. Otherwise I think there is a risk of a wiki being just for a couple of people, and they use it a lot, but the others are not into the wiki.**
	Q: If you think of a wiki for your team, who do you think should start such a thing or take the initiative to spread the use?
MS	A: **Ok. I think definitely the team members. The people working with it day to day, but they need to be supported perhaps a bit, from management. So that they feel that they have time to sit down with the wiki for an hour when it's needed.**
	Q: I wanted to ask you, what is your motivation to use X-coll? What benefits can you get from it?
FN	A: **I would say, I mean, it's very official. Yeah, you get the official information from there. From X-coll, if you are in charge of a certain project, for instance, there is the team leader for this group. Then I go and talk to him. And also the status on a high level, where in the validation process is our software right now, etc. Then you go to X-coll and have a look. I would say, now am working as an object leader, so am into the administrative stuff right now, but I have been a tester before, so I know how it is to be a tester. As an object leader, I use X-coll everyday. But as a tester, I did not. I used it perhaps once a week.**

During the next phase we compiled our coded material into a categorized table. This phase was quite important since the coded data was split up in categories, which consist of the same characteristics in order to establish different themes or patterns of data. Our coded data was classified into different categories and put in a table dividing them into different users in relevance to different organizational, system, and personal factors, see table (4.3). The Categories established was based on the different identified factors affecting the users' contribution to the Wikis. This classification was followed by the interpretation and making

sense of the essential information that has been collected throughout the research process. According to Creswell (2007), the term *interpretations* in research is linked to the act of making sense of the data and it can be based on hunches, insights and intuition and personal views.

Table 4.3: The Data Categorizing Table

	Organizational	Personal	System
Across Different Departments			
Active User			
Non-Active User			
Manager			

4 Representing, visualizing

"In the final phase of the spiral, researchers present the data, a packaging of what was found in text, tabular, or figure form", (Creswell, 2007, pp 154). Our findings have been visualized through the creation of this thesis document, through which we present our analysis and the different models established from the conduction of our qualitative research.

4.4. Discussion on how to reach scientific and ethical quality

Attention to quality should begin at the very beginning of research (Seale, 1999). How to achieve quality must be thought out in the beginning and carried out throughout the research. At each step of the research, strategy to achieve quality should be detailed and performed. To facilitate ethical and scientific quality of research, several techniques and tools can be used, and it is impossible to reach quality without addressing issues relevant to reliability, validity, and ethics.

4.4.1. Reliability

The objective of the reliability issue is to minimize error and biases in a study, in such a way, that if a later researcher followed the same procedures and conducted the same study all over again, the later researcher will be able to arrive at similar findings and conclusions (Yin,

2008). By some qualitative researchers, the concept has been divided into internal and external reliability. Internal reliability refers to the degree to which different researchers identify identical constructs as the original researchers (Seale, 1999). External reliability, on the other hand, is more demanding as it involves the replicability of the whole study and is concerned with the concept that other researcher studying the same or similar setting should be able to achieve the same findings and results (Seale, 1999). We have tried to describe our research process in depth and as detailed as possible, as we described specifically all the techniques and methods used in conducting the research. Moreover, we have been accurate, precise in our description, trying to minimize all sorts of errors. Following such a methodology, we trust that both the internal and the external reliability have been improved and made easier to a certain extent for the research to be repeated. This assumption; however, doesn't not ensure that we have totally accomplished external reliability in our report, because Seale (1999) argues further in his studies of the issue of reliability stating that external reliability involving replication of whole studies has been difficult to achieve in practice.

4.4.2. Validity

According to Creswell (2007), there are several criteria to follow in order to ensure the validation of a qualitative study. In reference to that, we developed the following criteria to seek the validation of our research:

- ***Criteria 1****: Clear identification of the case in the study.*
- ***Criteria 2****: Indentify the case being used to understand the research.*
- ***Criteria 3****: Develop a clear description of the case.*
- ***Criteria 4****: Use quotations effectively in the research paper*
- ***Criteria 5:*** *Reflect and self-disclose our position in the study conducted.*
- ***Criteria 6:*** *Use heading, artifacts, appendixes and indexes effectively in the research paper.*
- ***Criteria 7:*** *Ensure adequate attention to the various contexts in the study.*

We have attempted to follow these criteria throughout the research.

According to Yin (2009), in measuring external validity, case studies rely on analytical generalization where the investigator strives to generalize a particular set of results to some broader theory. While considering generalization to ensure external validity, we constructed our study in a form that will allow us to generalize our findings to be applicable for another company that holds similar or same characteristics.

4.4.3. Ethics

According to Creswell (2007), the ethical issues are important aspects in a research that continuously accompany the qualitative researchers in their studies. Kvale and Brinkmann (2009) address ethical guidelines and the importance of confidentiality, informed consent, researcher's role and consequences in all the stages of the research.

In the whole process of conducting our research, ethical aspects were considered a priority. We were mainly focused on three important ethical issues related to this study: informed consent, consequences and confidentiality.

"*The consequences of a qualitative study need to be addressed with respect to possible harm to the participants as well as to the benefits expected from their participation in the study*" (Kvale & Brinkmann, 2009, pp 73). As far as consequences is concerned, we conducted our research in a manner attempting to avoid the causing any problems, harms or put the participants in difficulties; on the contrary, we aimed at doing good as we sought to provide the participants with a solution that can benefit their way of conducting their work activities in a more effective and efficient way.

"Confidentiality in research implies that private data identifying the participant will not be disclosed" (Kvale & Brinkmann, 2009, pp 72). To ensure the confidentiality, we did not sign any form of formal agreement, but we rather followed an informal way of promising confidentiality. Israel and Hay (2006) argue that sometimes confidentiality is a signed agreement, but also other agreements can take place in a more informal way. Each interview started with an introduction part where the participants were sought the permission to be audio recorded and assured about the confidentiality and the protection of their privacy, as they were ensured that their names or any kind of identification will be anonymous in the report. Moreover, as far as Informed Consent is concerned, we made sure to include in the introduction a brief description about the purpose and the procedures of our research project;

informed consent involves informing the interviewees of the overall purpose of the investigation and research project as well (Kvale & Brinkmann, 2009).

4.4.4. Bias

In targeting the concept of bias, we find it critical to mention the extent to which truth and objectivity in our research are affected by unconscious processes of hidden assumptions and biases. According to Hammersley and Gomm (1997), it is problematic to refer to bias as a systematic error, as it depends on other concepts such as objectivity and truth. To limit and manage bias in our research, we have tried to follow an objective approach towards our research topic as we sought to mention whenever necessary our presumptions. In following such an attempt, we believe we hardly eliminated bias fully but attempted to minimize it throughout the study.

5. Empirical Findings

5.1. Participant Presentation

We provide a brief profile of each participant in order to highlight their usage patterns with respect to wikis. In order to keep the participants anonymous, we have not included names.

Participant 1: The interviewee is currently a tester at the organization. He has worked in different positions such as line manager, but he believes being a tester is the work he enjoys. He has used Wiki quite much for storing information.

Participant 2: The interviewee has been a tester and a consultant; however, currently he is an object leader. As an object leader, he performs project planning tasks. He uses different means and tools to manage knowledge and information in his department but he is not currently using a wiki actively.

Participant 3: The interviewee has been working in the organization for long, mostly in a test environment and currently with cross site projects. As he is working in a cross site team, they use various knowledge management tools including the wiki extensively.

Participant 4: The interviewee has been working in the organization for long. He is one of the founders of wiki with about 300 active users. In his department, the use of wikis is extremely important and users contribute much to the system.

Participant 5: The interviewee has been working in the organization as a tester. In his department, they don't actively use a wiki. They use other applications and oral communication to obtain and manage knowledge.

Participant 6: The interviewee has been working in the organization since 1996. He started as an engineer. Now he is a technical manager for the last three years. He is one of the critical supporters of the Wiki.

Participant 7: The interviewee is a section manager. Previously he was the manager of the department where a currently successful Wiki first started and spread. He had taken several initiatives to support the Wiki.

Participant 8: The interviewee has been working as a tester. He works in a multi site project. It is quite important for him to have an effective knowledge management tool in a

cross site environment. He uses an external SPOC (Single Point of Contact) wiki as well as an internal wiki, and contributes content to wikis in the form of links to manuals etc.

Participant 9: The interviewee is a tester. He is currently working in two projects, and one of the projects involves collaboration with an offshore location. There are two Wikis, one external and one internal, for the two different projects. He gets information from wikis, but does not contribute content to the wikis.

5.2. Interviews

5.2.1. Personal/Psychological

The responses varied according to the departments and whether the users were actively using a wiki or not. Hence the responses have been grouped according to this distinction.

1 Non-Active users

On the need for a wiki and its usefulness, the following comments are worth highlighting.

Participant 2 stated that they have an 'oral wiki' in the department where they could walk around and talk to people. Also that the personal bonds developed this way would be valuable since it would be possible to go and ask questions later. Oral communication was stated as the fastest way to obtain information. Wikis were seen to have some merits, like being able to spread information more, but the participant felt that it was always "*way superior to talk to someone*".

Participant 5 felt that with about three years of experience, the benefits from a wiki would not be much for him. He means that, since he has some experience and also knows other people in the team well, whom he can approach for help and information, he did not need the wiki. He also mentioned that when he was a new employee, he might have benefited much more from having a wiki, but he doesn't feel it is necessary now, "*When I was new, I didn't have the contacts* (that I now have) *and so on. Now I know how to find the information I need".* Whereas Participant 2 mentioned that, "*now am working as an object leader, so am into the administrative stuff right now",* and he used X-Coll to meet his needs. He also stated that even though X-Coll is not always up to date, he could verify the accuracy of the information there and he did not have a problem using it. It is interesting to note that the participant did not have a problem with having to go over and orally verify the information with the source, if there is a need for such verification.

Both participant 2 and 5 stated that it was good to collect information in a wiki. Participant 2 stated "*I think parts of our work would benefit from having a wiki. And we have that as an on-going discussion. That we should put up information on a wiki. Because there are things like how you manage certain things in the lab… like how you set up things in order to do certain tasks, which would be perfect in a wiki*". Information available at a common place with better back up is seen as a merit. Participant 5 stated *"it is better to have it* (information) *common so all can see it and its better backed up."* Wiki was seen as useful in that sense.

Participant 9 has however two wikis related to his projects. But he looks for information in the official documents first. If he cannot find the information there, he looks into the wikis. But he feels that there is not much information related to his work, in the wikis.

Participants were concerned about the efforts required to set up and maintain a wiki.

Participant 2 stated that a critical mass of users and content was necessary to get users to start using wiki widely. "*Otherwise I think there is a risk of a wiki being just for a couple of people, and they use it a lot, but the others are not into the wiki*". But he felt that it required a lot of time to write down some things and write them in a good way. Participant 5 also mentioned that the threshold was the problem with wikis and it was hard to start a new wiki. Participant 2 commented that the information was changing too fast and it would be difficult to keep a wiki updated and people would be "just sitting and looking at old wiki pages". He said he did not see a good trade off. Participant 9 made an interesting comment, he said, *"I guess it is kind of hard to measure but it would be interesting if we could measure how much time is saved and therefore how much money is saved by having a well updated and accurate and well structured wiki; could be a lot. Then more effort will be placed".*

When it comes to shifting to a new way of communication like the wiki, Participant 2 felt that, he would rather favour the old way of knowledge handling. "*They (some users) are into chat etc. I am not used to that way of thinking, I am more towards the 40's guys, walk over and talk about the problem. Don't just throw away a comment in a chat forum".*

Typically participants 2 and 5 use the options of going to their colleagues and getting the information they need, through the document management system or e-mail. And the participants are happy with those options.

2 Active users

In this group of users, the need for a wiki and its usefulness were expressed with the following comments.

Participant 3 stated that wikis don't replace oral communication as it is a completely different approach from oral communication. But with a wiki, *"I don't need to run around for a document when I can just click here and find it in 5 seconds"*, and *"I talk very much and I communicate very much but still I think that it should be there"*. Participant 8 mentioned that not having to go and ask colleagues for information was good, since it would be interrupting them and using the wiki was more productive.

Participant 4 mentioned that it was difficult to handle all the mails and search for information in e-mail and the document management system. There were instances when people lost their accumulated e-mails when a migration happened. This made keeping the information in a common place important. About X-Coll he said that *"I think it was harder to update, I don't remember exactly. But the user interface was not so good. That was the main thing. MediaWiki was very easy to use."* Participant 4 mentioned that there are kinds of information, *"for example, how to set up an instrument in the lab*", which people do not put into documents, but is good to compile for reference at a common place.

We can see that participants felt that wikis were a necessity. While wikis do not replace oral communication or e-mail, they meet some specific needs. Participants felt that their information needs could not be met through oral communication or e-mail.

Participant 4 mentioned that the wiki is the right place to have information like electronic manuals on software tools. He stated, *"You can just go in and check where is the user manual. And external web links that are good. So, I mean, it should be easy to find, the information. If someone else has looked into it and you can have the information directly."* Participant 8 mentioned that it saved time and he did not have to ask where information could be found or accessed. He also stated *"I think emails in any case will be better than oral communications. But I think Wiki is better than emails. Wiki is always there in case you need to browse, it is not deleted."*

On the effort required to set up and maintain the wiki compared to the benefits from it, users felt that the benefits were worth the effort.

Participant 3 commented that things were not changing so fast. He means here that so the effort to update the wiki is not so great. Participant 4 commented that the time spent writing

to the wiki, actually saved time. It increased the efficiency. Also, keeping the wiki up to date was not hard, as users just updated the information whenever they saw that it required updating. He also mentioned that he did not see a requirement for a person who is assigned to manage the wiki. Participant 4 also commented that setting up the wiki does not require a lot of effort, as for him it only required an initiative, continuous contribution, and 'winning' a few of the users. Participant 8 commented that the time spent on the wiki was not too much and that it benefited in everyone being able to access information, which was good.

We also notice personal differences in the attitudes of the participants. Some participants mentioned their enthusiasm to find new solutions and take initiatives. They also described the steps they took to spread usage. Another factor is the stages of system from the initial low levels of use to later high levels of use.

Participant 3 stated that it was necessary to discover new systems constantly to meet their needs, as the team worked cross-site and this involved bigger communication challenges. The participant is currently introducing a new tool in his department and taking the initiative to spread its use. The participant said "*I see myself as a pioneer of discovering new things to help people to communicate.*" And also, "*I am actually the first one to install it here*." He stated that he got the tool installed, sent it to his manager and got approval for it. He chose the system since it met their particular task related needs. He also described the steps he is taking to spread its use. Participant 4 mentioned how he introduced the wiki that they are using in his section now. He said, "*And then I set up a proposal. I just installed MediaWiki on my computer and ran it on a server and we started to use that. Yeah then it was* (investigated) *and we presented it to the whole section and we went for that."* When asked about whether everyone started using the wiki immediately, he stated *"No, It took a long time, before people started adding things. Took very long time. So, I think, if you can win one person, then the next one comes and you need to win each person to MediaWiki, or the wiki. Especially at the beginning, but later on, if you have 10 persons may be, adding information, then the information is more valid, and it's updated."* He also described steps he had taken to spread the use of the wiki. And also that *"in the beginning, maybe it was a couple of updates per week, now may be it is 20 updates per day or something."*

Participant 8 however said, *"So I think we appreciated the efforts of the wiki even when not everyone was trying to develop or support."* He means that in the beginning, not everyone put effort into the wiki, but all were happy to have the wiki introduced. He also stated that the

perception towards wiki changed later on *"I think (we) got used to this way of spreading and finding information. It gets more into your working way after a while."* He continued, *"I remember an instance in the beginning when as soon as you need some specific information we need to ask someone else. Then he needs to go through the mails, find it and forward it to you. Now they just look it up in the wiki. In the end, people don't even ask, they look up in the wiki and then if they don't find it they refer to a colleague."*

5.2.2. System/Design

Most users thought that wiki was easy to handle; to store information and also search and find required information. The biggest problem with the document management system, e-mail etc was that it was hard to find information unless a person knew the exact document he is looking for. Other issues of study include the information quality and content structure.

Participant 2 stated that although he preferred oral communication, the wiki was better at spreading information. He also stated regarding the DMS, "*the information there is very hard to keep updated and it's a lot of work to write a complete word document*." Another comment from Participant 2 was *"on a wiki you can, I mean, as a user you can edit, put in more information, and explore in more detail in a way that makes sense to your colleagues. Whereas in X-Coll, I don't have the right to update any page. So I am not responsible for any X-Coll page. I am just a consumer of the information on X-Coll."*

Participant 3 stated that "*wiki is very simple"*, and that simplicity was a plus. Participant 3 stated about the wiki, *"all important information that you can imagine about your daily work is here"*. Also that it was easy to search and find. Participant 3 also commented, *"You really put things that you need, it is really consistent".*

Participant 4 stated that the wiki was very easy to use as it was easy to add articles and other information. He also stated that *"it is flexible and it grows. We can handle it."*. But in the document management system, while documents could be created, it was hard to find information. He stated that, "*you can't search for something that is written inside a document in DMS, but on the wiki, if you put some information on a page, you can search for it*". Also the basic wiki was stated as sufficient to support most of the users' needs. About the particular wiki solution they use, participant 4 said, *"we went for MediaWiki because we thought that it was the best one."* And he said, *"MediaWiki was very easy to use."*

Participant 5 stated *"I think the wiki's design is good."* But about DMS, he said that it was *"a big black hole."* And, *"You put a document there and send a link and if it is a living document, it is used for a while but otherwise it is just disappearing there."* Participant 8 said, *"You have everything quite accessible."* He also said that *"It is fairly easy to learn to give a good shape to your comments so that it is clear."* Participant 9 thought that the design of wiki itself was good but was dissatisfied with the content structure. Participant 9 said that *"people are used to it, and people have used it outside work so they understand already how it works."*

When we come to quality of information, we get different perspectives.

Regarding the quality of information in wiki, participant 2 stated *"the problem with wikis is that people have not updated it enough."* And also, *"There is also the problem of how to maintain a wiki. I mean old information. Who is responsible for posts from last year that is wrong now. It's a problem. And the person has quit his job for instance. It takes time."* He also said about the unrestricted nature of wikis, "*That also makes it less valuable. Because a lot of people that have the best knowledge, are the ones that don't want to update. We have a lot of people with less knowledge that update the wiki. And they spend lots of hours updating the wiki. But it is not the best information. The best information is with the guys sitting inside the lab. So that's a problem*" Hence there were doubts about the quality of information. However regarding the other tools he stated they are hard to keep updated as they were much more formal.

Participant 3 said that information did not change so fast, and keeping the wiki updated was not a problem.

When it comes to data accuracy in wikis, Participant 4 maintained that while it could not be said that wiki was 100% accurate, information that was used the most, got updated frequently. He said, *"I know there may be inaccurate information. But I don't think it's a big problem. I use it a lot. And we use different pages for different purpose. And if you go to a new project, then you don't use the old pages so much."* And whenever a user notices, inaccurate information, it could be corrected instantly, which was an advantage. He said, *"If you know the correct information, then you can just update it. It gets better than before, and if it's inaccurate, then it's inaccurate."* Participant 4 also said that if there are more users, the information would get more valid.

Participant 5 stated about data accuracy, *"I think it's accurate. It's quite good but it needs some good control."*

Participant 8 thought that accuracy of data depended on what you are looking for. He also said, *"From my experience it is a bit difficult to keep everything updated for the reason that everyone can update whenever they want, so it is a bit difficult. Something which I think is a sort of solution to avoid unstructured information and out of date information is sending a mail, by the person who updates the wiki, to all the people in the project. So that everyone can check if there is an update and keep track of the source and know what things have been updated recently."*

Participant 9 feels that there is not much information related to his work, in the wikis.

When we come to the structure of the contents inside the wiki, two participants were especially concerned.

Participant 8 commented *"I think somehow it should be, if not restricted, probably organized or structured; what can you write or where."* He said, *"It happens often the information is not well structured because everyone can write everything without following rules or following the structure of the webpage. So it can get confusing at some point."* Participant 8 regarded the structure of the wiki as a critical issue that needs to be handled to ensure its effectiveness, as a proper structure allows you to understand the relevance of the information compared to your needs.

Participant 9 was especially concerned about the structure of the wiki. He said, *"it has become very unstructured and very difficult to follow, it is a mess. So you can find some tips here and some tips there but it is not really good."* He also said, "*When it comes to the delivery of software it should have a structure and there should be one responsible for keeping it in shape and if one link is broken we can contact him, I mean each page should have someone responsible for it*". He also thought that it would be good to have a 'map' of the structure or an index to guide the users. He said that lack of proper structure affected his use of wikis.

It is interesting to note that, Participant 6, a manger, also pointed out that the structure could be improved, in order to make it organization wide. He said, *"it has to be a logical way of finding yourself down in the structure and that is maybe something that can be improved in wiki."* He said that the wiki content should not be like apples and pearls mixed together.

5.2.3. Organization/Environment

We divide this section to users and managers. The 'users' section details the users opinions about management and the 'managers' section includes the management opinions.

1 Users

According to the users, the form that management support should take is to emphasize to all users, the importance of having a wiki.

Participant 2 said that the users need to be supported by the management. He said, "*So that they feel that they have time to sit down with the wiki for an hour when it's needed*". This did not mean users wanted to be coerced. "*I think as engineers we shouldn't be told or forced to do things*", was the comment from Participant 9. But users wanted to be sure if the effort they put into the wiki is viewed by managers as time well spent.

The participants, especially the group not using a wiki, felt that they do not have the time to spare, to write into the wiki. Their tasks were a priority and wiki was not. Users also stated that if the managers emphasized the wiki's importance, they would make it a priority, Participant 9 stated, *"The problem is that we are filled with tasks and if you can have one more hour to do more for your work or update the wiki, you would rather do more of your work. So in that sense we depend on management to assign us some time to do it".* Participant 5 commented, *"There is always focus on the project here".* He also stated that lack of time is a problem when updating wikis and if users are not pushed to do it, they will not. Participant 2 commented, *"time is not something we are allocated I would say, to sort out these things."*

We also note that in departments where managers emphasized the use of wikis, users felt that it was critical to allot time for wikis. Participant 3 stated "*We were pushed at the beginning. I remember one guy created it and then managers are pushing and pushing us to use it, and after one year we started to use it really.*" They saw lack of time as a personal matter of how each user prioritized his tasks, Participant 4 said, *"It's a priority, if managers push for it, you could save a lot of time actually. So may be its not good to say 'lack of time'. You can 'save' a lot of time if you have valid information there".* Participant 8 said *"my manager pushed for it in my project."* He also said that the wiki saved time.

