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Social Media

and the impact of business hierarchy on knowledge sharing within an organization: Case of SoftX.



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Abstract

In a rapidly growing global economy businesses must effectively manage their assets to remain competitive and promote company growth. Many companies are only now beginning to realize that employee knowledge is a valuable asset to their business and also needs to be managed. Organizations are exploring different ways to improve the sharing of knowledge within a business and how to keep employee's with key knowledge within the business. This study investigates social media and the impact of business hierarchy on knowledge sharing within an organization. The use of social media, in our particular case, wikis, within an organization is investigated as part of the broader term *Enterprise 2.0*. This study is based on the theoretical understanding of wikis as tools that enable internalization, externalization and objectification of knowledge. This study investigates what may be the contributing factors that affect an employee's use of a centralized wiki for knowledge sharing.

This study focuses on the employees of a British software development and training company, SoftX, and used a mixed method research strategy based on the use of online surveys and face-to-face interviews. We used an online tool, *SurveyMonkey*, to register and correlate responses to our survey. In total, 99 responses were received and semi-structured, face-to-face interviews were conducted with five employees. Correlations were used in establishing foundation for the analysis of the variables. Finally, the causality between the assumed factors affecting the use of the SoftX wiki is tested using multiple linear regression analysis.

Several important factors presented themselves as a result of our study at SoftX which could explain the apparent lack of use of their wiki as a means of knowledge sharing within the business. The analysis demonstrates that the use of the SoftX's wiki by employees was influenced by organizational, personal and technological factors.

Keywords: social media, wiki, knowledge sharing, internalization, externalization, objectification, mixed methods

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List of Abbreviations

| Acronym | Meaning |
|---------|---------|
|---------|---------|

| | |
|-----|--------------|
| F2F | Face to Face |
|-----|--------------|

| | |
|----|----------------------|
| KM | Knowledge Management |
|----|----------------------|

| | |
|----|-------------------|
| KS | Knowledge Sharing |
|----|-------------------|

| | |
|----|-----------------------|
| OL | Organization Learning |
|----|-----------------------|

| | |
|-----|------------------------------|
| PCA | Principal Component Analysis |
|-----|------------------------------|

| | |
|------|---|
| SECI | Socialization Externalization Combination Internalization |
|------|---|

1 Introduction

This initial chapter of our research project starts by providing an overview of the concept of knowledge and describes why knowledge sharing and collaboration within an organizational context is less than obvious. This section presents our roles and contributions, the research problem, the issues with previous studies, the significance of this study and finally the purpose statement of the research work.

In today's emerging economies, businesses regard information as a valuable resource. Smart employees who wish to remain successful and valuable to their employers need to consider updating their skills and knowledge in order to stay competitive. According to Wiig (2000), organizations introduce incentives to encourage employees to learn new skills and share knowledge with their colleagues. Knowledge sharing is important within a business as it acts as a catalyst for creating new knowledge, which in turn can be used as a source of competitive advantage (Lesser and Storck, 2001).

According to Huysman et al. (2002), the knowledge management process can be defined as:

“the structured support and guidance of acquiring knowledge, exchanging knowledge and using knowledge to support business processes within an organization”.

This thesis will focus on the social and hierarchical influences affecting employee perception within a business and how knowledge sharing is achieved. We will look specifically at whether traditional hierarchical roles of responsibility affect an employee's views on the benefits of sharing knowledge for the common good and their participation in the knowledge sharing process overall.

A complication arises when trying to understand how modern society and social media interact with each other. Social media's influence on business practices has increased in a relatively short period of time and, in some industries, it has taken time for many businesses to appreciate the need to embrace such technology. Technology is pervasive and few organizations remain immune from its influence. According to Bughin et al. (2012, p.33) “using social technologies to improve collaboration and communication within and across companies could raise the productivity of interaction workers by 20 to 25 percent.”

Social media promotes organizational communication and knowledge working which had previously not been possible (McAfee, 2006, p.22).

McAfee refers to the use of social media within organizations as “*Enterprise 2.0*” – highlighting parallels between the emergence of Web 2.0 concepts and technologies. The implementation of the Enterprise 2.0 vision can be achieved in many different ways including, but not limited to: blogs, wikis and social networks.

Social media in its most general sense may simply be defined as “knowledge sharing” (Caputo, 2009; McAfee, 2006; Safko and Brake, 2009). The effectiveness of social media is measured based on the social capital that it represents, which according to Burt (2005) can be defined as:

“the social capital explains how people do better because they are somehow better connected with other people”.

It should be reiterated that being connected via social media doesn’t necessarily mean the connections are good and new connections therefore need to be proven rather than being accepted as a matter of course (Smith, 2013; Lathrop, 2013).