Participants also stated that there was no organization wide knowledge management policy.

Participant 2 stated "*Not one that is implemented and followed by the people. No there is not.*" He also stated "*some departments have found a way to put information in a wiki."* And,

"*I get the feeling that it's not important to management, where we store information, as long as we deliver what we are supposed to deliver, basically. They don't care about how we store that information. It's basically up to us".* The efforts to create and spread wikis came from the developers, testers and their immediate managers. In some departments or sections the managers made wiki a priority and in some, wiki is not a priority. Participant 4 said, *"It's just that we saw a need to have a wiki, and we set it up and other departments also joined."* He also said, *"This wiki started at our department. May be there are other wikis starting. I don't know how the other departments work. This wiki was started in this department. There was no intention to make it for the whole organization. Other people were interested in it, who wanted to use it, that's why it has spread. May be other departments have only looked at X-coll."* Participant 4 stated, *"I think they just get the information that there is a new tool now that we could use. But they didn't do any initiative to start the users widely."* He means the higher level managers, as the department or section managers where wiki is actively used, supported its introduction and spread within the department or section.

Participant 8 thought that the structure of wikis could be improved and the managers could take the initiative to train the users on creating proper structure and maintaining the wiki. Participant 9 also thought that the structure of the wikis needs to be improved to improve the efficiency.

Participants appreciated the bottom up approach and informality of wikis. Participant 1 stated that, in wiki he was allowed to change the content himself, so he used it for daily task related information needs. For him, the wiki was a dynamic place where things are continuously added and updated. *"It is the only place I feel it is still living; things change, procedures, how to do things change and people use it and update it continuously".* "Everybody can store whatever they want", was a comment made in appreciation of wiki by Participant 1. When asked about who should be taking initiatives for a wiki, Participant 2 stated, "*The people working with it day to day."* Participant 3 stated that the structure was put in place by the users as users wanted, *"from us to us",* which was a good thing.

On probing whether the informality would lead to spamming and if restrictions were necessary we received several view points.

Participant 3 stated about content monitoring, "*If you are in a kindergarten you would probably do that but we are people working in a serious company so I don't think there would be any danger (*of inappropriate content*); for all my time here such a thing has never*

happened". He also said that if anyone puts wrong content there would be a reaction from the colleagues. Participant 4 felt that if there is monitoring users will be afraid to update. Also, if all content has to be reviewed beforehand, *"then you don't update, even if it's obvious, you know that there is a problem, and you can update it in a second"*. This means that the participants thought that the informality did not attract inappropriate content. And monitoring the content was not necessary as users are responsible. In fact it could be detrimental to the growth of the wiki. Participant 5 stated about the necessity for content restriction, *"No I don't think so. I think we have a level as engineers anyway in this company".* Participant 2 stated that he has not seen spamming.

However, users also noted that the system used mainly for project planning and control, X-Coll, had a different purpose and needed restrictions. Participant 3 stated *"You cannot go to X-coll and change because it is project related information."* Anyone should not be able to go and change project plans, so authorization was required. This also made X-Coll more formal. Participant 1 commented that *"X-Coll is good for management, not for testers and engineers"*.

Enquiring on the possibility of an organization wide wiki, we found that users are concerned about managing a large wiki.

Participant 4 mentioned that if the wiki is made organization wide then some restrictions would be necessary. He said, *"but then it's very big and then maybe you need some more strict rules on it, how to update and so on. Because now it's not so many, may be 300 persons or something. But if you exceed 8000 or 6000 then you need to have more rules."* He also stated that if such project management and planning information were to be put into the wiki, the wiki would have to be made more official. Participant 2 thought that if wikis are used in a bigger group, some kind of restrictions would be necessary. A master who maintains the wiki was thought to be necessary. It was seen as a trade-off to keep order and allow the wiki to fulfil its purpose. In a wiki, it was not trusted that everyone will do 'good things'. Participant 8 commented about an organization wide wiki *"it will become something huge and I am not sure it will be easy to handle due to too much information and too many sections."*

Other aspects we noticed as important are the size of the department or group where a wiki is introduced and the nature of tasks. These aspects were brought out by participants who did not actively use a wiki. Participant 2 stated that in his department, people tended to work closely together as a result of the nature of their tasks. He stated "*I think it is because we tend*

to work together much more in the day to day work." He also stated that at the departments where people used wikis actively, they tended to work in a more isolated fashion. Participant 5 stated that it was easy to go and talk to people when his team had 10-15 people. But, "*When you are bigger it's harder to spread information".* Or in the case of a team working across cites in different countries with language barriers etc, wikis are helpful to have.

Participant 3 commented that the nature of work determined which systems people used. Participant 8 said, *"Not all the projects use it (the wiki) to the same level, to the same extend. In my case this project is one parallel, multi site project. It is run here in Lund and in parallel in Nurnberg, Germany. So for us it is quite important, the existence of the Wiki."*

When we come to the influence of co-workers, Participant 3 stated that his manager is *"putting a lot of stuff himself in wiki. So when others realize he is doing that, then they will do more themselves."* Participant 4 said, *"One thing was integration team; they are providing a lot of information regularly, all the time, about the software deliverables and so on. So that was quite good to have that on board. Because when they were involved, they communicated a lot of information on the wiki. So then more people were starting to use the wiki."*

2 Managers

Managers also believe that wikis should develop in a bottom up manner. Also that they should be informal and users should not be coerced.

The opinion when it comes to the support of Wiki is that the contribution to this tool comes in a natural way. Participant 6 stated, *"The initiative to start Wiki was from one of the guys and it was an engineering initiative not a management decision and I think it is not always that managers should tell what to use. I think it is that you can start your things and when you think it is working, and then you can get a commitment from management. So all initiative doesn't actually have to come from above, I think it is more difficult to get people to work if you feel forced to use it, than when it comes in a natural way."* It doesn't need to be pushed but rather 'be blessed' by management. Participant 6 said, *"What you can do is that you can give them your positive sign to it; that is sort of to say I support you in this idea and that is more or less how I understand it is being done."*

Participant 6 also stated that the department or section managers supported and protected the wiki when the company management did not see it as an official tool. But we also noticed a statement from participant 6, that wikis need to be kept updated and that when there is in-

correct information, *"they start to correct information and they waste their time."* He also said that there is a risk that no one would feel responsible to change the information all the time, which was slightly contradictory. He stated that the users are pushed to update some kind of information, but managers did not want to control it much. Participant 6 also thought that finding the time to update a wiki or for documentation was a matter of outlook, he said, *"it is also a cultural wise thing."*

Since the different wikis were disjointed we wanted to enquire about an organization wide wiki and if it could help all departments to have a wiki. We saw that there was no attempt from managers to spread the usage of the successful wiki to the rest of the organization. When queried on the feasibility of an organization wide wiki, one main concern was data security. Participant 6 stated, *"Our company is a competence company so it is of course a big risk of wiki showing information, because it has a lot of important information located in it and so mainly not everyone should have access to all information."* He continued and said that it was a drawback of wiki, that it was open and everyone could access it. But participant 6 stated that *"maybe if we educate people in what information you should prepare in documentation systems where it is maybe not protected"*, wiki could be made organization wide. Security related problems can be reduced by teaching the users, what data to share in the wiki. Participant 6 said, "It sh*ould be kept in a more secure way and this is what I think, you have to teach them what to put there and what not to put there".* Another issue pointed out by participant 6 was that if open-source tools are used, the company would have no one to complain to, if there is a security problem in it.

From these we understand that in an informal environment there was possibility that users would add sensitive information unknowingly which could harm the company if leaked. Hence, an organization wide wiki with more information and users was seen as a risk.

Participant 6 also stated that an organization wide wiki should be more structured. He said. *"a logical way of finding yourself down in the structure, and that is maybe something that can be improved in wiki, that you have some editors that is designing the levels, what you should have on the different levels.* Participant 7 also said about an organization wide wiki, *"I think you need a very good structure to be able to host this information."* And *"if you don't have the right structure it would be a mess."* It is interesting to note here that Participant 8 pointed out the structural problems with wiki and believed that the management could give training on structuring or otherwise try to improve it. However, Participant 6, when queried

on the management's action regarding the structure, said that, *"Sometimes we do small improvements but we try not to interfere too much. But sometimes we go in and change some things."*

Following up on this and on user concerns about lack of proper structures, we can see that participant 6 so far had not thought training to be necessary. However, when we detailed reasons for providing trainings about content management and perhaps information security, it was acknowledged as beneficial.

Participant 7 said about creating an organization wide wiki, "it *won't help that our top management goes and says that we think you should have a wiki because by having a wiki we think you will work more efficiently".*

It is also interesting to note that Participant 7 mentioned an attempt to introduce an organization wide wiki, which came from the management. But the users discarded it since it did not meet their needs. Hence we can see that another problem about conceiving an organization wide wiki is that it conflicted with the bottom-up approach. Also, then it would have to be more formal and controlled. If it does not come from the users, the likelihood of it not meeting the users' needs is higher. The management needs to understand the users' needs, before attempting to introduce a solution. However, participant 7 pointed out that the concerns with an organization wide wiki need not be seen as drawbacks but as things that need to be handled. He also mentioned that any solution that improved the efficiency of the organization would be welcomed by the top management.

We also gained some insight to the way the successful wiki was introduced and developed. Participant 7 emphasised the importance of the size of the group. He said, for example, if there are only three people in a group, a wiki is not necessary and it would not become a success. He also stated that if the size is large enough, the personality differences between people would not matter. Providing the size is large enough, he said the key steps to success would be giving management support, putting the initial content and slightly pushing the users to contribute.

The comments by Participant 7 also pointed to the different stages in the introduction and spread of a wiki. He said that initially, "*there is a need of information that is usually expressed by some, and in others it can be in their head, but possibly stays there."* And *"(Participant 4) is a driving force so he started to populate the wiki with articles so we can also see the benefits of having the wiki. Eventually we got a critical mass in it and it took off*

and that is the way it was." And he said that initially users were reluctant, but eventually they saw the benefits and also started to get used to the wiki. Participant 7 also mentioned the steps that were taken to persuade the reluctant users. On how a wiki can be introduced and spread, he said, *"Decide what you want to have the wiki for; that is number one. Number two would be then, set a structure on the wiki such that it is clear for everyone how it is supposed to be used. And the third thing would be then to try to populate the wiki so you would get a critical mass in order to show the ones that are a bit reluctant or don't see the need for a wiki, that the source of information is the wiki and not the personal contact from the first step."*

6. Analysis and Discussion

We analyze the empirical findings based on our theoretical foundation. The factors that we selected for study form the base for the analysis. (See chapter 3). However, we believe that we also need to look at the inter-play of different factors. In this, we have been influenced by Markus (1983) and the theoretical models of user resistance (See chapter 2). Markus (1983) proposes the interaction theory in which each organization or context is unique and it is the interaction of various factors within this context which creates resistance. In our literature review, we also noted that the theoretical models connect some factors together and look at how each factor affects another in a context (See 2.4). Lapointe and Rivard (2005), also state the importance of time and stages of a system.

Moreover the definitions of resistance factors themselves are overlapping and affecting each other (See chapter 3). We believe that this becomes clear in the empirical findings as well. Hence we need to also look into how these factors relate to each other in order to gain a complete understanding of the context.

First we analyze the factors independently and then go on to look into the context and how these factors connect together.

6.1. Analysis of user resistance factors

6.1.1. Personal / Psychological Factors

When we look into the responses, we see differences in the attitudes of the users towards wiki as a medium to solve their information needs. Due to this difference we again group the users into active users of a wiki, and non-active users, for better understandability, in this section. Also we detail the conclusions separately, after presenting both set of users.

1 Non-Active users

Participants 2, 5 and 9 form this group of users. Here participants 2 and 5 do not use wikis actively. Participant 9 has two wikis related to his projects, and he is a consumer of information, but does not contribute content (See 5.2.1).

In this group, participants 2 and 5 felt that oral communication and other mediums they currently use are sufficient to meet their needs. They do see the merits of using a wiki, like being able to store information in a common place and being able to spread knowledge more.

But the important difference here is that, the current systems are not seen as in-adequate. This, we believe contributes to having low 'felt need' (See 3.3.1).

The users also displayed a skepticism on the value of the content, and skepticism on whether the information would be kept up to date. This affected the perceived usefulness of wiki adversely (See 3.3.1). Those who harbored the skepticism showed less enthusiasm for the wiki.

When we come to the cost versus benefits of wiki, both participants 2 and 5 think the efforts are very high. And they do not see as much benefits to compensate the effort. Here, the users dwell more on the initial effort required to reach a 'critical mass', which is sometimes seen as insurmountable. Also, keeping the wiki updated is seen as a huge task requiring a lot of time and effort. Hence we find that there is a higher perceived cost than benefits (See 2.3.1).

When we come to 'resistance to change' (See 3.3.1), we notice participant 2 preferred oral communication and thought that it was necessary to maintain the bond with colleagues. Also that he wouldn't want to comment in a forum compared to going over and talking to a person. This may be due to a resistance to change. We also believe that in this case, it may be a personal preference, highlighting personal differences (See 2.3.1). We also notice participant 5 stated that all his information needs are met by oral-communication, e-mail etc and he does not require a wiki. In this case, we believe, the reluctance to change from current ways of communicating could be more explained by low felt need.

When we come to participant 9, he is involved with two wikis. But he feels that the wikis do not have information related to his work. This we believe affects the perceived usefulness of wikis. And he is dissatisfied with the structure of the wikis he is using and says that this affects his willingness to contribute to the system. He interestingly wanted to measure the benefits from the wiki, compared to the costs. He says that if he could be convinced that the benefits were higher, he would put the effort.

2 Active Users

Participants 3, 4 and 8 form this group. Participant 1 also falls into this group, but since the interview conducted with him was intended to get an overview of the organization and tools, we do not analyze his comments here. All participants use wikis to meet their information needs and also contribute content (See 5.2.1).

Users in this group do not feel that oral communication or the other mediums are sufficient to handle their information needs. While users do not think that wikis would or should replace oral communication, they do believe that wikis are an essential complementary system. The need for wikis stems from the experiences of the inadequacy of the other mediums. Examples are difficulty of managing and searching for information in e-mails, loosing e-mails and difficulty of searching for information in the document management system. There is also need for meeting goals which are not met by the systems like e-mail. Example is being able to store information in a common place, accessible to all with better back-up. All these point to existence of 'felt need' (See 3.3.1). We find that there is clearly high 'felt need' for a wiki-style medium in this group of users.

Going forward from 'felt need', if some needs exist, users should believe that a particular system would be able to meet those needs; in that case the system would be perceived as useful (See 3.3.1). We see that the nature of felt need here and the capabilities of wiki directly co-relate. Here, the needs boil down to; need for a common place to hold information with central back up, ability for all users to add and edit content and being easy to search and find information. All participants believe that the wiki meets such needs (See 5.2.1). Hence, the wiki is perceived as useful (See 3.3.1).

If we consider the cost versus benefits of wiki, we can also see that users believe that the cost is compensated or outweighed by the benefits. Participant 4 thought that it requires some initial effort to set up a wiki and create a 'critical mass'. However, this effort was not seen as huge and would be compensated later, when there is a wiki with useful content. The wiki is believed to make work more efficient and help save time. At later stages of maintaining a wiki, users also think that the effort required updating and maintaining the wiki is not huge and the effort produced some benefits (See 5.2.1). We find that these aspects point to the existence of higher perceived benefits than costs (See 2.3.1).

3 Contrasting active and non-active users

We contrast the active users and non-active users to arrive at our findings for this section.

Active users showed high 'felt need' and high 'perceived usefulness'. They also thought that the efforts of creating a wiki will be compensated by the benefits.

Non-active users showed less ‘felt need’ and ‘perceived usefulness’ compared to the active users. Also they believed that the benefits of wiki are not considerable enough to take the efforts.

The difference in the attitudes of active and non-active users regarding ‘felt need’, ‘perceived usefulness’ and ‘the cost versus benefits’ point to the plausibility of these factors influencing resistance to wikis. Hence we find that ‘felt need’, ‘perceived usefulness’ and ‘perceived costs versus benefits’ contribute to user resistance to wikis.

A ‘resistance to change’ could be noted, only slightly, with only one participant, and combined with personal preferences. Since we have not studied personality differences deeply we believe we should not make any further conclusions on this factor.

4 Personality differences

Apart from the differences in the degrees of ‘felt need’ and outlook to the cost versus benefits of having a wiki, we believe there may be personal differences among the users as well. In order to bring out this aspect, we compare some of the stands and statements of the active and non-active users.

We noticed that some users are more enthusiastic towards exploring new systems. For example participants 3 and 4 took initiatives, not only for introducing wikis, but other systems as well. And these same users also put the initial efforts to get the wiki set up and gain momentum. They talked about how they spread the information of the new systems among their colleagues, how they had to win users for the new system etc. These aspects point to personality differences. Participant 7 also mentioned how when there is a ‘felt need’ in a group, it is some of the users who articulate it. He also mentioned how participant 4 took the initiative for their group.

However, we did not undertake a deep study of such personal differences: personality traits, cognitive styles and demographic variables, and hence, do not attempt to explore it further. Still, we believe that we can conclude personal differences exist.

6.1.2. System / Design Factors

In this section, since the users themselves are not on focus, we do not segregate the analysis into two user groups.

When it comes to the design of wiki all users thought that wiki was simple and easy to use (See 5.2.2). As such the perceived ease of use was high for wiki.

We also notice participants stated that the other tools like the document management system and X-Coll were not easy to use. It was difficult to search for and find information. Participant 4 stated that this was one reason for adopting wiki. Hence, we believe that the perceived ease of use, contributes to the 'felt need' for wiki (See 3.3.1).

We believe that the 'perceived ease of use' in itself is an important factor that could contribute to resistance. But in the case of wikis, since the perceived ease of use is high and acknowledged by all participants, we believe that this factor gets evaluated by users only if there is a felt need and when they consider the system to adopt.

Literature suggests that other characteristics of wiki, which make maintaining uniform data quality and creating structures difficult, are factors of high relevance (See 3.3.2). We continue to the empirical findings on quality of information and the structure of wikis.

We see that the participants thought that keeping the wiki updated was difficult. Participant 2 thought that users would not update the wiki enough. Participant 4 mentioned that it was not 100% accurate. For example if parts of the wiki are not used currently, those parts would become out of date. But participant 4 said that the parts that are currently used were up to date and it met their needs. And anyone who notices any in-accuracy, they could update the information. Participant 8 said that it depended on what you are looking for. From this, we understand that it was difficult to keep a wiki 100% accurate all the time. However participants 3 and 5 thought that the information was up to date. But participant 9 feels that there is not much information related to his work, in the wikis.

From this what we understand is that the inherent nature of wikis causes it to have information of varying quality. The parts that are heavily used tended to be accurate and the other parts not so accurate. Hence, as we have understood from the nature of wikis, the quality of information depended on how much the system was used and how much users contributed. These aspects conform exactly to the data quality problems mentioned in our theoretical synthesis (See 3.3.2). Also, if users do not find the information they are looking for, it affects their use. For example, in the case of participant 2, his perception of data quality is affecting his outlook to wikis. In the case of participant 9, not finding the information he needs, affects the usage. Whereas, participants 3 and 4 use wikis with active users, and

believe that their information needs are met, since there are several users and the information is up to date.

From this we find that the quality of information in the wiki is an important factor that influences usage or resistance of wikis.

When we come to the structure of wikis, Participant 8 thought that the wiki should have a structure and it should not be hap-hazard. And Participant 9 thought that the structural problems affected his use of wikis. A defined structure made it easier to navigate and find specific information (See 3.3.2). Even though only two participants pointed out the structural problems of wikis, we believe the problem stems from the nature of wikis (See 3.4.2) and is a potential cause for resistance. Participant 6 also mentioned that the structure of wiki needs to be defined and improved, in order to make it an organization wide wiki.

And overall we find that the 'system characteristics' is an important factor that affects usage. Hence, the characteristics of wiki, like the difficulty of keeping it up to date and difficulty of maintaining a structure are factors that we believe contribute to the resistance to wikis.

6.1.3. Organization / Environment Factors

We first look at the role of management support in the success of wikis. We have to note a number of factors in order to get a clear picture of the management's role (See 3.3.3).

Most users preferred bottom up approaches to the initiative for a wiki. They did not prefer the managers to provide the solution or monitor the usage.

This did not mean that managers had no role to play. In fact we believe it is a delicate role. The areas that the management needs to give attention to were found to be the following. These factors were found to influence the usage of wikis (See 5.2.3).

When it comes to training, participants did not require a 'technical training'. The fact that the wiki environment is familiar to most, combined with the factor that all users were technocrats, it was not necessary. However, Participants 8 and 9 mentioned that users added content in a haphazard manner without any structure and it made navigating difficult. This, to an extent deterred the usage of wikis. When queried further, participant 8 also said that, it would be good if the managers conducted 'training' for the users on creating appropriate structures and maintaining the environment.

Not only that, if the wiki is expanded, the managers harbored concerns that sensitive information would be placed without any protection (See 5.2.3). This was preventing even the conceptualization of an organization wide wiki and also a more comprehensive wiki including information on management activities. It was noted that if the management takes the initiative to improve the structure, as well as provide training on what sort of information was sensitive, it could benefit the growth of wiki into an organization wide solution.

Another area of support was that the managers should make clear how important the wiki was and how important the efforts put for the wiki was (See 5.2.3). Right now, many of the users did not consider contributing to the wiki as part of their 'tasks'. Tasks were project related and priority went to that. Hence, outlining the priority of the wiki would increase its usage. We also note that especially the non-active users, participants 2, 5 and 9 felt that lack of time was a problem. And also that priority was given to projects and time is not allocated to tasks such as updating the wiki. But participants 3, 4 and 8 thought that wiki saved time. They also feel that managers support the wiki.

These findings help us conclude that management support is an important factor and lack of management support could lead to resistance of wikis. However, the forms this management support should take should be carefully studied.

In our theoretical synthesis we looked at the possibility of management control for the sake of protecting intellectual property (See 3.3.3). We find that this indeed is a concern here as well, as mentioned by participants 6 and 7 (See 5.2.3). Protecting intellectual property and when using open source solutions, not having the opportunity to complain to a system support about security problems, were concerns that were mentioned.

Users in fact thought that for an organization wide wiki or a wiki with large number of users, there have to be restrictions, or a master, or a way to manage the wiki (See 5.2.3). However, users preferred this to stop with restrictions in order to maintain the structure of wiki. Further levels of control, like content monitoring, was not preferred and was thought to adversely affect usage. Users think that they are responsible and there is no spamming in the wikis (See 5.2.3). Moreover, while users thought that the access control in X-Coll was necessary, they also thought that it was only good for management. The restricted nature of X-Coll adversely affected its ability to act as a knowledge capturing tool. For knowledge capturing needs wiki was thought to be the better option. Not only that, none of the users wanted to introduce management related information into wikis. They believed that they should be kept separate.

Hence, introducing more restrictions into wiki would adversely affect its use and intended purpose. We believe this is in accordance with the literature which suggests that management control results in users resisting wikis (See 3.3.3).

From this we conclude that higher levels of management control could lead to user resistance. Again, the nature of control that would lead to user resistance must be carefully studied.

The size of groups and nature of tasks (department / organization depending on the context) were pointed out as critical factors (See 5.2.3). We did not consider these factors as part of our theoretical synthesis. While non-active users like participant 2 and 5 pointed out that the size of the group or the nature of their task reduced the relevance of wikis, active users like participant 3 and 8 also commented that people used wikis depending on the nature of task or if they have to communicate with offshore locations etc. For a small number of people, other mediums of knowledge sharing were found to be sufficient. Hence, a critical size exists which tips a group from low need of wiki to high need of wiki. However, we could not explore what this size might be. But we believe this can be better gauged by the 'felt need' in a group.

We could not find any substantial evidence for co-worker behavior directly influencing resistance (See 3.3.3). Still we can say that co-worker behavior in terms of some users' contributions influencing the perceived usefulness exists. Because when some users contribute the initial content, it leads to quantity and quality of conduct which in turn influences perceptions about the system (See 5.2.3). But this is an indirect application of co-worker behavior.

6.2. Summary of findings on factors

The summary of our empirical findings and how the factors affect each other is detailed in table 6.1.

Table 6.1: Summary of Findings

User Resistance
Lack of Felt Need
Felt need was found to arise from needs like a common place to store hard to document information, access such information easily, larger group size making oral communication harder, nature of tasks and current systems being inadequate to meet such needs. We also

found that a lack of such needs contributes to resistance to wikis.
Low Perceived Usefulness
The perceived usefulness of a system is determined by the nature of felt need. The system should be able to meet felt needs in order to be judged as useful. Low perceived usefulness contributes to resistance.
Low Perceived Benefits Compared to Costs
Users judge the efforts versus the benefits of using wikis. Drawbacks in system characteristics could lead to higher perceived costs. If the efforts are perceived to be higher, it results in resistance.
Lack of Perceived Ease of Use
Users evaluate the ease of use of a system if there is a felt need and the system has the features to meet those needs. In the case of wikis perceived ease of use was found to be high. However other system characteristics affect the wiki.
Drawbacks of System Characteristics
Drawbacks of wiki, like difficulty of maintaining data quality and structure, contributes to resistance to wikis.
Lack of Management Support
Users prefer management support in the forms of trainings and prioritization of wikis. Lack of such support contributes to resistance to wikis.
High Management Control
The nature of wikis makes them less secure for sensitive information and this could result in management control of wikis. Management control like content monitoring and restrictions on access and usage could lead to resistance to wikis.

6.3. Further Discussions

In this section, we look at the possibility of different stages in the life of a wiki. Since we would like to follow the life of a wiki, we only look at the successful wiki and its users. However, we must point out that this warrants an in-depth, longitudinal study, and what we present is only constructed from the statements of three users who were present from the start of the wiki.

We believe that our context is characterized by the bottom-up approach in which wikis were introduced. Also, this was possible since it was technology related company and users were all technical engineers.

In the life of wikis here, we believe that there are three stages. We derive this mainly from the statements of participants 3, 4 and 7 See (5.2.1 and 5.2.3). Participants 4 and 7 were involved in the introduction of one of the successful wikis. They mention how the wiki was introduced. They also mention that at the time it was introduced, there was not much contribution from users. Providing the initial content and structure of the wiki was carried out by participant 4. Participant 3 also mentioned that when the wiki was introduced, there were not many users. Then participants 4 and 7 mention the steps they took to spread the use of the wiki. Participant 4 encouraged other users to contribute content and update the wiki. They also state that once there was some information and other users saw that it was useful, more users started updating the wiki. Participant 3 also mentions that this happened.

From this we can see that at first, the wiki was introduced by a small number of users. Participant 7 especially mentions that the need was probably felt by all, but it was participant 4 who found the solution. We believe that this stage can be called as the inception stage.

Next, we see that not all users started contributing content to the wiki immediately. The users who introduced the wiki had to create a critical mass of content. However, we cannot tell if any other users did contribute. What is clear is that the number of updates to the wiki was small. We believe this is another stage of the wiki and we call it the early adoption stage.

Next, once the critical mass of content is created, we see that more users started updating the wiki. Participants 3 and 4 mention that it took a long time before this stage was reached. But once, the wiki developed some useful content, more users contributed and it in turn increases the usefulness of the wiki. We believe that the wiki reaches a level of maturity at this point, and call this the later adoption stage.

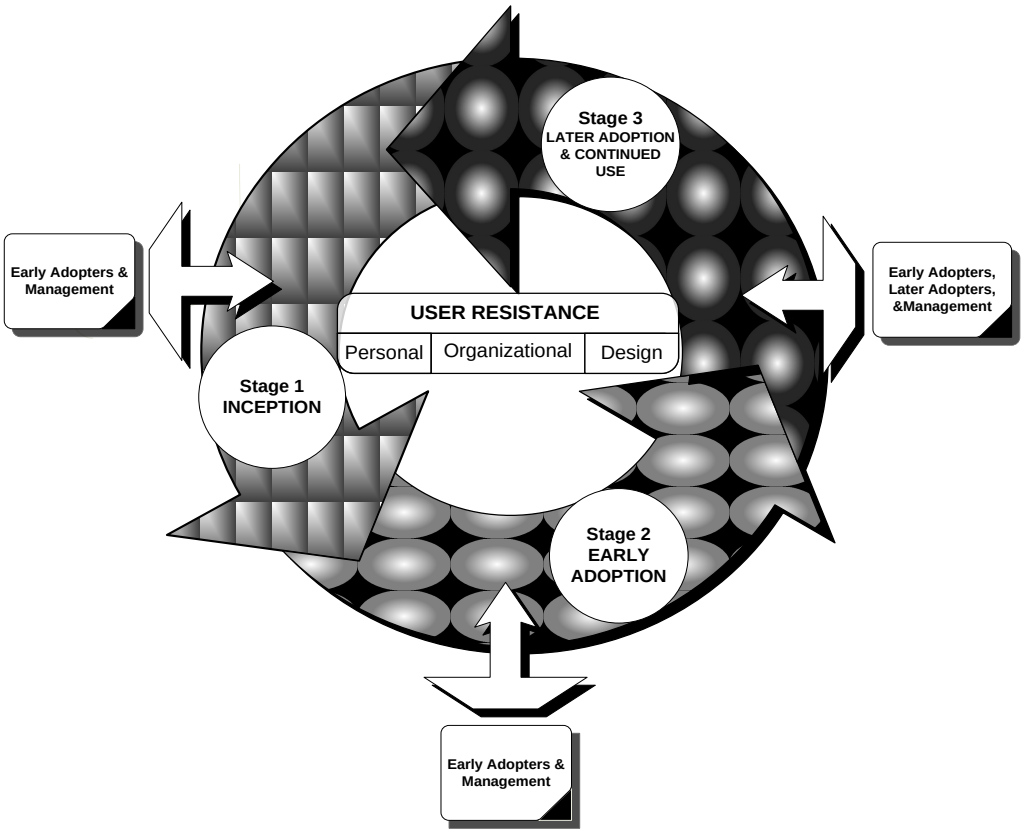

Figure 6.1: Model Diagram

Table 6.2 summarizes the stages and the different user groups of the life of the wiki, found in this study.

Table 6.2: Stages of the Model

Stage 1: Inception	People group: Early Adopters & Management
Felt need, Perceived usefulness, Perceived ease of use, System characteristics, Higher perceived benefits compared to effort required to set up system, Personal differences Management Support	Initiative and Inception of the system
Stage 2: Early Adoption	People group: Early Adopters & Management
Felt need, Perceived usefulness, Perceived ease of use, Higher perceived benefits compared to efforts to maintain the	Early adoption and Use of system

system, System characteristics Management Support	
Stage 3:Later adoption and continued use	People Group: Early Adopters, Later Adopters, & Management
Perceived usefulness, perceived ease of use, Higher benefits compared to effort required to update, System characteristics Management Support & control	Larger Adoption

Next we look more closely into each of these stages.

Inception:

We believe that 'felt need' plays an important role in the inception of wikis. In a bottom up approach, it is a combination of existence of information needs and those needs not being met by current systems that leads to the introduction of wikis. This felt need could be driven by inadequacies in current systems, groups getting bigger etc. (See 3.3.1).

This was validated by the users. Participants, who introduced a wiki, mentioned that in their group there was a felt need. The systems they used previously did not meet their needs.

If such 'felt need' exists, we believe it will be some of the users who take initiatives in a bottom up approach (See 5.2.1). For example participants 3 and 4 detail how they have taken initiatives. Participant 7 states that only some of the users articulate the need. We term these users as the early adopters. We believe that 'personal differences' is a factor that determines who the early adopters are.

Wiki or a particular wiki solution would be adopted by these users based on their perceptions of its usefulness and ease of use (See 3.3.1). Both participant 3 and 4 detail how they have chosen solutions based on these factors. More importantly it is the nature of 'felt need' which influences which solution is adopted. i.e the system being adopted should be able to meet the needs. For example participants felt that oral-communication did not meet their needs, so they required an information system. However, the system they had, X-Coll was not user friendly and also too formal and restricted. They saw wiki as the solution since it was thought to be user friendly or easy to use, informal and unrestricted (See 5.2.1 and 5.2.2). We can say that the usefulness of the system is determined by the needs. Hence, we find that the overlapping nature of these factors and how a factor influences another becomes clear.

The perceived ease of use and system characteristics, are other factors that are taken into consideration while adopting the system. We can also say that the perceived benefits have to be higher than the efforts required to set up the system. However, users do not conduct a methodological cost versus benefits analysis. As pointed out by Keen (1981), this is the users' judgment (See 2.3.1).

We believe that the role of the management at this stage is to provide support for the initiative. Participants 3 and 4 detail that when they came up with solutions; the managers supported them in the initiative.

Early adoption:

The same users who took the initiatives and other such users play an important role in this stage. These users need to set up the initial structure and initial content. And also maintain the quality of information. Examples are participants 4 and 7.

The quality of information was found to be of paramount importance during the initial stages. Participant 4 stated that it was essential to 'win' other users. And he also stated that having some initial content and making sure that the quality of this content was good were essential to win other users.

We infer that, after a wiki is in place, the initial content and the quality of this content influence the 'perceived usefulness' of the system.

Later adoption:

If the quality of information is kept high and it is seen to be useful, the rest of the users move from initial low levels of 'perceived usefulness' to high levels of 'perceived usefulness'. This in turn influences the users to start using the wiki and contribute content. We term the second set of users as the later adopters. But the important difference here is that these users adopt the system, after directly seeing the benefits. We believe the group shares the needs which resulted in the introduction of wikis. However, the later adopters are convinced of the usefulness of the system, only after seeing that it meets their needs. The reasons for this difference shown by users however are not clear to us. This may be due to personality differences or attitudes, but we did not enquire deep into those factors. Also, the users need to put effort to update the wiki, hence the effort required to maintain the wiki would be perceived to be lesser compared to the benefits from it.

Participant 8 describes how the users' perception about wiki changed with time. He states that at first users were depending on colleagues for information. But, later on, users started making the wiki the first choice.

We also believe that for the later adopters, management support is crucial. Participant 7 mentions how the users need to be encouraged or persuaded to start using the wiki. We believe that management support also helps users to priorities the wiki along with the project activities. We believe that the stages and the pattern of the development of wiki, as it is detailed here, was described by participant 7 in his tips for creating and maintain a wiki.

7. Final Comments

The purpose of the research was to contribute to the limited amount of literature on the use of social media within organizations. We, in particular, studied the reasons behind the failures of social media. We have used the extensive literature on user resistance to information systems to guide our study. This resulted in the conceptualization of user resistance to social media, for this study and we have adapted the user resistance factors for our purpose.

We focused on wikis as the dominant technology used in the corporate world. We also focused on the user resistance factors; resistance to change, felt need, perceived usefulness, perceived costs versus benefits, perceived ease of use, system characteristics, management support, management control and co-worker behavior. To an extent, these factors were chosen due to their importance related to social media and also because they overlap and affect each other. We have used our interpretations of these factors, relating them to the characteristics of wikis and the literature available on social media.

The empirical findings of the study indicate the strong presence of felt need, perceived usefulness, perceived costs versus benefits, perceived ease of use, system characteristics, management support and management control in the adoption or resistance to wikis. We also found the presence of factors like the size of the group and the nature of tasks, which we did not consider previously. We found that personality differences exist, but did not further study the nature of such differences.

7.1. Suggestions

From the study of the wikis in this organization, we believe a number of drawbacks have been found, which can be

Interviewees mentioned that different wikis were spread across separate departments and each wiki supported the purpose of the department that it belongs to. Any improvement or developments of the wiki was done on a department basis to match the objectives and purpose of the department. On such a basis, we believe any content development and any system improvement will be limited to a single department in the organization; hence, limiting the spreading of the benefits of the wiki in managing tacit knowledge across the whole organization.

One possible solution that we suggest to increase the usage of the wiki across the whole organization is to provide a single organization wide wiki. Taking into consideration the vast variety of information that will be added, it is of importance to stress on the fact that the wiki should be well structured to manage all the different departments and the information to be added. In order to protect sensitive information, however, we believe content restrictions should not be applied; however, access control could be considered. Trainings on managing the structure and information security would be beneficial. Through an organization wide wiki, we believe all users will benefit from the tacit knowledge found in the wiki and the wiki would benefit from the larger user base.

7.2. Evaluation and self criticism

We believe that narrowing our focus group of factors would have been better to fit the limits of the thesis. While we did gain some insights to all factors, we believe that limiting ourselves to fewer factors would have resulted in a more in-depth evaluation of each factor.

At the same time, we believe this study brings out the nature of resistance to wikis and could guide us on the focus areas in future enquiries.

The study could also benefit from a survey of all employees in the organization to understand the attitudes towards wiki. This could increase the validity and reliability of the findings.

7.3. Further Studies

In our research, we discovered various aspects of relevance to user resistance to wikis, but additional research to support our study is still required. Further study could include more users of different web 2.0 solutions from different companies worldwide. The research can be extended to different organizations with different sizes, nature of work, and cultures. For example, our study involved a tech-organization; further research should look into non-tech organizations as well. Including more organizations and users in our research, we believe would guarantee a better validation of the conclusions and allow us to achieve more generalization.

This study itself requires more in-depth research. There exists a part of this research that needs to be studied more in depth, and it is the management field - the high level managers. In our study we only focused on the views and perspectives of the users as well as the department or section managers, because we believed them to have the most knowledge and

multiple case experiences of the different social media tools being used in the field. Moreover, the short time duration that we had to conduct our research prevented us from going further into higher levels within the organization. Therefore, for further studies, the same research could be extended to include the high level management and their perspective of having an organization wide Wiki to support the knowledge management inside the organization. This would allow us to compare two different perspectives and add more credibility to our research findings.

Because we used the qualitative research strategy it was not possible to discover the relations between user resistance and some theoretical variables such as personality, cognitive styles, individual traits and demographic factors etc. To find patterns and make any substantial conclusions, we believe such factors should be studied through questionnaires and surveys including large samples of users.

A further quantitative study; therefore, could discover how such variables relate to each other and how they influence user resistance to social media.

APPENDIX A: Interview Guide

Overview Questions

In order to be able to formulate all our questions, along with the theoretical foundation, we also need to understand the organization setting, the systems that are used; in other words the context of the study. Hence, we first had a set of questions designed to get an overview of the organization, internal systems for communication, policies, culture and the likely participants. The following set of questions were designed for this purpose, to be used for the first interview and only once. The questions were also sent to the interviewee beforehand since some the questions may not be answerable off hand. The answers from this interview have influenced the formulation of the next set of questions.

1 **We would like to get an overview of the communication channels and tools used here**

With this question, we expect to be able to get familiar with the tools and technologies as much as possible. We want to explore the software in terms of ease of use etc. Being familiar with the tools would help us better explore and understand the issues users may have.

2 **Does the management consult the users on the choice of the tools?**

We expect to understand the organizational environment with respect to how much the users are involved in choosing the internal communication tools they use.

3 **Are there any content restrictions and related policies?**

Again, we want to understand the organization environment. How much freedom users have in terms of the content they can contribute. How much control is exerted etc.

4 **Do users get any training when new tools are introduced?**

We would like to know the extent of managerial involvement in the internal tools.

5 **Which are the most used or preferred tools among users generally?**

In order to select our participants, we need a prior understanding to their affinities with respect to the tools. This need not be concrete information but a general idea of the usage patterns.

Apart from the information mentioned as part of the organizational profile (See 3.2), we gained the following insights as well.

There was no organization wide knowledge management policy. There was no official content restriction or monitoring policy with respect to wikis. Wikis are ‘unofficial’ in the current scenario. This makes wikis informal. This may also be making wikis unsuitable for official and more sensitive content.

The document management system and X-Coll was considered to be not very user friendly. It was difficult to search and find information using them. This aspect made it all the more interesting for us since this seemed to have triggered the introduction of wikis to an extent.

Also, the presence of active and non-active wikis made it possible for us to interview two different set of users and contrast the situations.

Main interview questions

Following are the questions that we formulated to explore the theoretical foundation of our study and the context of use. The theoretically based questions relate to the factors that we wished to explore from each of the categories in our framework. There are questions that are meant to understand the context better as well.

All questions were not to be posed to each interviewee. Selected questions for any participant varied according to the organizational role of the participant, the usage pattern displayed by the participant etc.

Also the structure and construction of questions are expected to vary according to the flow of conversation. Where ever necessary, we also asked additional questions to explore a point further, understand the context or clarify a point.

Some of the questions in our interviews were introduced or improvised with the information we received from each interview. However, we do not detail all such questions here.

1 **What are the communication channels and knowledge sharing tools you use at work?**

The purpose of the question is to understand which of the mediums; e-mail, X-Coll, document management system and wiki; are used most by the participant. We need to understand the usage pattern in order to take the interview forward and ask the most relevant questions.

To participants not using wiki much currently:

These set of questions were meant for the participants who are currently not actively using a wiki.

2 **What are your motivations to use X-Coll / DMS / e-mail / oral communication?**

We expect to understand what the information requirements of the participant are and if the participant's information needs are met by these other mediums or tools.

3 **Have you felt any need for a system like Wikipedia?**

4 **Do you think Wikipedia is useful to have?**

The purpose of the question is to understand if there is any felt need. Whether the current way of communication is viewed as sufficient or not. Or, if the participant is satisfied with them, or feels a need for another system or way of communication including wikis.

5 **If there is a wiki, would you contribute content to it? Would you be comfortable writing to wikis?**

We expect to understand the personal attitudes of the participant, how much the participant is willing to contribute to wiki. Also, we expect participants may detail the reasons for their attitudes or choices.

To participants actively using a wiki

To the participants actively using a wiki, we asked several questions to gain more insight into how the wiki was set up and how it became successful. We had prior knowledge about two of the participants being involved in the initiative to set up a currently vibrant wiki. We were especially interested to understand if the success of the wiki constituted elements that could be replicated elsewhere.

6 **Could you detail how the wiki was started? Why was it started?**

We expected to gain an understanding about the circumstances that led to the setting up of a wiki. How much need was felt and what were the other reasons.

7 **Did everyone start contributing to the wiki immediately?**

Through this question, we looked to understand if the usage of wiki was spontaneous or immediate in this case. We also looked to understand if users started contributing to content right away.

8 **Was any special steps taken to ensure that users contributed content?**

We expected to understand if the success of the wiki was serendipity of conscious steps were taken that could be replicated.

9 **Are you satisfied with the features of wiki? Would you like to have any other feature?**

Along with the questions of design (mentioned later), we want this question to throw some light on the system characteristics that are good, bad or good to have in a wiki.

10 **Did the management support the wiki at the beginning in any way?**

We expect to understand if the managers supported the wiki in any special steps

Questions To all participants

These questions are common to all participants

11 **What is your view of the design of X-Coll / DMS ?**

This question would enable us to understand what the user's view about the design, and ease of use of these tools. We expect to be able to ask follow up questions to understand if this view affects the felt need and desirability of wiki.

12 **What is your view of the quality of the information in X-Coll / DMS?**

This question would enable us to understand what the user's view about the quality of the information found in these tools. We expect to be able to ask follow up questions to understand if this affects the felt need and desirability of wiki.

13 **Would you like any other features added to these systems (X-Coll/ DMS)?**

This question is also meant to enable us to explore the felt need and whether users think the current systems have some inadequacies which may be met through wiki or another system.

14 **What is your view of content restriction and monitoring in wikis? Will it affect your contribution to wikis?**

We want to understand if content restrictions are necessary and if there are restrictions, would it affect the usage in any way.

15 **Should wiki be a voluntary system where people can contribute according to their wish? Should wiki be informal or formal?**

We wanted answers to the questions: Do users prefer wikis to be informal? Will a formal wiki affect users' contribution?

16 **What is your view of the design of wikis? Is it user friendly or difficult to use?**

We wanted to understand the perceived ease of use of wikis and whether that contributes to the adoption and use.

17 **Do you think the efforts to set up and maintain a wiki is worth its benefits?**

The purpose is to understand how users compare the efforts and benefits and if that leads to resistance of wikis.

18 **What is your view of management support for the wikis?**

The purpose is to understand if the managers have supported the wiki and also what do users expect from the managers in terms of support.