With this in mind our research aims to investigate how wikis can be used as a collaboration tool in knowledge sharing within an organization.

Social media should be used based on the benefits it provides and be considered merely as one of several possible alternatives, including existing traditional approaches. The choice of which path to take is ultimately determined by the overall goals of the business and may result in a combination of more than one possible approach.

Since this has a direct relationship to age, which in most cases itself relates to seniority within the business), we will be trying to use as wide an audience as possible to understand whether an employee’s position within the business hierarchy influences their use of social media.

1.1 Roles and Contributions

Two Masters Students undertook this research. In general the work was divided equally however due to their geographic nature (Canada and the UK, later Dubai) the contributors used the time zone differences to their advantage by working in a shift pattern style.

Data was collected from employees in a business based in the United Kingdom and the analysis was done jointly by the two team members in their respective locations. The application of theory to the data was performed jointly and as such both members of the team were involved in the compilation of the results.

1.2 The Research Problem and Research Questions

The research problem for this thesis is based on the central role of employees and senior management in both knowledge sharing and the use of wiki. According to Argote (1999, p.105), the fact that an individual possesses knowledge does not automatically mean that he or she will be willing to share it with others. The individual must be motivated to do it. Senior management's recognition of the value of knowledge (Pfaff and Hasan, 2007; Wenger et al., 2002; Wasko and Faraj, 2000) and their willingness to implement new knowledge management strategies in their organizations means they are not always sure about how to put that into action (Wenger et al., 2012; Mansour et al., 2011). Employees' role in both knowledge sharing and the use of wiki (social media) forms the basis of our research problem. While some may see genuine benefits in sharing knowledge using wikis (Stocker et al., 2009), others may not want to see knowledge becomes open and available to a large number of individuals (Wagner and Majchrzak, 2007). Convincing employees to share their knowledge with other employees has always been a concern for businesses (Ardichvili et al., 2003; Paroutis and Al Saleh, 2009). SoftX is no different to many such businesses where a few key people hold the majority of the important knowledge and information. In order that the business is successful it is necessary to share key knowledge in a practical and systematic manner so that the apprentice ranks are able to adopt the skills and best practices necessary required to be productive employees in the company.

The success of any business requires it to have timely access to accurate and relevant company and market information. Unlike traditional models of knowledge sharing,

wikis use the idea of a managed centralized repository of information, allowing the creation of a store of pertinent business information and knowledge (Yates et al., 2010).

The process of knowledge sharing within a business usually starts with the senior management (Sunasee and Sewrey, 2002). The more senior employees have both the experience and expertise within the company and are often seen as the instigators to the knowledge sharing process. It is naturally in their best interests to maintain a viable business and it is often with this goal in mind that knowledge is shared downwards to junior employees to maintain competitiveness and protect their positions of seniority (and their ultimately their jobs) (Abrahmson and Goodman-Delahunty, 2014). Dean and Gottschalke (2007) indicated that any organization that relies on information or is sufficiently knowledge intensive relies on a deep and broad information and knowledge base to support its organisational operations. The visible action of senior employees relinquishing knowledge willingly acts as a catalyst to promote further knowledge sharing by other employees. Once this cycle has begun knowledge exchange will spread down through the hierarchies of the organization to all levels of the business as well as horizontally through each organisational strata. The key question then becomes how best to promote this spread of knowledge to produce the best results for the business.

The aim of this study was to examine the effect of business hierarchies on knowledge sharing within a business and how employees collaborated with each other and shared knowledge in such a structured environment; specifically whether a centralized wiki would be used by employees to promote collaboration and knowledge sharing more than a decentralized alternative.

The research sought to answer the following specific research question:

“What may be the contributing factors that affects an employee’s use of a centralized wiki for knowledge sharing?”

1.3 Focus of Previous Studies

In recent years there have been many discussions around the areas of research carried out in the field of knowledge sharing. These discussions were carried out using a wide variety of different theories and from various perspectives, including approaches such as network theories, social exchange theory, and social capital., Research has also been carried out that investigates the significance of knowledge barriers and enablers (Riege,

2005; Sharma et al., 2012) and wiki collaboration in organizations (Mansour et al., 2011; Mansour, 2012).

Trends and previous research in the field of social media within organizations show that wikis are widely used for knowledge sharing and collaboration (Hester, 2010).