APPENDIX B: Analysis Guide

In order to conduct the analysis, a coding scheme was developed. The codes are related to the factors that were selected to study. We have also introduced codes to analyze the emerging findings from the study. These are given below

FN	Felt need
PU	Perceived usefulness
PCB	Perceived cost versus benefits
RC	Resistance to change
PEOU	Perceived ease of use
SC	System characteristics
MS	Management support
MC	Management control
CB	Co-worker behaviour
PD	Personal differences
NT	Nature of task
GS	Group size
ES	Existence of stages

APPENDIX C: Interview 1 with Participant 1

The interviewee is currently a tester at the organization. He has worked in different positions such as line manager, but he believes being a tester is the work he enjoys. He has used Wiki quite much for storing information.

This was the initial interview conducted to get an overview of the organization, the communication tools used, and about the use of wikis.

	Q: Could you give us a brief description of your background here?
	A: I have been working as a tester and just until recently I have been a line manager and I have been a project manager. At the moment I am a tester again because that is what I think is really fun.
	Q: We would like you to give us an overview of the different systems and communication channels that are being used at the department?
	A: What we have used until now, lately, the last couple of years when I have been a line manager, we have a Wiki that we are using quite much for storing information as everybody can store whatever they want and then of course there is email. Email is the main one I would say, then depending where you draw the line; for example, as a line manager there is a lot of meetings and face to face discussions. That is not really a system, I guess, but we have quite a much of meetings. All products have their homepage and we have famous DMS for document handling, system where you can store things but you can't find anything.
	Q: Can you tell us more about DMS?
FN	**A:** What it is basically is that it is a good thing to store things in; however, as I said you can't find anything so if you don't have a homepage that lists the information or you know the product number or something you can't find it. You can't even find what you have written yourself. And this DMS is used within Y-COMPANY, and it is good in some part, easy to work with when you have the document. But to find the documents and find the information you need to search within this system or you have to go to Wiki or X-coll that is Y-COMPANY's in-house tool basically the same as Wiki. But of course Y-COMPANY invents tools by themselves and uses that!! So basically you go to those pages but I would say that 90% of the information I need I get by email.
	Q: But don't you have a system for communicating between one another or you just do it by email?
	A: Email
	Q: Because I thought you had X-coll?
	A: Yes X-coll we have , but it is for the project management and some lines has X-coll and use it for storing, I will show you it later on so you know what we are talking about, it would be easier for you to understand. But then we have clean Wiki, I mean downloaded and installed here which I used within this department, and there is basically where everybody gets the information.
	Q: So it is from Wiki not from X-coll?

SC	**A:** Yes because Wiki I am allowed to change myself so if I think something is wrong I can change it.
	Q: And X-coll you can't?
	A: No, Maybe I can but is much harder at least.
	Q: It is not user friendly you mean?
	A: Maybe, but basically I already used Wiki before X-coll got here.
	Q: So first came Wiki and then came X-coll? And didn't X-coll change anything to make the user start contributing to it?
	A: Basically it is like this, within Y-COMPANY, the order from above is that we should use X-coll.
	Q: You mean from top management?
SC	**A:** Yes from top management, but we know that X-coll is just for a short while, because sooner or later Y-COMPANY will say "hey you have to have your own". And we need to like log in to another account to reach X-coll, so it is always that I need to do three or two steps to just get there. The Wiki was not allowed but we had it already and it is the one that everybody uses within the section. Like if I came and I asked where can I find this software and where can I find this, the answer will always be Wiki, you will never hear people saying X-coll, because there is much more structure, it is in a way more clear in X-coll but since it is much more clear there is not that information that I need as a user because I need these specific things. X-coll is good for management not for the testers and engineers I would say in many sense.
	Q: So when they needed a tool they just made X-coll and gave it to you without consulting the employees of what they need, the user interface and what they prefer?
SC	**A:** No. It was basically a bit of Wiki. But of course with some other layers and how you are restricted to add and renew things, because it is always in this kind of companies, there is always someone who owns this page, and this person need to tell who else or allow to do changes. In Wiki it is basically you can do whatever you want and this is what it is the only place I feel it is still living, things change, procedures, how to do things change and people do it and update it
	Q: So basically there are two communication channels, X-coll and Wiki? X-coll is the official channel but nobody uses it, they use the Wiki?
	A: Nobody but the line and management uses X-coll; it is where you go to find time line, box planning status reports and stuff like that, but to find the things I need when I am sitting in the lab I go to Wiki.
	Q: Is the wiki likely to get faced out because it is not official?
	A: No, it is not likely to be faced out, if you go to other departments they will not likely have Wiki, it is not as undercover as it has been. It is a little bit the Y-COMPANY way, doing things that is not really allowed.

	Q: The two systems are they only for downloading documents or is it also for communicating between each other?
	A: It is only for downloading documents and spreading information, we have one more system when it comes to communicating, we has this Microsoft communicator... I will go and get my computer to show it. *After 40 seconds, he came and showed us the Microsoft Office communicator and mentioned,* People are using it from time to time, especially the line managers where they use it on meeting as they have the possibility to check with people who are not on the meeting and get fast response, the problem is that I don't have that many names added! But it is a good way to show if you are meeting or not or on vacation. *After that he showed us the Wiki and the X-coll.*
	Q: But is there any restriction for viewing different documents? Is that why they have the log in? Or is it like an open source tool?
	A: The documents are still within Y-COMPANY and yes there is most likely a restriction to which documents we are allowed to see when we are logged in. But there has been restriction even before, and this is stupid that we are basically a third party looking into their system in a way. But of course we are 50 percent owned by Y-COMPANY and that is why we are allowed to login.
	Q: Sorry is this the home page for X-coll?
	A: No this is actually the XY-COMPANY page to log in to Y-COMPANY page. *He showed us X-coll saying* Here I can't really do much myself, lets say if I want to add things I can't do it
	Q: Is it hard to navigate the user interface?
MC	**A:** I actually don't have rights to do it, it is that simple. I need to ask for it if I want.
	Q: So you don't have the right to change or add, so if you want to add the document you need authorization, so they need to check the document before adding?
	A: Well no, they need to check if I am trustworthy, basically X-coll is for management to inform what is happening within the project, it is not for me to add whatever information I want, and that is also as far I have understood, it could be that I have totally misunderstood.
	Q: So there is policy on the content?
	A: Yes
	Q: So there is basically no official tool for wiki, like collection of information?

	A: No because I guess the plan has been, and there has been a discussion here that the line should have X-coll where they allow all the users or the members of the line to add whatever they want. But since I came from the wiki, I stuck to it and there everybody is allowed to do what they want. *Showed us more about Wiki and X-coll.*
	Q: Since you set this up, what is your impression of the people's usage of it?
SC	**A:** Maybe not that much usage of it, because they are not really used to it and since they are working really close together it is much mouth to read information, but if you go to the other corridor, everybody is using it, so it is every bit depending on who you are talking to. If you talk with X sitting in this corridor, he has his own wiki page, where he add up everything he does and what he does, so if people want to know what he is doing they can go direct to that. And I think looking at it to the future it will be this one surviving because this is the kind of information that is needed for the daily work. I need X-coll from time to time to which deadline is it and where is the status of the project and this is much more up in the organization and more for the upper management. For me I need to know how do I download a new software to a phone, and in wiki it is found much faster.
	Q: Are the documents that are found in X-coll the same as the ones in the Wiki?
	A: From time to time yes, but the important stuff is that basically, what X-coll and wiki do is that they link to the DMS. *He showed us through DMS how you need to find the document after looking it up in the X-coll.*
	Q: So X-coll only gives you the reference of the link?
	A: X-coll gives you 99.9% a link into DMS to open the document.
	Q: So if you click on it through X-coll it will open the document?
	A: Yes it will open document.
	Q: Is there any way through X-coll where you can access you email?
	A: No there is no way to access the email through X-coll.
	Q: When X-coll came to usage did the employees have any training?
	A: Not that I know about, there might have been some, but I don't think anyone in this floor has participated in any training. It might be so that they have done some but I don't know any that we have participated in any because basically we don't have time for it.
	Q: Do you think that if the management gives more training sessions and listened to what the employees want, X-coll would have been used more now?

	A: No I don't actually, because I think it is used quite alright within the projects and within those line that needs to inform others of status of these projects. I don't think that X-coll in that sense at least not to my understanding have been really meant for me as an engineer, say, this are the things that are wrong at the moment. It could have been so but then it would be open for everybody to change and access.
	Q: If they gave more training to the employees, wouldn't it be more beneficial?
	A: But if you don't have access to do anything you will never use it anyhow!!
	Q: Maybe there are some options that some users don't know about?
SC	**A:** Well it might be so, but we still have Wiki and it fulfills everything and it is for free.
	Q: But isn't X-coll the official one?
	A: Yes, but as I said it is official for a short while, I expect it to be replaced by something, because we need to log in to another system to enter X-coll. And the official if you ask in this department which has approximately 200 people there will say that the official one is wiki because it is packed up and most of them use it so it has become more and more official. All this was already there when X-coll came, and for a new system to really beat the old it needs to be at least much more user friendly. I think X-coll is good for the projects because the project information there is good, but for the user that might need specific things, like I need my own page where I collect all the things that I have but I don't want to shout it out to everybody, I want to shout it out within my group. You can do that in X-coll as well but in Wiki there is a common understanding that this is nothing you communicate with the management for instance. X-coll for example, it is only the top 50 of a search that this system show. So if you don't have the full number you cant find the document and there is quite a lot of numbers and you should find the right one. And if that is number 51 you will not find it, and this is why you can't find anything you want.
	Q: About the wiki, you mentioned that people in one corridor of the department are using it, but not the other. What do you think might be the difference?
	A: The difference is basically the people. If you go back two years from now they didn't know it existed, they didn't know they were allowed to use it, and that is basically the main reason. I know that X-coll worked good for some of them and you might want to talk with them.
	Q: Does the management support X-coll? Do they recommend using it more?
	A: When it comes to Wiki there is a decision on end of last year basically that this department can use Wiki for the line, the project has X-coll. All the information the line wants to share is in Wiki and that is a decision, and the reason for that is basically due to that we were three people that met six people. We said that we will use Wiki, management can take whatever decision they want but we will stick to this because it is working and people think it is really really good. And as I said everybody expected X-coll to be short and changed after a time, and then why would you move into something that is a little more complicated than the Wiki.
	Q: How long has X-coll been on the system?

	A: I think it came, maybe beginning last year or something like that; a little bit more than one year.
	Q: And the wiki?
	A: Wiki was here when I started 2007, so it was widely spread over the net, when I came the first thing I did was to ask "where can I find this? " Everybody answered the same thing "search on the Wiki"
	Q: Do you think if the management contributes more on the wiki that will be better?
	A: It depends which kind of information you would like to have, as I said for time plans and so on I can find that on Wiki as well …. *He showed us time plans in X-coll, and it showed up that the information was out of date as he said*
	Q: So the information is out of date?
	A: Yes, and the reason for this is that a person here, has the authority to update but she hasn't really been interested, and X too should do this but he is the test project manager he wont have time to do this when there is too much to do, and the difference if I see something that is wrong I can log in and do changes in Wiki but in X-coll only some people are allowed to change.
	Q: So the management asked about your opinion regarding X-coll and Wiki and still they didn't do any changes to X-coll to improve?
	A: But X-coll we don't own, X-coll is an Y-COMPANY tools and Y-COMPANY is the one that owns it. It is basically like saying I like BMW but I am driving a Toyota at a moment and I cant do much but change the color. I think actually even with everything I am saying still X-coll is still a good tool for the purpose that we are using it for. We have two different systems, one system is for daily use and one is to inform the status of what we are doing and I think that is quite difficult to have it in one system. Because one you want to have it a little bit chaotic, I mean people want to change and move and add and so on. It might be hard to find things if you are not used to be within the system. I was working in lab for the first time two weeks ago and the first thing I asked was how to flash and directly someone showed me the links how to look on the Wiki to find the information, no one knows how to find it in X-coll.
	Q: If there are more training session on X-coll would it be more used because what you said is that nobody knows a lot about X-coll?
	A: No but if you ask me, I don't even know.
	Q: But for engineers they can say they are happy with wiki and they don't really care about X-coll?
	A: Yes, and I think you should have a meeting with someone working with regression test because they use X-coll.

End of Interview 1

APPENDIX D: Interview 2 with Participant 2

The interviewee has been a tester and a consultant; however, currently he is an object leader. As an object leader, he performs project planning tasks. He uses different means and tools to manage knowledge and information in his department but he is not currently using a wiki actively

	Q: Please give us a brief description of your background, to have an idea of what your background in XY-COMPANY was
	A: Yes, I started in Lund, Engineering Physics, and when I was finished with that, I wrote my thesis, up in Linköping, for the Swedish defense agency. After that I started looking for jobs, and I got hired by a consulting company called Cybercom. My first job was as a tester, testing Y-COMPANY former EMP platforms, just over at the road in another complex. I was working as a consultant for Y-COMPANY Mobile Platform 2005. And then, from there, I moved on, changed a couple of positions, eventually I got hired here as a consultant, in this building and also within test. Then I worked as a consultant here for a year or two and then I got hired by Y-COMPANY. And I have been working here as an employee since 2007.
	Q: Basically, we are trying to understand the knowledge management systems in an organization and in a previous interview we understood that there is X-colll and a wiki and people also use e-mail. So since 2007, what are the communication channels you have been using?
	A: I would say it is, for the vast majority, I get my information basically orally, sitting down with colleagues in the lab for instance. That is definitely the major part. X-coll, of course I use it everyday, but that is mostly to check up on very rigid things such as 'ok here is software versions', label of s/w that we are supposed to test or the 'status of the s/w label is like this' etc. That we can see in X-coll. But you don't use X-coll to improve your skills when it comes to 'how the base station communicates with the mobile' etc. There you use oral where you go over to people and talk.
	Q: But you don't use a wiki? Because, Participant 1 stressed that in his department they use wiki much more than X-coll?
NT	**A:** He comes from a slightly different department than me and they have been using wiki with great success I would say. A lot of people have used it and they have put up tips and tricks etc in the daily work, on the wiki. We have tried to do that in my department, but it has not been a great success, I can say it. I think it is because we tend to work together much more in the day to day work, whereas in the department where Participant 1 is from, one tester sits down with one problem, and the other tester sits down with the other problem, so they are more isolated. In my group, its always some kind of team work I would say.
	Q: So basically you communicate orally and also use X-coll?
	A: Yes, that I would say. I use wikis sometimes but I don't use it every day, let's put it that way. Orally, I communicate a lot, say every day. X-coll, I am there every day checking up on things, but, there you get information about very rigid stuff, for the projects.
	Q: Have you felt that you need a system like wiki, say, to look up on things easily?
FN PCB	**A:** Yes, I can see, I can definitely see the benefits. I mean there are pros and cons. Some things are really good to put in a wiki. But other things perhaps are not so good. It also takes a lot of time to write it down and write it down in a good way. So I think a wiki takes a couple

	of people to get a critical mass, so that people start using it. I mean, one person writing down what he thinks is important, is not enough. You need three or four people who help out together. So that has to be something that is decided. Otherwise I think there is a risk of a wiki being just for a couple of people, and they use it a lot, but the others are not into the wiki.
	Q: If you think of a wiki for your team, who do you think should start such a thing or take the initiative to spread the use?
MS	**A:** Ok. I think definitely the team members. The people working with it day to day, but they need to be supported perhaps a bit, from management. So that they feel that they have time to sit down with the wiki for an hour when it's needed.
	Q: I wanted to ask you, what is your motivation to use X-coll? What benefits can you get from it?
FN	**A:** I would say, I mean, it's very official. Yeah, you get the official information from there. From X-coll, if you are in charge of a certain project, for instance, there is the team leader for this group. Then I go and talk to him. And also the status on a high level, where in the validation process is our software right now, etc. Then you go to X-coll and have a look. I would say, now am working as an object leader, so am into the administrative stuff right now, but I have been a tester before, so I know how it is to be a tester. As an object leader, I use X-coll everyday. But as a tester, I did not. I used it perhaps once a week.
	Q: What is your comment on the quality of information in X-coll?
FN	**A:** Yes, varying I would say. I would say for some things it's good, because there I know the information is up to date, and I perhaps also know who has put the information there. So I know it's someone that does this every week and its good stuff that he puts up. I can trust his information. If I go outside my normal territories on X-coll, for instance, if I have a look at another project to see how it is going, it might be that they have not updated their error page for weeks
	Q: Last time, we were shown some information on X-coll that was completely out of date, what is your opinion about that?
FN	**A:** I mean that's a problem. I only use information that I know that I can trust. So, I mean, I have been to the person updating this specific X-coll page and I know that, ok he puts the relevant information there every week. So I can trust that information and send it to my testers etc. We can use that information.
	Q: So you check the information and then go to the person in charge of the information and check with him directly orally?
	A: If I have more questions etc. yes, that would be the way.
	Q: Do you think that's a bad approach for using X-coll? Or you have no problem with going and checking?
FN	A: I think the problem with X-coll, I guess, is that it takes someone to manage the page all the time and the persons assigned to that is not their main task so it always falls behind a bit. If you want to use X-coll, I don't think it should be used as a wiki or anything like that. I mean its good enough for this formal information. Of course it's not good when a page is from January, we are almost in May. But I think that's bound to happen if you don't prioritize it. So it's a trade off. I mean, you could make X-coll being always up to date, but then people would

	spend an hour everyday just updating their X-coll pages with the latest information. And that would not be efficient in the long run. So you have to just weight it in
	Q: But it would make the users trust the system more?
	A: Yes, definitely.
	Q: If the information is always out of date, users will be scared to use the system?
	A: Yes, that's true, but that is part of the trade off, that we have chosen not to spend that much time on it basically. Then it would have to be stressed from management that it is vital to the project that this information is always up to date.
	Q: Going to wiki, if there is a wiki like knowledge management system, do you see yourself contributing? Would you be comfortable to write?
PD SC	**A:** Yes, definitely. I mean I like writing, whereas a lot of my colleagues do not. So I think some people do not find it so hard to sit down an hour to write down something. But some people are really opposed to it. As they think "I don't want to put that down in words and its obvious how it should work etc". So there is a problem. That the people with the knowledge are perhaps not the people who like to sit down and type it down into a wiki page. And that is why I walk out to the lab and ask them.
	Q: Do you think, having a forum integrated to the wiki where people can ask questions and the answers will be visible to others as well, this might work better?
PD FN PU PCB	**A:** Perhaps. That I have never tested. Perhaps it could work out. But I think, I mean the environment we have now up on the fourth floor is that we have the wiki, but it's oral I would say, that you walk around and talk to people. And of course the drawback is that yes, then, you don't share the knowledge to that extent. But we have a bond, I mean, you get a personal… I mean you talk to the developer regarding something and yeah you have a personal bond with that guy and you can ask him questions later on. I think that is also very valuable. Instead of just sitting and looking at old wiki pages because things happen so fast that even a wiki is out of date in three months, the information is changed. So it's hard to find a good trade off between. I mean oral is the fastest way. Wiki in between and X-coll at the other extreme, I would say.
	Q: What features might you like to add to X-coll to support your daily work?
	A: I think, I mean, the crucial thing with X-coll would be its update frequency. If there was something, say in a project that had the task to always keep it updated, to go, I mean, almost like a journalist, walk around different (people) in the project, and ask, what is your status, what is your problems, your latest information, where can I find your monthly reports, everything and keep that updated. But that is a half time job I would say. Or full time.
	Q: What about e-mail, if there was integrated e-mail in Ercoll would people use it more often?
	A: It is a trigger for using it more, but on the other hand it would cost that person.
	Q: I ask that because you said that you would prefer to have an oral conversation with your colleagues rather than sending e-mails. So even if this was found in X-coll, would users prefer it or would they prefer oral communication?

FN NT	**A:** The oral communication works fine when you know the people. But if I don't know, or haven't seen, then of course mail is superior. And also for working cross-site, we have collaboration between Nuremburg, Bangalore etc. I can't guarantee, but it would not be bad. It would be an enhancement, but the update frequency is the crucial thing, and being able to trust the information.
	Q: But it not being there is a drawback, do you think?
	A: This with the mail? It's not a big thing to me. No.
	Q: So in your team, we could say that you are comfortable with the current oral communication situation and you don't really feel that you need a wiki or other knowledge capturing system?
FN PU	**A:** I think parts of our work would benefit from having a wiki. And we have that as an on-going discussion. That we should put up information on a wiki. Because there are things like how you manage certain things in the lab… like how you set up things in order to do certain tasks, which would be perfect in a wiki.
	Q: So if a wiki is introduced, the reaction from your team would be positive? What do you think?
PD	**A:** I think, both ways. Some are pro wiki. Some are against it. Regarding that, some people don't like to write lab reports etc. And the same people don't like to update a wiki with information. That is a problem.
	Q: Do you think that if it is introduced as a very structured, restrictive thing, where everyone is expected to contribute, that may not go down very well. But, if it is a voluntary thing where people who feel the need can update information that will be more good?
PU SC	**A:** Yes, but that also makes it less valuable. Because a lot of people that have the best knowledge, are the ones that don't want to update. We have a lot of people with less knowledge that update the wiki. And they spend lots of hours updating the wiki. But its not the best information. The best information is with the guys sitting inside the lab. So that's a problem.
	Q: What is your view of the design and interface? Is it user friendly, easy to navigate?
	A: No. When I started here, it was not called X-coll then, it was some other system. I found it hard to navigate
	Q: Was it another system?
	A: The name was not X-coll, but it was very similar in the appearance. And I remember it was hard to find your way around, much harder than if you browsed the internet. I mean this felt a lot like. You got that feeling that this is not updated.
	Q: Did they give you any training sessions?
MS	**A:** Yes, there was couple of hours, basically. But it's more like ok here you find, here you have links to the benefits you get as an employee, here is a link to where the different projects are listed. Then the projects we didn't go into detail. I mean you got the feeling that here is

	information but it's not really for me.
	Q: It wasn't beneficial, the training
	A: No
	Q: Do you think if you were given more training at the beginning it would have affected the way you used the system now?
FN	**A:** May be, to some extent, but the crucial thing why people are not using X-coll now is that the information is not accurate, up to date and relevant in the work. I have a couple of pages I use everyday as an object leader, but as a tester, I mean, you can go there once a week, that is enough. You don't use it in your daily work.
	Q: And what about the restrictions in X-coll? You can't add/remove content?
SC	**A:** Yes, that makes it static. But that is what you have to pay, if you want order in the content. Then you have the wiki, but then you have to trust that everyone does good things. In a wiki with one thousand employees you need to restrict that, so that it makes sense to have a smaller group. 25 people can share a wiki.
	Q: So you don't use the wikis as another option?
	A: There have been different attempts, two attempts in organizations I have worked with, it has not worked out. People stopped updating. You put some information there and then it drizzles off
	Q: Were you using wiki before X-coll was started? Because we understand X-coll was started only last year?
	A: No, X-coll just had another name.
	Q: So you started with X-coll?
	A: Yes
	Q: How much do you think the management supports the system?
MS	**A:** It works well enough to deliver our deliverables. So it does its job in that sense. But of course if I look at X-coll as a tool, then you need to spend more time and emphasis on it to get it up and running and to get it used more widely. That would take the managers to say that this is more important than these tasks for you today. You should spend time on this. They prioritize other things. I mean, people don't work with updating X-coll, people work with other tasks.
	Q: Have you talked to the management about the problems in X-coll?
	A: No, regarding X-coll, I have not done that. Mainly because it's not the biggest problem in my daily work, that X-coll is not updated. I have other things that are bigger obstacles to me.
	Q: Do you think the usage will be dependent on how people look at it, if the management is more enthusiastic about a system, would people think that their time is well spent?

MS	**A:** Yes, definitely. It's as easy as that, If the management starts asking for these things, starts putting demands, people would update it definitely. But they don't, if they need some rapid update, to send to the costumer, it will be written in a PDF and sent by mail.
	Q: How about a knowledge management system, like wiki?
MS	**A:** Yes, I get the feeling that it's not important to management, where we store information, as long as we deliver what we are supposed to deliver, basically. They don't care about how we store that information. It's basically up to us.
	Q: So basically the management does not support any kind of knowledge system
MS	**A:** No, not in an active way. I would put it as that.
	Q: We could say that in Y-COMPANY there is no actual knowledge management policy?
MS	**A:** No. Not one that is implemented and followed by the people. No there is not.
	Q: Only in some departments?
FN **MS**	**A:** Exactly, some departments have found a way to put information in a wiki. And of course there are, we have a documentation system called DMS. An old inheritance from Y-COMPANY, where you just store documents and keep them in a version controlled way and that is also good for long term information storage, but it does not serve as a wiki. I mean the information there is very hard to keep updated etc., and it's a lot of work to write a complete word document.
	Q: It's more formalized?
SC	**A:** Exactly, much more formalized.
	Q: And the documents found in X-coll, can you find them by clicking on a link, or is it harder like you have to copy paste a link?
	A: If the links are pointing to a DMS document, for instance, then you need to log on to a specific application as well, before you can open that. Then it's just a click. You have to login to X-coll, and then to access DMS you have to login to another small application. And of course that is not user friendly.
	Q: Why would some department want to use wikis, when they can find documents through X-coll with a click?
SC	**A:** But on a wiki you can, I mean, as a user you can edit, put in more information, and explore in more detail in a way that makes sense to your colleagues. Whereas in X-coll, I don't have the right to update any page. So I am not responsible for any X-coll page. I am just a consumer of the information on X-coll.
	Q: So they can put whatever they want in wikis
	A: Yes
	Q: Is it sometimes bad, to be able to put whatever you want, is it necessary?

MC **SC** **PU** **MS**	**A:** No. In my world, the problem with wikis is that people have not updated it enough. I have not had the problem that people spam it with lot of un-useful information. There has always been too little information, I would say. But if we have a bigger group, then I can see, we might need some kind of restriction. Some kind of a master. There is also the problem of how to maintain a wiki. I mean old information. Who is responsible for posts from last year that is wrong now. It's a problem. And the person has quit his job for instance. It takes time. And time is not something we are allocated I would say, to sort out these things.
	Q: Do you think if users could contribute to X-coll, then they would use it more?
	A: Yes, if I am responsible for a page then I would update it more and I would know the tool better
	Q: Do you think as a younger user you might be more adaptable to change and new systems than older users?
PD	**A:** Think so. I felt a difference, I am 31 now and I feel old compared to people starting now like 25/26, they are much more into chat etc. I am not used to that way of thinking. I am more towards the 40s guys, walk over talk about the problem. Don't just throw away a comment in a chat forum. So I can imagine a 60 year old.
	Q: More person to person interaction?
FN **PD**	**A:** Yes. Person to person interaction, it is vital. You can't take that away with wikis. Wikis are a very good complement but it is always way superior to talk to someone

End of Interview 2

APPENDIX E: Interview 3 with Participant 3

The interviewee has been working in the organization for long, mostly in a test environment and currently with cross site projects. As he is working in a cross site team, they use various knowledge management tools including the wiki extensively.

	Q: At the beginning we would like to have a brief description of your background?
	A: Working for Y-COMPANY for ten years now, mostly in test organization recently last two years I am sort of project coordinator in a cross site project including Germany, so mainly I am project leader of a project consisting of ten people working on this project.
	Q: What are the communication channels you use in your daily work?
PD	**A:** Yes, exactly, because it is a cross site project, it is becoming more and more important to discover things on the way, but officially we use something called Inter-Coll where we share a screen and basically it is a voice meeting. And we have meetings where we have cameras to see each other. PDF online reviews is something that we are using very much lately. It is a PDF acrobat professional tools, very new, where online couple of users can be using same documents and review it and put their comments in a very interactive way. So it is a communication tool, you see the comments and you comment on them. So it is an online review, interactive online review, and we are using that very much recently. Lots of internal chat with people online, better than mail, maybe it is not that official.
	Q: And what about wiki and X-coll?
	A: Yes, these are more likely having static reference documents that you always want to go there, and yes we use them very much. For all static stuff it is wiki and X-coll and for the other daily stuff, it is the other I mentioned.
	Q: Can you show me and example of the Pdf online?
	A: Yes, I will show you I just received a call for an online review
	Q: We have actually made a couple of interviews and nobody mentioned about PDF online ?
PD	Yes, because I am the only one who is using it right now, that is why you didn't hear about it. Well I see myself as a pioneer of discovering new things to help people to communicate because I have realized that we are rather static in our view of what to use and how to see other papers, so we have to sometimes take new things and try to use them. One of those was Pdf that my colleagues (abroad) are using a lot, so I have been there I tried it and realized that is a nice way of communicating. I will show you but the server is down. Exactly, nobody, I am actually the first one to install it here.
	Q: So you are the only one who is using it here?

	A: No, in fact no, because people from Lund are participating in those reviews and there are people here who use that maybe ten on a thousand. *Showed us the PDF online*
	Q: Why do you think the people here are not using it?
PD **FN** **PU**	**A:** It started now, I got it installed on my computer, my line here are using it and the organization said it is okay, people are asking me now how to use it. So in the next project it will be sort of official tools here. But it is just in a start phase so it will be, my manager told me it is perfect. I sent him it and told him please try. What we were doing is that we were sending the word documents with no interactivity in it and people fill their comments on an excel sheet and imagine 15 people are sending by mail their comments to the original editor so nobody else see anything what other people are doing and this is really bad. And this PDF will become a new tool.
	Q: But you are also using wikis?
PU	**A**: Yes but wiki, I don't know if you have seen wiki, all important information that you can imagine about your daily work is here from who is responsible for what , where you can find specific documents, what is the instruments used. It is really referenced that I use that list at least once per day.
	Q: When was the wiki launched?
	A: I don't remember well, but approximately 5 years.
	Q: And how do you think was the people's reaction to it? Did they initially start using it?
MS	**A:** We were pushed at the beginning, I remember one guy created it and then managers are pushing and pushing us to use it, and after one year we started to use it really.
	Q: So what do you think made people get on to it after one year?
PU **CB**	**A:** Because when you realize that somebody else put stuff there that are usable, and maybe you do next step you know. But maybe in the beginning you wait for other people to do it, I don't know, after maybe having five or six documents there, the people realize that if I put five more, usage will be more and more, I don't know.
	Q: I was wondering what kind of information are you interested in your daily work?
	A: Everything that you can imagine in your daily work, test instruments, etc..
	Q: Do you use X-coll for your search of information?
	A: No not for that particular one, X-coll is for project information
	Q: So you don't use X-coll?
	A: Yes, I do use it. I use X-coll very much because all projects run in Y-COMPANY

	everything that concern specific project planning deadlines in the project, very project specific stuff is in X-coll. So it is maybe a little more different as the wiki is more static concerning this organization but here it is really on Y-COMPANY level
	Q: So the only thing missing in wiki is the planning and project statuses?
	A: Yes because those things change a lot you know. That today you have this project next year is a next one, but what you have on wiki is really static need both in first and second project.
	Q: So you wouldn't really want them on the wiki?
	A: No in effect, links are there in fact a lot of links are in wiki to X-coll but not the other way around
	Q: Do you think if you have all these options and tools found in wiki it will contribute to using it more than you using X-coll?
	A: No, I don't see , no.
	Q: You have contributed pages to wiki? What do you like about wiki?
PEOU	**A:** Yes, easy to find easy to search, when you want stuff there you just don't put things because it is fun to have them there. You really put things that you need, it is really consistent. And condensate and that is why you use it.
	Q: How do you think the structure should be? Should it be more formal for a company or should it be as people want it?
SC	**A:** I think we have it here somewhere in between, it is like people wanted it but they tried to follow some kind of structure but it was like we wanted it , no body controlled that part really it was really from us to us.
	Q: Do you think it was a positive thing?
SC	**A:** Yes, definitely.
	Q: To what extent does the design and usability of a system affect your usage?
PEOU	**A:** Well, wiki is very simple, but yeah, I don't think it affects very much the way we use but simplicity is still a plus.
	Q: In one of the interview , one of the interviewee felt that person to person interaction is more relevant , maybe the system cant replace that and maybe we don't need them in an organization ?
PU	**A:** No they can't replace that but it is a completely different approach to person to person communication. Here there is more static stuff I don't need to run around for a document when I can just click here and find it in 5 seconds, they don't replace each other, I talk very much and I communicate very much but still I think that it should be there
	Q: It is more complementary?

	A: Yes exactly not replacing, definitely not nobody can replace a face to face communication it just something different
	Q: Now that you are trying to introduce the system you saw in Germany what do you think management can do to support it?
MS	**A:** Yes they asked me if I need some support but it showed that I didn't need that. Otherwise, I would get it. But it was simple that I got it from Germany sitting with my colleague receiving information for half an hour. It is very easy, otherwise I will get it probably, somehow, but it showed up we don't need it.
	Q: For the users in your group to use it what steps are you taking?
PD	**A:** First, face to face I spread the rumors how good it is. That is the first step you talk about it how good you know and all that and people are starting to ask, then next step I took, I made the online review sent to manager and also with the note please try it is a really good tool, if you use it and you think it is ok it will be easier for me to spread it. So for next step he said it is fantastic so after your manager think it is ok, it is always open to spread it and to ask two more object leaders to use it because it is so useful, they did that and they thought it was fantastic. And now it is the next step to have those reviews that was the easy way but you have to be confident because of what you are saying it to be, and what you feel about your tool because there are many other tools.
	Q: You have various communication channels; you have X-coll, wiki, and the PDF. Wouldn't it be more beneficial if the management provide only one system with all the different capabilities?
SC	**A:** No, I think wiki is very static, it is like having a bulk on your table you just come over and over and search for information. X-coll contains dynamic information it is very dynamic. So here you have a bulk that you can have for ten years without changing some parts of it , X-coll is constantly changing.
	Q: Can you do that in wiki, like add the comments and add status planning?
SC	**A:** I don't really know about it, wiki is first of all open since anyone can go into it and change, that you are not to do in official X-coll stuff, so really they cannot be mixed. You cannot go to X-coll and change because it is project related information and so I don't think any of these tools should be mixed.
	Q: Don't you think it would be of any benefit at all to have a single interface to access these different things?
SC	**A:** I don't think it matters really; the most important thing is that you reach the information and you share it.
	Q: Wiki, since you think it is informal, and since users are contributing to it, do you think there is a danger of people posting non work related things? And somebody should be there to monitor the posts?
MC	**A:** If you are in a kindergarten you would probably do that but we are people working in a serious company, so I don't think there would be any danger. For all my 10 years such a thing has never happened.

	Q: So you don't think there is any necessity at all to worry about that?
	A: No, you have to trust the people.
	Q: To follow up with the question related to the restriction of the information. Do you think restriction of content is necessary?
MC	**A:** No I don't think they are necessary, I mean of course there are restriction we all signed contracts how we can behave and not behave but it never such things has happened. But X-coll is related to project planning so you cannot open it like that in way that you can go in and change the plan if you feel it is necessary.
	Q: If they try to put restriction do you think it will negatively affect how people use it and contribute to it?
MC	**A:** I don't know really, if you just contents there it would not affect.
	Q: Do you think there should be somebody monitoring wiki's contents?
MC	**A:** No, because we use it very much and you would get a direct reaction from your colleague if you put something wrong so it would be discovered early if you put something wrong. So it will go very fast in that way so you don't need a manager to tell you since your colleague will tell you that. That is from my experience in Y-COMPANY.
	Q: When we talked to another person he was very skeptical that since knowledge keeps changing very fast it might take too much effort to maintain wikis or other similar systems, what is your opinion on that?
PCB	**A:** I am not updated very much in fact… but maybe it is true… but things are not changing so fast.
	Q: So in your experience you find it is not changing?
PCB	**A:** Maybe it depends how responsible you are for those parts so maybe for some people because they have many things to do, but things are changing once per year as an average so I don't think it is so much
	Q: The PDF system you showed us, is it only about putting documents and comments to them?
	A: Yes, we share documents and we review it before putting it to DMS, so we share the documents and ask people for feedback to see if we are able to put it in DMS or not
	Q: Can't you do the same on wiki?
	A: No, before those tools we used the mail system tool for the same purpose we send our comments by mail
	Q: But can't you put the documents in wiki?
	A: But there is no point in doing that because we need to take off them later, it is easier to write a mail than put it them for one document review because after that when you

	have to update the documents you have to delete those comments and you want to save them anyhow.
	Q: Isn't this is the same with the new system?
SC	**A:** No, because you type it online and nothing is uploaded. You see wiki is something else wiki is more static you know. You put on wiki things that you want to keep, not stuff like that, like putting comments and deleting them afterwards.
	Q: There are some users who don't contribute to wikis, why in your opinion is their contribution different than other users?
NT	**A:** It depends on what you work with completely. Probably the person you talked with wasn't from a tester organization because it would be impossible for him to use X-coll and not wiki, so it depends how the wiki is developed it is not one wiki we have our own pages you know every department has its own page and it depends much on how much this organization develops and puts stuff on wiki, so if you talk to some project manager for example probably he will never use wiki he will use X-coll because his type of work that he is not interested in wiki at all, he needs all these project info and all these planning but not wiki because wiki is more for people on the first floor so to say like testers and developers where they say please I found a good trick in this code and so on.
	Q: What is your perspective of the management support for Wikipedia?
	A: Yes, rather good here.
	Q: Are they pushing users to contribute?
MS CB	**A:** Yeah my manager now is starting to do that. He is putting a lot of stuff himself in wiki. So when others realize he is doing that, then they will do more themselves.
	Q: So you think if the management supports more, the wikis will become more official and used than X-coll?
	A: No, I don't want to compare those tools anyhow, wiki and X-coll are different. We had a section meeting last week and my manager put section meeting slides on the wiki that is something you wouldn't find on X-coll, there you have some other info, project related, nobody would be interested to look into my lines slides from a section meeting you would need a non official place for that, so I wouldn't compare those two at all.
	Q: Can you give me more examples of how management supported wikis at the beginning?
	A: I don't remember really, but I remember that we had a section meeting that they took it in our aspect to start using it that was I remember it on 2005
	Q: So they put it and if you want to use it you can use it?
MS	**A:** No, he took it up as a discussion on a section meeting, mentioning it for people took one guy who started to use it to show us how to use it , how to create an account and stuff like that and that was that.

	Q: So that was the support from the management as a start?
	A: Yes in fact, maybe I don't remember something from that time but something like that.

End of Interview

APPENDIX F: Interview 4 with Participant 4

The interviewee has been working in the organization for long. He is one of the founders of wiki with about 300 active users. In his department, the use of wikis is extremely important and users contribute much to the system.

	Q: We are studying knowledge management systems and we understand that here there is a wiki and also X-coll. We would like to know the usage patterns on these?
	A: I have mainly looked at MediaWiki that we have set up here in our department. So I haven't looked so much at X-coll, mainly at the MediaWiki solution.
	Q: Could you give us a brief description of your background here?
	A: Yes, I have been working here for 9 years now and started to work with a Radio implementation and Software implementation. I continued with implementation of drivers. Now am working with algorithms, layer 1 algorithms, implementation and design.
	Q: About the wiki in your department, could you go as far back as when it was started?
PD	**A:** Yes, we had a meeting with our section. We have that once a year and we come up with ideas on how to improve our organization, how to improve efficiency and so on. Any idea is welcome. And one of the ideas was that we need to have some webpage. We need a webpage to add all information we have in common, like to do things or how to set up different things in lab or those kind of things we don't write in documents. Then, I knew about MediaWiki, and it was 2006, I think. And then I set up a proposal. I just installed MediaWiki on my computer and ran it on a server and we started to use that. Yeah then it was (investigated) and we presented it to the whole section and we went for that. And then, it just grew, so now it's also the test department, and other departments have joined. We are running it here in Lund, Japan is also using it, and yeah its quiet many that are using it now. I think, there are 400 users, but there are some duplicates, so may be 300 or something users.
	Q: And if you go to the beginning, do you remember, if everyone started contributing to it right away, how did it happen?
PD **ES**	**A:** No, It took a long time, before people started adding things. Took very long time. So, I think, if you can win one person, then the next one comes and you need to win each person to MediaWiki, or the wiki. Especially at the beginning, but later on, if you have 10 persons may be, adding information, then the information is more valid, and it's updated. It's very important to update information. If you have a lot of invalid information on the wiki, yeah, then its chaos and it is not anything you can use. So it's important that wiki is updated regularly.
	Q: Did you take any special steps to win those people?
PD **CB**	**A:** Yes, when I heard about it and tell people that may be you can write this here, because then we can share, all of us, this kind of information. And then yes, people started to do that. One thing was integration team; they are providing a lot of information regularly, all the time, about the software deliverables and so on. So that was quite good to have that on board. Because when they were involved, they communicated a lot of information on the

	wiki. So then more people were starting to use the wiki.
	Q: And did people ask for any features or capabilities?
SC	**A:** No, not so much, because MediaWiki is supporting most of the things that we need. But we had added some things, some plug-ins. But it's not a big part of it. So we were mostly using the tools that were in the default installation.
	Q: Could you tell us what features it supports?
FN **PU** **SC** **PEOU**	**A:** Yes, we were putting a lot of document links, to other document systems, and also sharing how to set up hardware and so on. Also a big thing is the tools. The tools we use. We might have a user guide may be. But where to find the user guide, we don't know, we just know that there is an instrument may be in the lab. Someone has a user guide printed out. But where to find that, so most of the tools have a page on the wiki, you can just go in and check where is the user manual. And external web links that are good. So, I mean, it should be easy to find, the information. If someone else has looked into it and you can have the information directly.
	Q: When you introduced the wiki in the meeting, did the management support you actively or were they more like, yes that's nice, go ahead?
MS	**A:** Actually, it was the section's initiative. I mean, we needed a web page. Everyone agreed about that. This was a good solution, MediaWiki was, I think, Wikipedia was known in 2006, but we didn't know we could set up our own MediaWiki. At least I didn't know so much about it. So I just provided the solution to it. Everyone wanted it from the beginning, so I didn't need to push this.
	Q: Did the management do anything to spread the use of it to other departments? How was it spread?
MS CB	**A**: We work quite close to the test department, and since some people were interested to use it, I also thought that it was a good idea if they started to use it. Actually test department was very driven to use it actually. That's why I just let them to use it also. I mean, they are not part of our section or department, but I let them use it because they could drive the wiki forward a lot. I didn't push it much outside our department, because people were interested in this, and it was widely spread. So I didn't push so much.
	Q: Someone expressed the concern that maintaining the wiki up to date might be hard and they might need a person dedicated to maintaining it. Have you had a need for that?
PCB **SC**	**A:** No, we don't have that. And I think it is better not to have that kind of person. Then the people are afraid of updating the information on the wiki. Because the master needs to review the changes, may be, before. Then you don't update, even if it's obvious, you know that there is a problem, and you can update it in a second. That's what I think. These corrections (updates), the person can do even if it's not 100% correct, and later on someone else can correct it again.
	Q: So a system where whoever notices there has to be an update just goes ahead and performs it?
SC	**A:** Yes. If you know the correct information, then you can just update it. I don't think there is a need for a person reviewing it. It is better like that. It gets better than before, and if it's

	inaccurate, then it's inaccurate.
	Q: We also encountered concerns that there is a risk of spamming if there is no monitoring. What has been your experience?
SC	**A:** No, I haven't seen that. I know there may be inaccurate information. But I don't think it's a big problem. I use it a lot. And we use different pages for different purpose. And if you go to a new project, then you don't use the old pages so much. And there may be inaccurate information. Buts it's not a big problem.
	Q: And someone told us that it's a static environment. What do you think? Do you consider it dynamic?
SC ES	**A:** Our system, I think its dynamic, because if you look into recent changes, I mean, people are updating all days, I mean, everyday something is updated. And in the beginning, maybe it was a couple of updates per week, now may be it is 20 updates per day or something.
	Q: That is in your department?
	A: No, that's a total. The whole wiki, and it's quite a lot.
	Q: Does each department have a different wiki?
FN MS	**A:** There are different wikis. This wiki is used by several departments. But there are other wikis as well. So it's not strictly connected to one department. It's just that we saw a need to have a wiki, and we set it up and other departments also joined. So it's not strictly connected to a department.
	Q: But you don't have a wiki for the whole organization?
	A: No
	Q: Do you think that would be better, if you have one for the whole organization?
SC MC	**A:** Yes, I think so, but then it's very big and then maybe you need some more strict rules on it, how to update and so on. Because now it's not so many, may be 300 persons or something. But if you exceed 8000 or 6000 then you need to have more rules and so on. I don't know. But it would be good I think if we can do it. But it would be hard I guess.
	Q: And have you tried any other tools other than Wikipedia? A:
	A: Yes, We had looked at X-coll, but we didn't see that it was not better than MediaWiki solution.
	Q: Why was that? Can you explain?
FN SC PEOU	**A:** I think it was harder to update, I don't remember exactly. But the user interface was not so good. That was the main thing. MediaWiki was very easy to use.
	Q: We were also looking at X-coll, and our understanding is that it's used for planning, project control and such management tasks. Was there ever an intention to