Previous studies have concentrated on the causes and barriers to knowledge sharing (Riege, 2005; Sharma et al., 2012), rather than ways to increase the knowledge sharing potential of the resources that are actually available. Since the majority of junior/apprentice employees have little or no technical experience when they join the business they will all be starting from a similar position, providing a level playing field. Such a starting position allows training to be provided to all of the apprentices in a consistent manner and ensures that they all have the same knowledge base to build upon. This not only has the advantage of allowing apprentices to feel as though they are all on the same journey during their training but also provides a benchmark for the business in terms of the minimum skill level of the apprentice workforce as a whole. Periodic assessment of the practical application and understanding of the knowledge gained through the company's training process and informal group work will be measured on a regular basis for each employee as part of their personal development and progress reviews.

1.4 The significance of the study

Research has been undertaken into the spread of knowledge within businesses where there is a wide range of age and experience levels within the employee ranks, (Sharma et al., 2012; Endres, 2012). The findings from their research could assist managers who need to improve the effectiveness in knowledge sharing and collaboration within their organization as well as nurturing and improving collaboration and knowledge with employees at more junior levels. The company used as part of this study consists of a majority of apprentices and relatively few senior staff, together with having training provided internally and not by an external training resource. As such our findings should provide a novel insight into the effects of knowledge sharing with such a bottom-heavy environment.

1.5 General concepts and definitions

In this section we will discuss some basic definitions of knowledge management terms that are relevant for better understanding the topic of this research. We will later develop the most essential of those that will help to underpin our research and build the theoretical framework.

1.5.1 Knowledge

Nonaka & Takeuchi (1995, p.58) described knowledge as a dynamic human process of justifying personal belief toward the 'truth'. Such knowledge can be divided into two types, tacit knowledge and explicit knowledge (Polanyi, 1966). As pointed by Lenski (2010), Nonaka & Takeuchi (1995) underline the difference between explicit knowledge, which can be articulated in formal language and transmitted among individuals, and tacit knowledge, which is understood as personal knowledge embedded in individual experience and involving such intangible factors as personal belief, perspective, and values. Although it is possible to make a conceptual separation between these two types of knowledge, they are not in fact discrete in practice (Angioni, 2011). In a more generic way knowledge may be considered to be an awareness of familiarity of someone or something based on the facts, feelings or experiences known by a person or group of people. Such knowledge can be determined based on the experience of discovery or learning of the individual or group (Cavell, 2002).

1.5.2 Knowledge Management

From a business perspective knowledge management is more important today than ever. Organizations must adapt to reduce the gap between those who retain the knowledge and those who seek it. Although there are various definitions of knowledge management, it's very difficult to come out with a single all-encompassing definition (Argote et al., 2003). For the purpose of our study, we will define knowledge management as

"the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organization's intellectual capital and performance" (Jashapara, 2011, p.14).

1.5.3 Knowledge Sharing

Knowledge sharing as defined by Jacobson (2008) is an exchange of knowledge between two individuals: one who communicates knowledge (the *sender*) and one who assimilates it (the *receiver*).

1.5.4 Organisational learning (OL)

With a focus on knowledge management as illustrated by Wang and Ahmed (2003), organizational learning can be defined as the changes in the state of knowledge (Lyles, 1992, 1998). These changes in the state of knowledge include knowledge acquisition, dissemination, refinement, creation and implementation: the ability to acquire diverse information and to share common understanding so that this knowledge can be exploited (Fiol, 1994) and the ability to develop insights, knowledge, and to associate among past and future activities (Fiol and Lyles, 1985).

1.5.5 Communities of practice

As defined by Hinton (2003), Communities of Practice are "*networks of individuals with a common, shared purpose grouped together to facilitate knowledge building, idea creation and information exchange*".

1.5.6 Internalization

Huysman and Dirk (2002) define the concept of internalization as being the process by which a business' employees acquire knowledge from their work environment and their interactions with fellow employees

1.5.7 Externalization

Externalization is the process where individuals share knowledge with each other. (Huysman, 2002).

1.5.8 Objectification

Objectification is the process of globalizing local knowledge (Von Krogh et al., 2000). Knowledge needs to be accepted by a community's members before it can be considered organisational (Huysman and De Wit 2002; Von Krogh et al., 2000).

1.5.9 Wikinomics

Wikinomics describes how the use of wikis for customer-collaboration purposes effects the corporate world; how its influence encompasses, but is not limited to, the ideas of open source software development, social networking and crowdsourcing. The guiding principles however are the same regardless of its real-world manifestation promoting an environment of openness, peer review, data and knowledge sharing (Tapscott and Williams, 2006).

1.6 Structure of the thesis

This initial chapter (*"introduction"*) of our research project starts by providing an overview of the concept of knowledge and describes why knowledge sharing and collaboration within an organizational context is less than obvious. This section presents our roles and contributions, the research problem, the issues with previous studies, the significance of this study and finally the purpose statement of the research work.