	use it as a KM tool?
SC PEOU	**A:** Yes. I think when we started we looked into X-coll as well. And the decision was taken by the department manager that we go for MediaWiki instead of X-coll. We also looked at other wiki solutions. But we went for MediaWiki because we thought that it was the best one. I think we looked at 3/4 different solutions and then we went for MediaWiki.
	Q: There are other departments who don't use wikis much. Why do you think that happens?
MS	**A:** I don't know. This wiki started at our department. May be there are other wikis starting. I don't know how the other departments work. This wiki was started in this department. There was no intention to make it for the whole organization. Other people were interested in it, who wanted to use it, that's why it has spread. May be other departments have only looked at X-coll.
	Q: Do you think management support may be one of the reasons? The management is not pushing the people to use it more, or giving training sessions or giving a view of wikis?
MS	**A:** Yes, the wiki has not been pushed by management. The wiki was pushed by developers and testers, the people that actually work with test and implementing the code. It was not pushed by management. Management has been pushing to use X-coll. But it is not easy to use. Yes.
	Q: So you introduced the MediaWiki, Can you tell us what tipped you in favor of MediaWiki than the other wiki solutions?
SC	**A:** I don't remember, I think it was that, I saw that MediaWiki has been used for Wikipedia for instance, so it has been really tested and it could be used for a big system. And it was very easy to add articles and also add information. MediaWiki has very easy way of adding headers, text and points,and yeah like that. It is very easy. But X-coll, it was not that easy. You need to have special commands and text and so on. But here it is very easy. And it is designed to have an update system also. So it is flexible. It grows. We can handle it.
	Q: Going back to the management, do you think if the management pushes for wikis, all others will also start using it more?
MS	**A:** Yes, I mean, if the managers, they want to use it widely within Lund, then it will be bigger of course. But right now, officially it is only our department using it. And some other departments also are adding information to it like text and so on, but it is not like the manager in the test department they are pushing the wiki, it is just that some testers are using it. But I also know that the managers in some sections are interested and they push the wiki, but am not sure of the extent of that, I don't know.
	Q: there is a document management system called DMS. How is that used? Who can put documents into it?
FN SC PU PEOU	**A:** Anyone, can put documents but it is very hard to search for documents, in that system. So that's why we put all links to DMS. You have web links to each specific document and you create pages where you put up all documents (links) related to one thing on a page. So we use it (wiki) for that too, to get an overview of what kind of documents exist for the thing we want to describe. In DMS there is nothing like that. Yes, its hard to find

	documents in that system.
	Q: Is it possible to put all information you put in a wiki, into DMS too?
FN **SC** **PU** **PEOU**	**A**: Yes, you can put all information in DMS, it's possible. You create documents, it's a document system. And you can search for documents, but it's very hard to find it. You can put any information in that but you can't search for something that is written in (inside) a document on DMS, it's not possible. But on the wiki, if you put some information on a page, you can search (for it). So that's available on a page and you can search, I mean, it's an ordinary wiki. But on DMS you just have documents. You can put keywords that you want to tag this document with and a number. That's it. If you have a document of 400 pages, you can't search for anything that is within the document. So it's not good. The best would be if we have all information on the web and you can just update. And check in of course to revise information and so on. Right now we have word documents and it's not easy to access them
	Q: We came to know of another system where you can share documents on line and people can put comments. And when we asked if that is possible on the wiki, we were told that wiki is more static, so it's hard to remove comments and so on?
SC	**A:** Ok, we don't put that kind of information there. We don't put for example design of a certain block or something on the wiki. That kind of information we put in documents, in DMS. We don't put up review on how to set up a certain instrument and frequently ask questions and so on. But of course we could do that as well. But that is not anything that we do today. But we could do that. Then the wiki will be more valid I think.
	Q: Many users would like that maybe?
	A: Yes, but it takes time, and it is a priority issue.
	Q: If someone wants to set up a wiki, say in another department or organization, what would be your tips for them?
PD **ES** **SC**	**A:** I think, try to gather as many persons as possible, that believes in this, to have a wiki and add as much information as possible even if its invalid in some cases, it will be changed, updated during time. Just try to put as much as possible into the wiki. Then it gets the users and then it will get more valid because you have more users. And try to push that users should update, if they see the information is invalid. Try to get the users not to be afraid to update the wiki, because sometimes I see that problem. You can update in 5 seconds if you see something incorrect.
	Q: In a small group, where people work closely together and there is a lot of person to person interaction, do you think a wiki is relevant for such a group? Will it be useful?
FN **PU**	**A:** Yeah, I think so. Because we communicate a lot with mails today and that is a big problem I think. Because you can't handle the mails. All the mails you get one day. It could be very important information and that is valid may be, long time. It's not the kind of information that you put in a document; for example, how to set up an instrument in the lab or something. Good to have (kind of) information, but it is not the kind of information you put in a document. Then it's very important to place that kind of information in a common place. Then you can go to the same place all the time and get that information. If you have it in a mail, then you need to search, you need to know when you received the mail, then find the information there. And mails can disappear. I mean, we have migrated recently and some people have all their mails disappeared. Then you don't have the information

	anywhere. So I think it's better to use the wiki. The department thought that it was better to use the wiki. We wanted to place that kind of information on a common place, and not in the mails. So a lot of information we put on the wiki is from the mails that we send.
	Q: Was wiki introduced before X-coll?
SC	**A:** I think X-coll was introduced before wiki. X-coll is an Y-COMPANY tool. We had it. But it was not very spread. Mainly because of its structure. Some people used it.
	Q: Was management favoring X-coll more than the usage of wiki?
MS	**A:** They didn't have an opinion there. I think they just get the information that there is a new tool now that we could use. But they didn't do any initiative to start the users widely. They didn't push it at all.
	Q: Did they ever prohibit the use of wiki, in order to make people use X-coll? Asking you to use X-coll instead of wiki?
MS	**A:** There was one manager that said that. That "X-coll is the official Y-COMPANY tool and we should use that. We should not use anything else. All other tools except X-coll are not official and we shouldn't it use it".
	Q: But that was long back?
SC **MS**	**A:** Yes. It was long back. It was at the time we started the wiki. But then the decision was still taken that we should use MediaWiki because it was much better solution. We saw that the wiki will be used for long time. It's not a product that will end in half a year or something. We would use it a long time. Yeah. We have used it for a couple of years now. And it's important to have a good solution from the beginning.
	Q: So it's like a freeware/open source tool?
	A: Yes.
	Q: And if you need any help with the tool, you get support?
SC	**A:** Yes, But we haven't used the support. What we use in the tool is the basic default and some plug ins, but not so many.
	Q: So you have not run into any problems?
	A: No, we have updated the wiki (software) one time during the way. We got a better search function...
	Q: Going forward, what more would you like to see in the wiki, like more features?
SC	**A:** I don't know, I can't see anything right now. It's working well. But I think you can improve a lot. But I haven't thought about it so much recently. No I haven't done that.
	Q: To what extent does lack of time prevent users from contributing to this system?
MS **PU**	**A:** It's a priority, if managers push for it. You could save a lot of time actually. So may be its not good to say 'lack of time'. You can 'save' a lot of time if you have valid information there. I think managers have not pushed this so much think. It's more the users that push

	the wiki forward rather than the managers.
	Q: So do you think they don't have a felt need for this wiki?
MS	**A:** They think it is ok, or good, but they don't push for improvements. Because we could improve ofcourse if it is a priority. So that is not done. It is the users that have pushed this more.
	Q: Do you think the age or organization level of users may have anything to do with their contribution levels to the wikis?
	A: May be, we are quite in the same age, most of us I think.
	Q: Do you think managers might not use the wiki much because they are involved with time plans and the like. And we asked in a previous interview why they didn't put time plans in the wiki, and were told, it is because wikis don't have any restriction. So anyone can go and change the status of the plan. Do you think you can add restrictions to wikis, is it possible?
SC **MC**	**A:** It's possible. I think we can restrict certain pages. I think so. And yes, we have a lot of planning info on X-coll. If we have that on the wiki, it's good I think. That's a good idea.
	Q: Do you think if managers also contribute in wikis, more people will be motivated to use wikis?
	A: Yes, But I think it would be very hard to convince the people
	Q: Why?
MS **MC**	**A:** I don't know. May be the managers see the wiki as a non-official tool. I mean, if you put product planning and all, then it is affecting a lot of departments. Then you communicate the plans to the highest manager in Y-COMPANY, or at least in Lund. Then you need to get the wiki, also official, to the highest level person in Lund may be. Then it's a big tool. Of course, that could be done. But it's hard to convince. But if you make the wiki available to put planning information and such, then it could be done, but it would take some time. It could be done I guess.

End of Interview

APPENDIX G: Interview 5 with Participant 5

The interviewee has been working in the organization as a tester. In his department, they don't actively use a wiki. They use other applications and oral communication to obtain and manage knowledge.

	Q: First we would like to know your background here?
	A: I have studied Master (science in Physics) in Linkoping and worked here in Y-COMPANY for 3 years joining directly from the University. I have been on the same position, as a tester in WCMDA L23 tester the whole time. So yeah…
	Q: Have you been in a Management position?
	A: No
	Q: And what kind of communication channel do you use in your daily work in this department?
	A: I think, most is the FIDO application where we have the error reports, that is the most and mail of course is my normal, and some wikis but not so much.
	Q: Wikis and Mails?
	A: Email, of course.
	Q: And X-colll?
	A: Just to some extent, but not so much. Like some X-coll pages finding builds and so on. It's good to have a fallback when I need to test on, like say another project which I am on not now. Because I got always, the builds, mail wise and getting it pointed out but if I need a build for another project then I go to the… first to the internal page and then I find X-coll site for it and I can find it.
	Q: At your department what kind of systems do you use? Everyone uses separate…?
	A: We did have an X-coll page before the reorganization just for our section and we have put up a new one but it is not so common. Just did reorganization so we don't have much information in it.
	Q: At your department so you use only X-colll to communicate?
	A: But all information goes mail wise also.
	Q: I was wondering what is your view of wiki as a system?
	A: It is good when you all put effort on it.
	Q: When there is contribution from everyone?
	A: Yes, exactly

	Q: And what kind of benefits do you find from Wiki?
PU	**A:** I like the fast 'how to' so, how to say… Fast instructions when you need to work with… there is a benefit I think, when you don't have someone to show you use it. If I have a near colleague, that is my normal way, just go and ask him. And yeah, often times to show how to use an instrument. But when you don't have that contact, it's great to have.
	Q: Is it for management? I didn't understand
	A: No, For management information, its e-mail.
	Q: To get these benefits from a wiki, do you think it is too much effort, setting it up and getting it to a point where it is useful?
PCB	**A:** Yes, I think so. I think that threshold is that is exactly the problem with it, in our department; No not our department, our section. There is a good wiki at the layer 1 section. And that's ok, that has been pushed on and people really use it. And also our section is looking for information there. But it is hard to start a new one. At our section it has been hard, we have twice tried to do it, and I don't know, it may work out in the future.
	Q: If you compare the costs or efforts of setting up a wiki versus its benefits, do you think it is worth the effort to set it up?
FN **PU** **PCB** **GS**	**A:** Both yes and no. I think for me personally with three years of work experience, I don't think the benefit is so big. But I was also new here once and 'then' I really, I think, needed it. When I was new, I didn't have the contacts (that I now have) and so on. Now I know how to find the information I need. Also, before I had a line manager who had a section of 10-12 people may be 15 was the maximum. Now we are 30 in the organization (meaning section) with the same line manager. Now I think it's more important to have this. When you are bigger it's harder to spread information. When we were as small as 15 people, then it was no problem.
	Q: You could go and talk?
	A: Yes, exactly. We could talk.
	Q: Does the work experience affect the usage of systems?
	A: Yes.
	Q: And the age or organizational level. Like if you are a manager you might use it less?
PU	**A:** I think it is good for managers to use. There are some kind of information that is really not needed frequently, information like what happens next week, you don't put them in a wiki. But things like 'this instrument is (not audible)' is something we use the wiki for, that is great to have but when we want to look overall…(not audible) that kind of information is good to collect somewhere.
	Q: But for management planning etc. They don't have anything like that in the wiki?

	A: You can find links to vacation lists etc. But then it's to the document. We have this DMS
	Q: Is it only vacation lists, or other project planning links as well?
	A: Not in our section. We can find the project planning in the intranet pages.
	Q: Would you like to contribute to the wiki that is being introduced, and what about others?
	A: I would write to it. I think half of the peopled care. I think some of the older people, they pay more effort to it. And also the new comers, who know they need it, they will also contribute. But there is a big group who will not.
	Q: The older more experienced will contribute?
	A: Yes, at least in our department. We have a couple of guys who think it's important. At least from the old section when we had it; we had one wiki there as well.
	Q: The PHY wiki took a long time to take off. Do you think the same might happen in your department?
	A: I think it could happen. We are also users of the PHY wiki.
	Q: So you write to the Phy wiki too?
	A: No, we don't write so much. At least not me.
	Q: Are you allowed to do that?
	A: I don't know actually
	Q: Something which grabbed my attention is that some users wouldn't like to write but will be more comfortable with person to person interaction?
PD	**A:** Yes, I understand and maybe that's what I think as well. But if you see it, if you have a person who works 1 or 2 years, a new comer would contribute, then you have the need. Then you are here like for 3-5, 10 years, then you always have much to do and he will not contribute. Then these guys who have more experience, 10yrs, it's more like this is a company for me that kind of person. That guy I think will contribute. He is more not only project doing for the moment, he think more line and need to have the information and so.
	Q: A larger view I guess?
	A: Yes.
	Q: What kind of information do you look for in a system?
PU	**A**: But it is this, like I said, keeping track of instruments, and when I need like for planning and stuff like that.
	Q: I didn't mean Wiki, in general what kind of information do you look for? New

	tools, new equipment etc.?
	A: Yes, both that and information that I don't use so often but it is good to have somewhere. That kind of information, vacation list and so on
	Q: When we talked to someone else, he had an opinion like he gets a lot of information through email and sometimes it hard to find the information and also when they had a migration recently, lot many people lost their emails. So he said that it is may be beneficial to have that kind of information in a common place like a webpage or a Wiki or something, What do you think?
FN **PU**	**A:** Yes, I think so too. I think a lot of guys here is collecting this kind of information. It could be instrument information, technical information and he stores it on his hard drive and knows exactly where to use it. But then it is a hardware crash and stuff like that then it is better to have it common so all can see it and its better backed up.
	Q: Do you think that the type of information you want, would you find it in Wiki's? or you don't? Like the information you want, if you were using Wiki do you think you will have these information there?
	A: Actually I think yes and no! I don't search so much directly for information on the Wikis. It's more like I go to Wiki when I know I can find it.
	Q: What about the DMS? How do you find the design? Many people said it's hard to search on it?
PEOU	**A:** It is. DMS then you get links mostly through emails. Sometimes if you want to search, you can be skilled on it but it also like then you should know the project number and so on. I have a colleague who is really skilled to find out information on DMS. But many of my colleagues and me as well see it just like a "big black hole." You put a document there and send a link and if it is a living document, it is used for a while but otherwise it is just disappearing there.
	Q: What do you think about the design of Wikis? Is it same as DMS or is it different? Ease of use?
PEOU	**A:** I think the Wikis design is good but the problem with Wiki is that the system is quite slow. The Wiki page we had before written in it and X-coll system I referred that is slow to write in and also clicking a link is slow.
	Q: The Wiki, not the X-colll right?
	A: Sorry, it is the X-coll I meant which is slow. Wiki is ok.
	Q: What is your view of content restriction in Wiki? As we know there is no content restriction, do you think it is a drawback as anyone can go in and put any information he wants?
SC **MC**	**A:** No I don't think so. I think we have a level as engineers anyway in this company. So it's ok that way.
	Q: Have you used similar systems like Wiki or you just have used the mails?

	A: Only the mails. Not in the profession. With friends yes.
	Q: Concerning the information found in the wiki, do you find it accurate? Or not so accurate since people keep updating and there are a lot of changes?
SC	**A:** I think it's accurate. It's quite good but it needs some good control
	Q: If you can find the same information in X-coll and wikis, would you trust X-coll more or is it the same?
	A: it's the same.
	Q: Many feel that wiki is rather static than dynamic. What is your opinion? We mean static in the sense, people can put only information that they don't tend to modify much. And dynamic in the sense of reviews and comments etc which may need to be erased etc.
	A: I think of it quite static, I do.
	Q: Instead of links for management and planning things, if they are directly present in the wiki, do you think it would make users contribute more?
	A: May be. I don't search for that kind of information much, but when it's wanted it is really good to have it there.
	Q: What is your view of management support to wikis? Here X-coll is more the official system and wikis are promoted by testers and engineers if they want. Do you think there would be a change in the usage of wikis if wiki is made more official?
	A: Yes, I think so. I think both systems are really great and if things are not equal, managers should support both.
	Q: Both? Not one more than the other, because wiki might be more beneficial?
	A: I think X-coll could be more beneficial actually. But for the moment, X-coll is too slow.
	Q: So you think X-coll is more beneficial than the wikis?
	A: Yes, I think so.
	Q: Do you think if wikis are more official, the work would be more seen by top management, and would it have an effect?
	A: Yeah, I think there would be an effect.
	Q: How much does lack of time prevent users from writing to wikis and blogs?
MS	**A:** I think quite much. Quite very much, when you are not pushed to do it, you don't do it normally.
	Q: Because people are more involved with their tasks ?

MS	**A:** Exactly. That is the chief, there is always focus on the project here.
	Q: To what extent do managers use wiki?
	A: They try to do it. The managers are trying to use it. Now we are new, reorganized, and the line manager has put up a wiki
	Q: And when they start to use it, did you see any increase in usage among other users?
	A: We are really too young to have a good opinion on that. We are not pushed by the management at the moment. They want us to update the information there but we are not really pushed to do it. But it may really happen.
	Q: And we had an impression that oral communication is used more here? Does it affect the usage of wikis?
	A: Yes. Like I said, you search for the information yourself… most of the time by email or oral.
	Q: Do you think in smaller groups, oral communication works better? And may be in larger or cross site groups wikis are more relevant?
SG **NT**	**A:** Yes, I think so. There can be a language gap as well.

End of interview

APPENDIX H: Interview 6 with Participant 6

The interviewee has been working in the organization since 1996. He started as an engineer. Now he is a technical manager for the last three years. He is one of the critical supporters of the Wiki.

	Q: To start off we would like to know your background in Y-COMPANY?
	A: I have been working since 1996 as an engineer for Y-COMPANY starting in the network side and then I had moved over to Lund to the mobile side. I have been working in both software design and system design, test, outsource projects and then technical manager for the last three years.
	Q: In your department do you basically use wiki or X-coll?
	A: Yes a lot, for all tips and tricks and so on describing our ways of working. It is also very much a pointing tool for the documentation system, in which we have version control and so on. Wiki is very much showing where these resources are located, instructions on how to work or when you start as a new employee all these material are found and located in wiki. That is how you direct people to wiki to find information by searching in it and also by looking at the different departments. I mean it is structured on departments and areas so if you are working on test you can go to test department and find resources related to work in my group for example.
	Q: When we talked to people in places where wiki is not much used, people were feeling there should be more push from the management because they don't feel it is worthwhile spending their time on it, because they don't feel it is valued by management if they spend time on it. So what do you think the management can do for that?
MS	**A:** It is always difficult as we have been in a growing situation in my organization for the last three years, now not growing anymore, but the wiki is where people find information. When they start this is where they are directed when they start so it became a very natural way of working from the beginning. The initiative to start wiki was from one of the guys and it was an engineering initiative not a management decision and I think it is not always that managers should tell what to use. I think it is that you can start your things and when you think it is working, then you can get a commitment from management. So all initiative doesn't actually have to come from above, I think it is more difficult to get people to work if you feel forced to use it, than when it comes in a natural way.
	Q: Yes exactly, we felt the initiative should be bottom up and that is why it should come from the users. We have felt there are some believers who want this and who want to make an initiative but at the same time, at the user level there are some non believers. Will they benefit by a little push from the management?

MS	**A:** Yes, what you can do is that you can give them your positive sign to it; that is sort of to say I support you in this idea and that is more or less how I understand it is being done. Some started setting up wiki in their own computer and people started putting in information and when it became a very successful tool it got its positive sign from the management. Management have supported and protected it because wiki was not the way of working that was supported by Y-COMPANY. They had similar tools internally and that was the official tools to work, but I don't think they were so easy to work, and it feels more like its pushed to people. Here with wiki you feel it is a more natural way. Wiki is something that people are familiar from their private usage.
	Q: Could you give us some examples of how the management supported wiki?
MS	**A:** For example the IT system didn't want to have it in because it wasn't an official tool. Management protected it and when they came to discussions they tried not to get it up to higher management, but when it became big enough and it was too many users it wasn't possible to close it so you had to make it official and then the company has to accept because it cannot take away all the information channel that is being used by several hundreds of people. And it seems that wiki popped out not only in our organization but in many other organizations in the same way.
	Q: We understood that X-coll is more official tool here, so do you think systems like wiki would benefit by making it more organization wide and more official and more of an Y-COMPANY tool rather than just in departments?
MS **MC**	**A:** Yes, but then you must have things from a security point of view. We have some external people who come and work in here. Our company being a competence company it is of course a big risk that wiki showing this information because it has a lot of important information located in it. So may be not everyone should have access to all information. In a documentation system there is more restricted information and that is maybe the drawback with the wiki, the way it is open, so if you find it everyone can access to read information
	Q: So if we could say that if wiki or a similar system where you have the ability to restrict parts of it, then it could be a future system for the organization?
MS	**A:** Yes I think so, maybe we also have to educate people in what information you should put there in wiki where it is not protected compared to documentation systems
	Q: There was a concern from one of the users, that if the system would become organization wide, it would reach the top management at Y-COMPANY and it would be hard to manage both the systems?
MS **SC**	**A:** The risk is that they will try to structure it. I think it is good to have some kind of editorials where you get the structure of it. If you are going to use it, and not just search it like a web search, then you can click through structure. Then someone needs to design the structure of wiki in a high level so that its not only apples and pearls mixed together, but there is a logical way of finding information down in the structure. It is something which can be improved in wiki, that you have some editors that is designing the structure of what you should have on the different levels.
	Q: So you believe the structure is not fit enough for the organization as a whole?
	A: No

	Q: Can you give me an example?
SC	**A:** For example of the resources you use at the beginning someone put test and someone put something else, test and design I mean are the same thing but if you put test and something where you not find a logical connection.
	Q: Since there is a "felt need" that the structure should be changed, has the management tried to push the users to come up with the idea of wiki to try to improve the wiki and its structure ?
MS	**A:** Sometimes we do small improvements but we try not to interfere too much but sometimes we go in and change some things
	Q: Why don't you want to interfere so much?
MS	**A:** In our area, we normally try to have an order. So when it becomes too messy we go in and say maybe you should change a little bit or move around things here.
	Q: Do you think if the management monitors the wiki, this will affect the users' contribution to it?
MC	**A:** Yes could be. That is also a risk.
	Q: Is that why you try not to monitor it that much?
	A: No, we have put up a structure of how we should construct the wiki page. Then the user can put in whatever he wants to accordingly.
	Q: And are you happy with the wiki?
	A: There is also a risk with these kind of systems that you put a lot of information there but is not updated over time and it might be wrong information or wrong time and no one feels responsible to update it.
	Q: Do you feel the data inside the wiki may not be accurate always?
MS	**A:** It could be, in some cases like procedures that you do for some things that is very much related to a project. These procedures change many times during a project and are not up to date and people try to do it. As it is not the correct information they waste their time or destroy things. Then it is always a risk as no one feels responsible to update the information all the time when it is changing
	Q: But maybe the user's contribution to update is not that prompt because the management doesn't recognize it as an official tool?
MS	**A:** Yes it could be in some cases that way. But for example, in the projects we are forcing people to update, say, the status of their work and that is always tracked under wiki. So when you do an update you also update wiki to say what is the status of things. That is kind of positive sign for the managers as it is the way users should work rather than management just controlling it.

	Q: To what extent is the lack of time preventing the users to contribute to a non-official tool?
MS	**A:** Normally you have a lot of tasks, but it is also a company culture thing. For example I have a colleague that used to work in another company and now he is a consultant here. From where he used to work before he is used to always document everything. It is the same if I look at when I previously worked at the network site with the German engineers in Y-COMPANY. They were very good in always documenting their things in these kind of WebPages. Before they had wiki they used internal web and they had a lot WebPages where they shared information of how they do things that are not found in documents.
	Q: What you think of the education level and experience of the user and to what extent does it affect the contribution of the user?
PD	**A:** Yes, I mean with experience you change the way you do things. For example if experienced people like to put information to share its because if I know how to do things rather than having five people coming and asking me for this, I can just write it in wiki where they will be able to check it. But I would say that this habit comes over time, if you would look at senior engineers with maybe 5 to 10 years of experience they are normally much better in documenting and spreading information this way because this is the way they would also not get too much disturbed by people with simple questions and they are also more used to documenting things. People are sometimes afraid to put something officially if they are not sure.
	Q: When we talked to one person, he has used the wiki but he is not aware if he is allowed to contribute to that wiki, so do you think making that wiki more visible could improve the contribution?
MS	**A:** First, maybe I can say for example in my department I have worked in an organization that started with the wiki, and then I moved in to an organization that used X-coll or were supposed to use X-coll. I don't know if I used it that much. The management that I joined wanted us to move over to X-coll, and I said no, as a manager. I said that wiki is a much better way and I will defend it for my employees and that is the way we work. I will not adapt your ways of working. So you can say in that way we kept it and one other line manager actually joined in and over time people started joining in but maybe not all, but it was a positive sign for my manager that we used it. He was not that happy about it from the beginning maybe he hasn't said officially that this is the way you should work and maybe that could be a good way to say you should use wiki in your way of working. That can probably improve the people that are not aware.
	Q: As many people are not aware of the benefits of a wiki and maybe this has to be done with training, to what extent has the management tried to educate its users and increase visibility of wiki?

MS	**A:** No, but I actually think that this would be quite good, this discussion is actually beneficial for me and I also think what is important in the training to learn is what kind of information should you put there and what should you actually put in the official documentation system. I have for example come across a couple of times where I have felt people are pointing to classified information that is not for everyone to read and that information should not be in wiki and not pointed out to. It should have been kept in a more secure way and this is what I think you have to teach them; what to put there and what not to put there.
	Q: What is your opinion of the benefits of wiki versus its perceived costs?
PCB	**A:** I think it is a worth a lot because we are a knowledge company, it is beneficial and it doesn't have to cost that much to train people, it is not a complex tool and it is quite easy to work with.
	Q: It is more a question of visibility and convincing rather than technical training?
	A: Yes
	Q: If that is the case why haven't the management tried to do this?
	A: I think its because in those organization that has been using wiki, it has been working and no one has complained either about it. No one has raised the question that there is a need, and I think that is the reason.
	Q: Would you take an initiative?
	A: Yes I would say, that this was good information it is actually a good way to raise this.
	Q: And for doing an organization wiki?
	A: We have an organization sort of wiki, so to say, where we have line information and project information under our structure.
	Q: **Should the organization level wiki happen more bottom up, by departments connecting and growing rather than coming from the top?**
	A: Yes but I can say that in our department we are around 80, 90 people but it is not all sections in the department that has joined with this, it is just some. It is more based on who worked in this group as a manager, it is they who have encouraged wiki in their section.
	Q: What is your opinion of having management tools inside the wiki?
SC **MS**	**A:** We have a webpage with links to management information and that is more official. Because wiki hasn't been done as a really official tool, you have maybe what is official in the normal webpage and wiki as a more low level way of working.
	Q: So you think it is not safe to put management planning inside the wiki?
MS	**A:** Most of the WebPages have links where you can find the information and in theory you can have it in the wiki as well if it was more structured so now you don't have it. In normal WebPages you have an editor working on structuring things, in wiki we don't have this.

	Q: When we have links in wiki which lead back to X-coll, this will not be efficient for the user as he can go to X-coll directly, but if we had the X-coll by itself in the wiki wouldn't it be more effective?
	A: What I think I can put in the wiki, is information of things that administration work which each individual themselves can do, for example, How do you time reporting? or What is the information on the vacations this year?, that information I can could have put on wiki and I could point them to look their first and then you could come to me , I could probably benefit from that myself. Normally I have them in presentations and I don't put those presentations in wiki.
	Q: Some times people share knowledge through chat or email, more like person to person interaction. But if you have a forum, like a more permanent solution integrated to wiki, where people can chat but their comments will be saved for everyone to see, what do you think about that?
SC	**A:** What I used pretty much myself back in 1998 ,1999 was newsgroups when I worked in design where you can post a subject and that was very good information source in your work because we worked with a new area of programming and not many people have done that so it was very good way as we had a couple of experts answering and I think it is a very good way to spread information, and maybe it could have been nice way if we use a more modern way tools than newsgroups but something that does the same thing, it would be probably to integrate it in wiki, but I don't know what kind of tools are being used today
	Q: What are the tools that you would like to add wiki?
	A: It is a free application called "ShowMeDo", where you are able to record what you are doing on your computer. What you are thinking and doing while going through a material can be recorded and people can then look at that. And that is a good way to store information , it is better as you can show more than when you do with text, we have used it a couple of times but I think maybe I should train people more in how to use it.
	Q: The issue of stability, as there is some change of organization tools, people feel distrust to contribute as they feel the current system will only be for short while?
	A: I am really glad that we jumped on the boat on to work in X-coll because it is an Y-COMPANY internal tool and now when we change to another company that is not an Y-COMPANY company, I would prefer to use a tool that is used over the internet, so either open source or heavily used internet tools rather than having an official one. But I don't know when it comes to security as it is more likely that you can hack this but that is a risk.
	Q: So concerning the security of wiki what is your opinion?
	A: That is of course a risk that you should think about when you are using an open source or shareware.
	Q: Would Y-COMPANY allocate resources to improve the wiki?

MS	**A:** I don't know. I know that we weren't allowed to use wiki at the beginning because it was not supported by Y-COMPANY and for the IT guys it was not an official tools and I guess it was because of security reasons. Of course the drawback with open source you have no one to blame there is no one to complain to if you have a hack or a problem there is no one responsible that is probably why Linux is not used in companies because you cant blame anyone when you have problems
	Q: Is there any way that management can allocate some resources to improve the wiki, like in terms of restrictions, contents , security ?
MS	**A:** Nothing that I am aware of but I think it could probably be a good idea.
	Q: If there are solutions which address the security concerns to improve wiki, do you think the IT people would be interested in that?
	A: I guess in our case we are not interested it is not our core business. But if you have a company that take the wiki and say that we make it secure and if you have a problem address that to us if you buy the version from us. That kind of business can solve some the issues that open source has today.

APPENDIX I: Interview 7 with Participant 7

The interviewee is a section manager. Previously he was the manager of the department where a currently successful Wiki first started and spread. He had taken several initiatives to support the Wiki.

	Q: When you set up the wiki did the whole section want the wiki or was it a couple of people who wanted it?
PD **MS** **CB**	**A:** I would say that it was a need that was expressed by *** (*Participant 4)*, so it was an individual expression and then he also had discussed with some other persons. The idea seemed to be good so he got my support for setting the wiki up. We were assigned a server and we just tried it out, and *** (*Participant 4)* is a driving force so he started to populate the wiki with articles so we can also see the benefits of having the wiki. Eventually we got a critical mass in it and it took off and that is the way it was.
	Q: But as a the start was it a need felt for a solution from the management or was it an individual need that only *** (*Participant 4)* **felt?**
FN **PD**	**A:** I think we were all frustrated at that time that we didn't get the information spread. That was felt by myself as a manager, and also the team members inside the organization. Then the proposal to use the wiki to solve that frustration or to fill that frustration was expressed by *** (*Participant 4)* so that could be the potential solution to our frustration.
	Q: So it was like the management felt it was a need and the users too and one came up with the idea and the management supported it. Where there other ideas or was it just a wiki?
PU **SC**	**A:** No I would say there were other wiki ideas that were expressed at that time. We were Y-COMPANY and we had sort of Y-COMPANY solution that we looked into. There was also some collaboration tool, which was quite formal, but it also didn't support the need that we had. So this wiki we setup as a local server, could spread things that are on peoples mind, the things that can go by word of mouth etc.. are the things that we would like to address in the wiki.
	Q: One opinion is that people with more experience and new comers support it. However the people who are in the middle, not new comers or not that experienced, they don't really want, as it doesn't support them much. What do you think?
PD	**A:** I don't know if it has so much to do with the age or the experience in the company. I think it is more of a personality. if you see for example some person are more expressive than others. Some are more in a way of expressing their thoughts in paper or in descriptions and how to do things, and I think it is the same way in contributing to wiki. So I don't see it as a sort of age or experience in the company. I see it as an expression of different individuals, as some might not think that you should need to or should not share things on the wiki
	Q: So in your experience in your own section , do you think that it was the people in this expressive side who wanted to contribute and that was the reason for success or is there a mix of people as you see it ?

PD GS NT FN	**A:** There is a big mix of people in the section. So there is a need of information that is usually expressed by some, and in others it can be in their head, but possibly stays there. And as sort of the need of information is larger than the number of people to go and talk to, then the wiki fulfills its purpose. If we were only three persons in the section, then you would obviously just go to the other one to get the information. But in this department we are quite a large group, dealing with the same things and working with different countries, with a common information need. So therefore we sort of see if we describe this, then we might contribute to another person's or site's success or possibility to act and I think that is a critical thing.
	Q: So if there is a size that tips the balance and that also that need for sharing information. Then even though there are people who might contribute and people who might not, it can be a success?
GS PD	**A:** Yes, I think so, size matters actually here, because there might be persons in the group that are not that expressive and might not be natural in sharing their thinking and their words through a wiki. But if the size is large enough there will be sufficient people to fill the information need. So that is correct and that is what I think.
	Q: When you started the wiki, have you seen any difference in the way it started? Let's say, the people who was contributing and how it spread?
PD ES	**A**: I think people were a little reluctant in the beginning, but eventually also saw the possibilities and the success. I also think that there are some persons that know that wiki exists but potentially do not use it as often as they should be. So I think there are still some heavy users and some users that don't use it so much. It works both ways, but it has taken off after some time when people got sort of used to it.
	Q: For the people who were reluctant, did the management try to push them more to use it?
MS	**A:** Yes, we pushed in the sense that we would like to see more articles up in the wiki. In the personal talks and in team meetings we had, we actually gave some references that we have put this in the wiki and that we have this article there. We pointed out the structure on the wiki and how that should be set out to make it easy for people to actually use the wiki. That's what we did as well.
	Q: What you think about adding an organization wide wiki instead of having different wikis in different departments?
FN SC	**A:** I think it depends on what you want to achieve with the wiki. What we wanted to achieve was really the simple things of "how to do" things, how to get this new electronic board working in the lab for instance, very detailed particular things that someone with a particular experience have found in the lab and is needed by many. I think there is a possibility that you to for an organization wide wiki that also consist of this level of detail, I think you need a very good structure to be able to host this information.
	Q: And what about the security?

SC	**A:** It could be also a problem. At first our CM, configuration manager, (for version control, builds) was not too fond of having a wiki. They saw it as a way of putting sort of competing information on to the wiki than in real product documents, like X-coll or DMS. And those are more the sort of documents that are valid. But what we do in the wiki is that we point out by putting references to DMS to keep things sort of updated because otherwise the DMS or the X-coll will become sort of black hole of information. It is sort of there but you don't know. The wiki gives an ability to sort out information and put references.
	Q: So you think the security factor, the complex structure and the quantity of information is a drawback to have a organization wide wiki?
MS **FN** **PU**	**A:** No I don't think so, but I think it needs to be handled. You need to have an organization wide wiki, but if you don't have the right structure it will be a mess. If you don't have a documentation database that you can use for security and group information such that attachments are also brought into and displayed in the wiki, then I think the wiki will not fit the need. The wiki can point out references to this information. But then it is the DMS that sets the access rights.
	Q: Is it possible to do these improvements on the wiki?
	A: Not in the way that we have today, but possible.
	Q: I mean, does it require a lot of resources from the organization to improve those issues on the wiki?
	A: I see them as two collaborating systems actually rather than one system. Because I think you need to have for instance, a documentation system and have web pages for project, which is X-coll for instance, and then potentially to have a wiki to serve as a glue in between documentation and project web pages. I think that I see them as three individual systems that you basically need all the three of them. They serve as glue to each other and that is how I see them.
	Q: Wouldn't you rather instead of using the three system try to make improvement in one system to have it as a common system for the whole organization, for example improve the WIKI to have the tools X-Coll, wouldn't it be better for the organization?
PU	**A:** I think using different systems actually, because you have documentation sets, for instance, and activities that are very dependent on specific projects that need to be handled within this project course. I don't see that would go into to the wiki for this purpose actually. It is not in my mind, possibly it a solution. Maybe I am too framed in my thinking, I don't know.
	Q: What do you think about the benefits versus the costs?

SC	**A:** I think one of the problems that we have in the current wiki, is that we have articles that are not up to date. For instance, articles that have been written just recently and we don't understand if the content is valid or not. That is something because of the wiki we have today is sort of "how to". It is to spread information, valid information, but it is not as important as to put it into real sharp documents. It is more of collaboration between individuals rather than having that formal types of documents like in DMS. For example consider an interface specification between two different objects in a project. To have them work independently we need to be very formal in setting this interface up so that it is understood by object A and object B that this is the revision of document we should use. Having that seen and updated in a regular fashion needs to be handled outside the wiki. At least in the wiki that we have today.
	Q: Do you think it would benefit more if the wiki from each department is coming from users, or if you had the management bring it as solution for the organization?
FN PU	**A:** At one point, Y-COMPANY in a way launched a wiki to be used. You could apply for an account, then start a page and do whatever you want to do within that specific space. So in that sense management decided that wiki was a good tool to have and they did it this way. But when we as a team came in and looked what that was, it didn't fulfill the purpose that we intentionally had at the moment. So we went for a sort of separate solution. I think that is just an example, but I think every organization needs to assess the requirements that it has on the wiki. So that we know what it should be used for, and if that is sort of done, then we should be able to do it also from a management point of view, like the X-coll. I also think that the maturity level that we have on the wiki today, I would be not very keen on migrating this wiki that we have for thousand articles into a new tool just to have it working in a specific framework.
	Q: And if actually nothing like that happens from the management or any KM policy, is there a way this particular wiki can benefit other sections to get them started?
MS	**A:** Yes I think so. We started up this wiki with the purpose of serving only our organization's (meaning department) need. But the word of mouth have sort of spread and we have then created a structure that allows other organizations and other projects to be able to populate the wiki with their content. It has already happened, although we are not announcing that we have a wiki and please join in developing this tool into a larger scope. We have not done that.
	Q: So you are basically satisfied by only your department contributing to the wiki?
MC	**A:** I can see that it has some benefits, if some other organizations join, it would benefit. But I also think that in order to be able to judge the information I need to know who puts that information in, sometimes it is only applicable to our own department and sometimes it is applicable to other parts of the organization. That is something that needs to be ruled out in a way.
	Q: So you think the information needs to be monitored and controlled?

	A: Possibly, but I also think it is a problem already today that we already have old and non updated information and having the wiki in smaller group or in a group where you understand the group context, will help you understand the information, for example, to know it is invalid and then update it. However , if the number of organizations grows then you will not be able to do that , because it is out of your scope and you would have difficulties in judging if this information is relevant for you or if it is relevant for some other person in another organization.
	Q: But if we had somebody monitoring this information wouldn't that be helpful?
SC	**A:** Yes it would be helpful, or if you have a structure that allows you to understand who put this information in.
	Q: What new features do you look for in a wiki?
SC	**A:** I think, possibly it has been taken care of but I haven't seen it. But sometimes it would be good to be able to understand sort of the relationship of articles, but I think that it changes on what kind of wiki you use or implementation or the wiki. But I can see articles that are cross referenced in a lot of places and that is somehow difficult to understand, okay how many places is this cross-referenced to. I can also see that the search capabilities are somehow limited
	Q: But as we know you have added some search tools to the wiki?
	A: I don't know if we have had it recently, possibly I haven't used the most recent if there is a specific recent update.
	Q: Would you want some management tools inside the wiki as well, or you wouldn't trust the wiki with the management information?
SC	**A**: I think the problem in the wiki is the outdated information. It is difficult to judge if the information is old, or relevant, or if it is still in use etc..
	Q: But if you solve the problem of the outdated information, would you like to have the management tools that you use in X-coll or different systems inside the wiki ?
	A: I can see the benefits of having the wiki together with X-coll, but I am not sure how that would look like or sort of seem because X-coll is sort of team page which you sort of post information on which is in a way different that we have today. But if you connect them I am thinking that it wouldn't give you sort of possibility to restrict the information that is related to a specific topic or specific project. This is one way covered in X-coll
	Q: So if someone is trying to set up a wiki for the organization what tips would you give them?

ES	**A:** The tips would be to decide what you want to have the wiki for; that is number one. Number 2 would be then set a structure on the wiki such that it is clear for everyone how it is supposed to be used. And the third thing would be then to try to populate the wiki so you would get a critical mass in order to show the ones that are a bit reluctant or don't see the need for a wiki, that the source of information is the wiki and not the personal contact from the first step. That is how I would do. And in some sense I think we did just about that, the structure however we did not set, we didn't put so much attention to it at the beginning.
	Q: So you think the top management will support if you took an initiative for the wiki?
MS	**A:** I can't say that top management are negative to the wiki, and quite frankly I think they would just like us to collaborate and if we could do that better with a wiki then it is just for us to decide. If we can say that to improve the wiki also means that we improve collaboration and improve our ways of working and eventually the efficiency of the company, who can turn down that proposal.
	Q: To what extent do you think the lack of time is affecting the users contribution?
PD FN	**A:** I think it is affecting a lot, but again I also think that for instance the guy you met previously, *** (Participant 4), is a person that has not so much time or not more time than the others have and is preoccupied by couple of things, but he prioritizes these things because he understands that he might get this question again. It is more likely related to the individual character of if you are expressive and put your things to show others.
	Q: Don't you think the perceived view of the wiki affects the users' contribution? Has the management tried to change the users' view of the wiki?
MS **MC**	**A:** I think you are right, but I don't think it can be done. At least not for intentions or the scope of the wiki that we have, it won't help that our top management goes and says that we think you should have a wiki because by having a wiki we think you will work more efficiently. What we did was to take it from the guys that work with the "how to's" and have the wiki as a platform for sharing collaborative ideas or collaborative know how's, and that way when we showed that this is what you can use it for.
	Q: Do you think, like in your department, if there are a couple of people who drive this wiki, if in a section or another place they are not there, then really the time is not right for a wiki and then a management push may not work?
FN PD	**A**: Yes I think so, I think you need to have some persons that think that this would help and start contributing, and in this case it was myself and ***(*Participant 4)*. We launched the idea, set the scope and then we tried to populate on each side, he on project activities and me on line information. I think that was the key.

End of Interview

APPENDIX J: Interview 8 with Participant 8

The interviewee has been working as a tester. He works in a multi site project. It is quite important for him to have an effective knowledge management tool in a cross site environment. He uses an external SPOC (Single Point of Contact) wiki as well as an internal wiki, and contributes content to wikis in the form of links to manuals etc.