This second chapter (*"theoretical framework and literature review"*) presents the literature review and theory used in our research study. This section initially describes the literature work of research findings and later on it explains the three dimensional (internalization, externalization and objectification) Huysman's (2005) knowledge sharing cycle theory and collaboration. This chapter describes the core idea of our research study and was used later in the analysis of results and discussion/data analysis chapters.

The third chapter (*"research tradition"*) describes the research tradition together with those factors that affect knowledge sharing based on previous studies. The purpose was to present empirical findings of a number of previous studies in the field of social media (wiki) and knowledge sharing with similarities to our study.

The fourth chapter (*“research methodology”*) focuses on the method used in our research and the justification of their choice. The structure of this chapter is as follows: research design and strategy, population and sampling, data collection method, data analysis method, validity and reliability of the data collected and finally ethical considerations.

The fifth chapter (*“study case description”*) describes the environment and environment under which the case study was performed. Detail is given to the structure and hierarchy within SoftX and the processes involved in carrying out the study.

The sixth chapter (*“analysis of the results”*) centers on the statistical analysis of the survey and interview responses coming out of the case study in the previous chapter.

The seventh chapter (*“summary and discussion”*) focuses on discussing our results and summarizing our findings with regards to the suitability of wikis as a knowledge sharing tool.

Finally, chapter eight (*“conclusion”*) of this research project, we evaluated what we have discovered as a result of our study and reflect on how our findings related to our initial research questions. We also recommended additional directions for further research in the area of wiki and knowledge sharing.

2. Theoretical framework and literature review

This second chapter presents the literature review and theory used in our research study. This section initially describes the literature work of research findings and later on it explains the three dimensional (internalization, externalization and objectification) Huysman's (2005) knowledge sharing cycle theory and collaboration. This chapter describes the core idea of our research study and was used later in the Analysis of results and Discussion/Data analysis chapters.

2.1 Wikis

The term 'wiki' was introduced by Ward Cunningham in 1994 to describe a web application that allows its contributors to manage and manipulate content collaboratively as part of a larger group. The informal nature of wikis allows its structure to evolve according to the needs of its contributors acting as a type of content management system without implicit structure or defined owner. (Stenmark, 2008; Stenmark, 2005; Mitchell, 2008). This idea is reinforced by Leuf and Cunningham (2001), who describe a wiki as:

“a progressive and dynamic website in the sense that it allows multiple people to modify, add and even delete content from the site”.

Ward made use of the term wiki or ‘wikiwikiwebs’ (Cunningham, 1995) to illustrate what he meant by the “quick web”. Wikis helped to transform the web into a collaborative environment (Desilets et al., 2005). Another aspect of wikis is that, they have no established structure and are set out by users, group dynamics and the establishment of social principles and standards (Doolan, 2010a). Major attributes of Wikis are:

- Simple processes for participation. By default, people should be able to edit and track content in a wiki (add, modify or delete)
- Possibility to edit others' contributions in order to enhance readability, organize pages and integrate ideas (Yates et al., 2010; Rafael and Ariel, 2008). Changes made by individuals on wikis pages can be tracked

The most significant success of wikis is undoubtedly Wikipedia (Happel and Treitz, 2008).

2.2 Wikis in organizations

The use of social media, in our particular case wikis, within an organization is often referred to as part of the broader term *Enterprise 2.0* (McAfee, 2006). According to Hinchcliffe (2007), Enterprise 2.0 can be defined as the collection of tools that are “*free of unnecessary structure, highly egalitarian, and support many forms of data*”. Wikis can be considered to meet these criteria since their existence relies on the premise of the free form collaborative efforts of small groups of equally valued, like-minded people working together to achieve the same ends.

One advantage of the wiki is its low cost and ease of use. The wiki is a suitable tool for knowledge sharing and collaboration in the organisational context (McAfee, 2009). This makes their use within organizations different from other settings like Wikipedia (Danis and Singer, 2008; Stenmark, 2008).

Existing collaboration technologies described as ‘channels’ (including: instant messaging, emails and short message services (SMS)) provides a means to transmit data securely and safely. (McAfee, 2009). Knowledge shared through such channels is only accessible to specific people making this approach generally less collaborative, thereby reinforcing the need for a more open collaborative tools where knowledge can be shared publicly. Enterprise 2.0 provides businesses with new tools for emergent collaboration and co-creation (Soriano et al., 2007). Soriano et al. (2007) continues by saying that the main goal of Enterprise 2.0 (and so wikis) is to create a mechanism that supports common practices and allows knowledge to be stored in a way that makes it easier to find, access and use by the wider public.