	Q: Can you give us a description of the communication channels you use?
PU **PEOU**	**A:** The First time I had to use wiki like a webpage was for something which is called SPOC "Single point of contact" and I had to prepare a webpage where all the instruments vendors in the lab will be stated so that every user could access info about particular instrument. What kind of instruments we have from vendors in the lab, manuals, facts and figures of the instruments. FAQ's, and also new firmware versions. It was good because it was structured in such a way where we had first like instrument vendor section then every instrument vendor then all the instruments from each one and for each instrument we could access the information I mentioned before. It was in a step way so it was quite straight forward and also that was linked to the folders where we used to store every thing. So I think it is quite good in that sense. You have everything quite accessible. You don't need to... I mean saves time… asking where is this saved and how can I access this.
	Q: Are you a tester, developer, or?
	A: I am a tester, hardware and software tester in L1.
	Q: In your section this is the system that you are following,
NT	**A:** Mainly, but it depends on the projects. There are several projects ongoing in our section. Not all the projects use it to the same level, to the same extend. In my case this project is one parallel, multi site project. It is run here in Lund and in parallel in Nurnberg, Germany. So for us it is quite important the existence of the Wiki. We find lot of information, there are some information we can access by other means, but nevertheless it is also stated in the Wiki. So in some point of time if we don't remember you always have that support.
	Q: Have you been writing to the Wiki too?
	A: Yes, not so much to this one. But to the one I mentioned before, the SPOC wiki.
	Q: What is your experience about writing into the Wiki? What do you like about it and what do you dislike?
SC	**A:** I will say it is good to start writing even if you have never done it. It is not difficult. It is fairly easy to learn to give a good shape to your comments so that it is clear. I would say that is the main advantage. Then later on as a disadvantage I would say it is also easy, or it happens often, a lot of information from different, what I mean is that it happens often the information is not well structured because everyone can write everything without following rules or following the structure of the webpage. So it can get confusing at some point.
	Q: What is your opinion about data accuracy in the Wiki? Are they correct information in the Wiki? Are they out of date, not valid anymore?

SC	**A:** I think it depends. For instance we have a database for documentation management system, DMS. Then if you place a link to a document and the document keeps updating you can get the latest version from the link. But if for instance you place a link to a physical document placed in a folder of course it will be out of date after a while. So it depends.
	Q: So this can happen in the Wiki that there are things out of date and people can use them by mistake sometimes?
	A: Yes, you better always check what the latest version is.
	Q: We have been actually asking about making an organization wide Wiki here. How could it be like to have a more structured and more official Wiki? A manager expressed a concern that since Wiki is more like, people update it when they feel the need, nobody is responsible for a page or information or anything. So there could be a lot of un updated or invalid information in that. So do you think if there is an organization wide wiki, will people take the responsibility or will they have to be pushed to it?
SC	**A:** From my experience it is a bit difficult to keep everything updated for the reason that everyone can update whenever they want, So it is a bit difficult. Something which I think is a sort of solution to avoid unstructured information and out of date information is sending a mail by the person who updates the wiki to all the people in the project. So that everyone can check if there is an update and keep track of the source and know what things have been updated recently.
	Q: If you have an automatic mailing system which alerts people to changes, will it be good?
SC	**A:** Definitely. We don't have such a feature in our wiki currently.
	Q: As the structure can become haphazard, if there is a person who is a master of the wiki who makes the structure and rules, do you think it is good or will it put off people, like it gets more formal and you don't feel anymore to update?
	A: I think in ways you will feel free to update but your comment will get modified somehow. Rather think that it will be difficult for the person to handle such a big Wiki. It could help but it is difficult.
	Q: You have different wikis in the different departments. How about an organization wide wiki where everyone can contribute? Maybe a little more structured, like every section has a section in the Wiki. So that people from a section only go into their section to modify. But still if you want to, you can see or connect to other sections?
MS	**A:** Ok, like all wikis are connected to a big one. Sometimes if you want to check something of different project, it is not easy to find that information. Probably it will be easier in this way. But on the other side it will become something huge and I am not sure it will be easy to handle due to too much information and too many sections.
	Q: From our talks to others here, some people think it is not really worth it to spend time updating the wiki and they don't have the time for that. From your experience what do you think, will you have time for that? Or you spend too much time on it compared to the benefits you get?

	A: I haven't spent time updating the Wiki. But I have been updating the information about physical folders or hard drives were the links from the Wiki are accessing. So I tried to make sure that everyone who is looking for that specific document by accessing the link will get the latest version. This is the SPOC wiki I am talking about right now. In the other one, the project I am working on right now, I haven't updated very often.
	Q: Do you think that as Wiki doesn't have content restriction, like anyone can delete or update, is that an advantage or disadvantage for a system?
SC	**A:** I think that's the reason for Wiki becoming unstructured or too dense information in the end. You have to browse to find what you really want. So yes I think somehow it should be, if not restricted, probably organized or structured; what can you write or where.
	Q: Following up our last question, you are updating your information in your hard drive. Is that the pattern you are told to follow or you don't feel its good to have that in the wiki or there is no space in the wiki for that? Or it works better to have link to that?
	A: In this case it is because those are either software files or documents or manuals which cannot be put directly in the wiki.
	Q: But you add the links to the wiki? But you have been doing that? We can consider that as an update.
	A: Yes, you mean if it was done very often or it took too much?
	Q: If you are spending some effort for that, like writing those documents and adding those links to the wiki. So you and your section members see some sort of benefit from it. When you look at all of it together, do you think you are spending too much time compared to benefits that you are getting?
PCB	**A:** No, I don't think it is too much time. On the other side, everyone who needs to get hold of that information can access the wiki. For instance I have received mails asking this information is not found in this particular document, is that the latest one? Is there any update to this document? And sometimes I had to say yes. People sometimes hesitate a little bit if it is the latest version but then they can always access it. So I think sometimes you need to say, "Yes it is the latest version" or "I will contact the instrument vendor to see if there is a newer version but this is the latest one I have. The profit is that everyone can access it.
	Q: So maybe in the wiki, when you are updating links if it can show the dates which it was updated or something like that which will give the others an indication of how latest the information is, wouldn't that be very good?
SC	**A:** I think that is very in the wiki like pages you can see that. Not if you browse but if you logon and try to edit it then you see what the latest modifications was. You can see the date and what was changed. So yes it helps definitely.
	Q: As wiki is not currently used in all departments, why would you think these departments do not contribute to the Wiki?
	A: I don't know why they don't use. Maybe they think it's too much time to gather all that information or maybe they think its better to spread that information using mail.

	Q: Or do you think if oral communication has a lot to do with it?
	A: I am not sure probably it has. But I don't think it is always.
	Q: Or more emails?
FN **PU**	**A:** I think emails in any case will be better than oral communications. But I think Wiki is better than emails. Wiki is always there in case you need to browse, it is not deleted.
	Q: Do you think maybe that they don't know about the Wiki or they have any view about the wiki? Like CPO tried to push the wiki to all departments. Like your management, you know about the wiki. Have they tried to push it outside your department or they are fine with using it inside only your department?
MS	**A:** I cannot answer that. I don't know if we push it outside the department. What I can say is that as soon this project started we have also with all the information and when my manager came in, he pushed for the wiki and we started this development. So at management level I think they are aware of the benefits of the wiki, At least in my case at least my manager pushed for it in my project.
	Q: In your department or the project?
	A: In the department and also the project. But as soon as this new project started, it was pushed. So it is not something like, how to say, static. As soon as another project comes in, it is also included in the Wiki system.
	Q: So when this wiki was developed for this project was everyone in the project enthusiastic about it?
PD	**A:** Not everyone to that sense. It depends, at least the developers. But I think everyone was kind of happy or relieved to have that kind of information. So they don't have to go back to mails two months back to find information. So I think we appreciated the efforts of the wiki even when not everyone was trying to develop or support.
	Q: So if you compare the starting and now, do you think peoples perceptions have changed or is it more Pro-wiki? Like do you see any change if you compare the beginning and now?
PD **ES**	**A:** Yes in general. I think got used to this way of spreading and finding information. It gets more into your working way after a while.
	Q: So in the beginning people were used to something else like emails. After a while when they get used to this new thing it picks up more?
ES	**A:** Yes definitely. I remember an instance in the beginning when as soon as you need some specific information we need to ask someone else. Then he needs to go through the mails, find it and forward it to you. Now they just look it up in the wiki. In the end people don't even ask, they look up in the wiki and then if they don't find it they refer to a colleague.
	Q: Do you think because of the wiki, your personal contacts in the project or section might suffer? Like before you had the wiki you tend to go and talk to people, so you kind of build up on them. If the wiki is there, you sit back and use it and don't go

	around asking people.
PD	**A:** I think you spend less time asking other people.
	Q: Do you think it is a bad thing or a good thing?
PD **FN**	**A:** I think it is a good thing. If you need to ask someone, the other person needs to spend time with you. This is something trying to differentiate between professional and personal relationships. You can always go and chat or talk to a colleague. But if for professional reasons you always need to interrupt it is not so productive.
	Q: I was wondering to what extent you think experience has to do with this contribution? If somebody is more experienced, will they tend to use wiki more as it saves time? Or it has nothing to do with experience? *We explained the question more:* **We have got different perceptions on this. Some people think more experienced people know a lot of things so they don't want to be disturbed by newcomers or less experienced people coming and asking them question's all the time. So they like the wiki. The other perception is that more experienced are not into chat or wiki or all that. They prefer more face to face communication or oral communication etc…, What has been your experience?**
PD	**A:** I think I have experienced both cases. It depends on a bit on the person. I have colleagues who as soon as they find out something they publish it in the wiki and send out a mail. In this case they probably don't want to interrupt and want to share information ASAP and I think it is the easiest way. But there are also other colleagues who are always on the phone, they prefer oral communication. They haven't been updating the wiki so often.
	Q: So you think it's more of a personal preference rather than experience or age.
	A: Yes, I think it depends little bit on the person.
	Q: Do you think the level of education of each person has to do anything with this?
	A: No, Not necessarily.
	Q: Any other criteria like gender or age?
	A: If I think of my colleagues I don't see anything like that. Its personal preference I would say.
	Q: About structure, is there anything bad about the design of the Wiki?
SC	**A:** I think the secret is to set about a good number of well defined levels, what should be under each level and how to divide the information and not publish everything on the main page. Then it becomes very difficult.
	Q: You think it's very difficult to use the wiki if all the information is on one page. Is it like that now?
	A: No, there are different levels. But I must tell you I mainly only use the one for my department or project depending on what information I need.

	Q: Is it easy or hard to go through?
SC	**A:** If it is everything on one page it is very difficult because you need to browse a lot and is also advisable to use different fonts and different sizes of it.
	Q: Are they using like that inside the wiki now?
	A: In the one in my department it's being used, in the one in my project it is not so much.
	Q: So do you think when a wiki is being developed, a training session for the group which says if this is the kind of information put it in this level or font, provides an initial structure? Just a half an hour session where people are told or this is put up somewhere in the Wiki itself maybe, so that everyone who comes into it knows how to follow the rules.
MS	**A:** Yes, I think some kind of rules for wiki will be very good. I think that is one of the reasons why people edit on the main page because maybe there is no good structure and there are no rules set. Sometimes you find headers that are less important and all that information is on a bigger size. So I feel that it is not good.
	Q: Are you satisfied with the design of the wiki?
SC	**A:** Not fully satisfied. I am happy with the service of having the Wiki and being able to access the information present there and also link to other databases or information sources. I think it can be improved definitely.
	Q: Do you think the management to support you more than they are doing now? Like put more resources to try to improve it. Or take some initiatives to ask people like whether and how it should be improved and doing something for it?
MS	**A:** Yes it should be good, some directives maybe.
	Q: Because right now if it has to be improved, no one has a particular task to do that. So if the management comes and says that this guy can do that, just to get it started, maybe that will be good?
MS	**A:** I think that will definitely be good. Maybe some of the existing wikis will need some changes after that.
	Q: Do you think if the management declares the wiki as the official tool for the department, will the users be more willing to contribute to it?
PU	**A:** No the fact that it will become official will make the people to feel more eager to report it. I think what will really manage the tool is if everyone manages to find the information they are looking for easily.
	Q: What we see is that right now wiki is more developed on a needs basis. Developers and testers feel that they want it for their own efficiency so they go and do it. Whereas, if it is more official like DMS, X-coll, there would be a little more pressure. So if there is a similar pressure on wiki will it be positive or negative. Do you think it will make people stay away from it or like DMS they will contribute?
FN	**A:** I think what will make people stay from it or try to get closer to use it depends on the

PU	need of the information defined in the wiki. Of course better shape will help wiki.
	Q: So basically how useful it is and how much it is needed?
	A: Depends of course on what you are looking for. For instance I check it almost everyday; not every moment but for my daily tasks I check it every day.
	Q: Does management monitor your work on the wiki, like how it is updated?
	A: No.
	Q: Do they contribute by adding information?
	A: Yes.

End of Interview

APPENDIX K: Interview 9 with Participant 9

The interviewee is a tester. He is currently working in two projects, and one of the projects involves collaboration with an offshore location. There are two Wikis, one external and one internal, for the two different projects. He gets information from wikis, but does not contribute content to the wikis.

	Q: First we would like to have a brief description of your background?
	A: I have been here for two years, mainly working with ***. I am working now in two projects which are IT oriented.
	Q: And in your section do you have a wiki or what are the communication channels that you use?
	A: One of the projects I am working with involves collaboration with one on site in Germany. To transfer all sorts of knowledge in general, we use the wiki, and also I have seen that for the development that we do just here, we use a different wiki. So it really depends on what sort of information you are looking for. I mean we have one wiki to collaborate with the developers since I am a software tester, so in order to make sure that I am taking the right software and that I am taking the right tools to verify that software, I use one wiki. And in order to understand how our tools in the field test work we have a different wiki that is our own internal wiki. So I use those different wikis for the project that we run here and we use a different one for the project that is run in Germany. So that is a lot of things that is different between those two, they are organized by the same people they have different structures, besides that we use a lot of chat application (Intercol) with our colleagues in Germany.
	Q: You mentioned that you use different wikis with different structures, so what do you think about a more organization wide wiki, where you can go to one place where you have different sections?
SC **PU**	**A:** Yes, actually I don't like the way we have our internal wiki here. I mean compared to the other ones, the other ones are just presenting information. I am not really sure but my impression is that you need to have a link to the information you need to deliver you just need to have it in place. Now the wiki we have here, it works very different, that is more like tips and tricks, and the problem with that one is that everybody can make use of that, I mean in one sense there is a benefit about having some hierarchical structure regardless of how you will present, you will present information, you will know exactly how the tree is, or you can go from one place to another, but the one you have here it is everybody can really have something, so now it has become very unstructured and very difficult to follow, it is a mess. So You can find some tips here and some tips there but it is not really good.
	Q: So would you like the management to take some initiative to ask users what improvements or changes they can make to wiki?
MS **MC** **SC**	**A:** Yes, I think, I mean it is obviously hard since everybody has his own style, in a wiki that is open to everyone it is quite difficult to do that. I would like to , I mean of course they have asked us to try to propose something but I think it doesn't always match with the ideology of not having a very vertical structure rather something more horizontal, but the problem is that you can get lost in that structure. So I mean my idea would be to have everybody have input but they give that input for few people who are allowed to add the information, I think that is

	probably how wiki works and such I mean it is only a few people who have the right to change the information even though their inputs comes from everywhere. So I would like to have something like that, content restriction.
	Q: So you think that wiki having not any content restriction is a drawback for it?
SC MS MC	A: It is not a drawback but I mean it is not fulfilling its purpose. I mean the one I am talking about is not an official wiki, I mean nobody is expecting it to be there, nobody is in charge in giving support to it. For the other ones, there is someone expecting to see the content. When it comes to the delivery of software it should have a structure and there should be one responsible in keeping it in shape and if one link is broken we can contact him, I mean each page should have someone responsible for it.
	Q: Can you tell us about the difference in the two wikis?
SC **MS** **MC**	**A:** The difference is two parts, the one in Germany I think only few people have access to it, and it have some main structure so you know how to navigate and you know where the information is because it is presented in a different format. The one we have here, that is the tricks and tips, that one is not like the person is in control of this and responsible, it is not to do his job, but nobody is expecting that to be documented so if it is documented and you find it then good for you, but otherwise nobody is going to get blamed for in case this is not well structured, but I think that is not good, it could be improved and it could make things more efficient.
	Q: Do you see any difference between the quality of information in terms of updating?
	A: No in terms of updating , it is hard to put a line under the that issue.
	Q: Do you think experience has to do with the users' contribution to the wiki?
	A: Yes probably, well I have only been here for two years, I am kind of the new comers, probably something that I knew here are really important ,maybe for me it is going to be obvious for me after few years. I wished that someone could have told me about before, so something that I will find in my work.
	Q: So if somebody is a new comer, he would sometimes be afraid to put information that is not relevant for experienced users in the organization?
	A: Yes probably, or the other way around, maybe after some years you would think something might not be that interesting but it would be good to have it in for the new ones. You just think it is just not worth writing it but it is actually important.
	Q: Other than the structure than the wiki, what are the other design problems that it has?
PEOU **SC**	**A:** I don't find any other problems in that sense I think. I think it is only the structure.
	Q: Do you think it is easy to use, or is it hard to navigate through?
PEOU	**A:** Yes, as long as you know what you are looking for, I guess it is easy to navigate. But if it had a better structure it would be easier to find your way through it.

	Q: But if a new comer was going to use it would you think he would have a hard time going through the wiki, or you think he will find it right away?
PEOU **SC**	**A:** Yes, I think he will have a hard time. I mean the idea is and I think it applies to both wikis, the idea is that you should spend some time browsing and then you will understand better how it is structured. So you need to make that map in your head because there is no map, it would be nice to have a map like an index in the wiki.
	Q: You have experienced different systems, not only wiki, for your information needs. Which one do you think is the best way to get information?
	A: Yes, I think wiki has a good trade off
	Q: So if it is just improved from the way it is handled now, it would have the most potential to be considered as a KM tool?
PEOU	**A:** Yes I think so, I mean people are used to it, and people have used it outside work so they understand already how it works.
	Q: Since you had experience with other system, do you think having previous experience with other system will affect your usage or contribution to the new system you are using?
SC	**A:** I mean from my point of view, maybe because I am person who likes structured things. If I see that something that is well structured I will be willing to contribute and cooperate more, but If I see that something is a mess , I won't really see the point of adding something because I would see it as a waste.
	Q: Do you consider the wiki as a static or a dynamic system?
MS	**A:** Yes I think it is more static, but I guess it depends what the policies are. I guess it depends on how the budget is assigned, I mean if someone have within his task to update the information and make sure there is no information out of date; then it will be more interesting to see the result. But if it is a low priority task with no budget assigned to it, then it will remain static with out of date information.
	Q: Do you think management is giving a low priority for the wiki?
MS	**A:** Yes, I think so.
	Q: Considering its benefits, do you think it is worthy to give attention to the wiki, would you tell the management it needs more attention?
GS **NT** **FN** **PU** **MS**	**A:** That is hard to know as well. I think it mainly helps people who will work with the same technology and in later projects, but I mean I have seen that the wiki has so far a lot of information related to WCMA, that is a technology that we have been working with for many years. So I guess there is a lot of information there but when it comes to IT we don't have so much experience it is just new and just few people working on it, and I think you can't find many things there yet. So I mean I would say that management should have more priority to these depending on how much people are going to be using it and since so far we are so few people maybe it is not a high priority task, but I have seen people who work with WCMA and they use it a lot, especially if you are going for example to test one functionality that you have never dealt with, so of course you read the documents and you read everything

	that is official, but if there is something that you don't understand then it is a need and hopefully you will find the additional information in the wiki.
	Q: So you think the number of people inside the wiki will push the management to support it and give it a high priority or the other way around the management feels a need and they push the users?
MS PCB	**A**: Yes it is hard to say. I think that it should ideally the use of it should come from the person, I think as an engineer we shouldn't be told or forced to do things. Especially we are working together to complete one project, it should come from ourselves and from each other to include the little bit of knowledge, but the problem is that we are filled with tasks and if you can have one more hour to do more for your work or update the wiki, you would rather do more of your work!! So in that sense we depend on management to assign us some time to do it, of course we have been told in meetings to update the wiki but we don't have the feeling it is a priority. I guess it is kind of hard to measure but it would be interesting if we could measure how much time is saved and therefore how much money is saved by having a well updated and accurate and well structured wiki, could be a lot. Then more effort will be placed.
	Q: Do you think the lack of time is the reason that users don't contribute?
PD	**A:** Yes that is hard to tell, I guess it is up to each one. I guess it really depends on how you were educated as an engineer or I don't know, it Is a culture thing because it is not just about the wiki, it is for instance that each piece of code should be documented. You would be surprised how many people don't document, not even include a header. So if we cannot for something that is official, what can you expect for something that is not official like a wiki? So I think it very important to make sure that culture, having a priority to document these kinds of things, is there for everyone.
	Q: Do the management contribute inside the wiki?
	A: Yes, I think they use it.
	Q: But do they use it as users or monitors?
	A: Yes, I see them as both as users and controllers, but as controllers they just assign the control to some people to control the wiki for updates. In our section, I am not sure how many people have access to modify the content, and I haven't modified the content since the project I am working with is in Germany so every time I have some I send it to the people in Germany. But here I haven't changed any content because most of the contents we have here are WMCA related and I think there is more than one person that is not management but is assigned to modify it.
	Q: If there is somebody then why is the information out of date in your opinion?
	A: Well the person that I know that is in control of it; that doesn't mean he has knowledge about everything. I don't think he knows everything so that he can say that some information is not relevant any more.
	Q: To what extent does oral communication affect the users' contribution to the wiki?
PD	**A:** Yes maybe that is a cultural thing, for me I am **** (*Nationality*) so for me it is very important to talk. Or maybe it is a generation thing, for example I am more used to talk than

	to text, I can text my friends but I would rather go and talk to someone.
	Q: Than use the wiki?
	A: Yes
	Q: Some people have felt that if there is a wiki, it would actually affect their bond with their colleagues, they feel closer when they go out to people and talk, what do you feel about that?
PU	**A:** Well I always try to do things by myself first, so first I go to the official document, if it doesn't work I go to the wiki, if this also doesn't work then I contact my colleagues. But that would be last thing for me to try because I know they are busy. So the wiki will be for me the first option before contacting anyone.
	Q: So professionally you would prefer the wiki but personally you would like to go and talk to people?
	A: Yeah but maybe that doesn't apply in the work, I am just saying that when it comes to chatting when we use the messenger for example, I would rather call someone, if I am already going to contact someone I would rather call the person than sending an email or use the messenger.

End of Interview

APPENDIX L: Interview Calendar

4/15/2010 - 4/30/2010

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
April 12	13	14	15	16	17	18
			First interview to get overview of organization and tools **Interviewee Position:** Object leader/Project manager			
19	20	21	22	23	24	25
				Conduct user interview		
26	27	28	29	30	May 1	2
Conduct user Interview				**Conduct user interview** On this date we would prefer to make two user interviews		

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