Following this approach to its conclusion results in an improvement in collaboration within virtual communities by promoting user-contributed content management platforms such as wikis, blogs and forums. (Soriano et al., 2007). However, in an organisational context, a completely uncoordinated use of a wiki by a large number of employees may result in a poor structure, inconsistent content and non-intuitive navigation (Danis and Singer, 2008).

2.3 Knowledge sharing within organizations

Knowledge sharing is a core function within an organization without which it would not be possible to achieve and maintain its competitive advantage. Knowledge sharing as defined by Jacobson (2008) is an exchange of knowledge between two individuals: one who communicates knowledge (the sender) and one who assimilates it (the receiver). Organisational knowledge can either be tacit or explicit (Wenger et al., 2002; Casimir et al., 2012). Tacit knowledge is difficult to capture or share from one individual to another as it is stored within the individual and is intertwined with their personal experiences and subconscious. In order to make use of tacit knowledge it is first necessary to represent it in an external, tangible form that can be used by others. However, explicit knowledge can readily be acquired and shared (Nonaka and Takeuchi, 1995). Regardless of the nature of knowledge whether tacit or explicit, its state at any specific time depends on its current mode of conversion.

The knowledge sharing cycle created by Huysman and Dirk (2002), Figure 1 below, consists of three major processes: *externalization*, *internalization* and *objectification*.

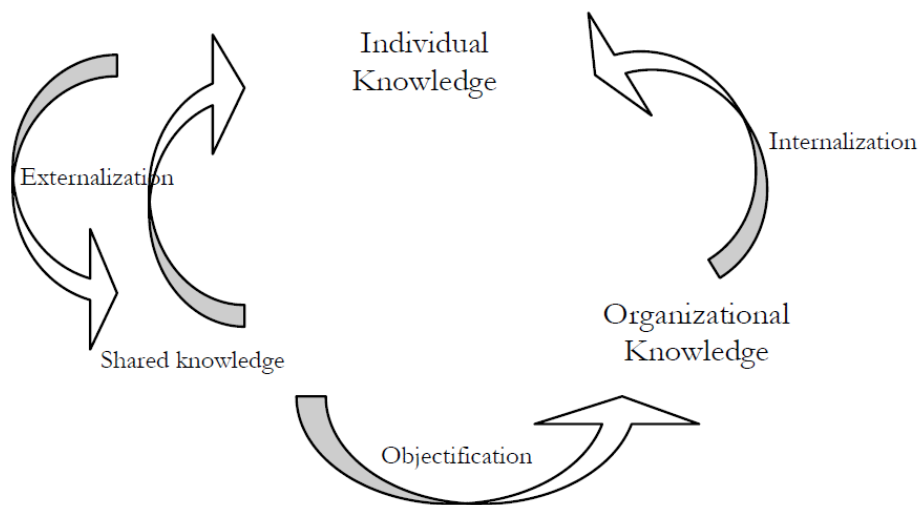


Figure 1: Knowledge Sharing Cycle by Huysman and Dirk de Wit (2002)

The relationship between tacit and explicit knowledge and transition of knowledge types can be seen in the summary given in Table 1.

| Learning Process | Learning Source | Learning Outcome | Type of Knowledge Sharing Support | Knowledge Transition |
|------------------------|--------------------------|--------------------------|--|---|
| Internalization | Organizational Knowledge | Individual Knowledge | Knowledge Acquisition | Explicit to Tacit Knowledge |
| Externalization | Individual Knowledge | Shared Knowledge | Knowledge Exchange for reuse and development | Tacit to Explicit Knowledge |
| Objectification | Shared Knowledge | Organizational Knowledge | Knowledge Sharing | Explicit Knowledge Remaining Explicit but to a wider audience |

Table 1: Relationship between Huysman Cycle and Tacit/Explicit Knowledge

2.3.1 Internalization

Huysman and Dirk (2002) define the concept of *internalization* as being the process by which “a business’ employees acquire knowledge from their work environment and their interactions with fellow employees”. This informal and passive acquisition is reinforced by the like of Dalkir (2011) as “*learning by doing*”; a less formal method of acquisition than formal training or knowledge sharing. There are many ways to internalize knowledge including some which may be specific to the particular working environment, however more generally these can involve training sessions, use of knowledge management systems, books and training literature etc. (McAfee, 2006; Tapscott and Williams, 2006). One more informal, and less readily measurable means of knowledge internalization within a company is the tacit knowledge stored in the employee pool (Huysman, 2002). Such knowledge is also referred to as “collective knowledge” (Spender, 1996). The informal interaction between staff members through gossiping, chatting or story telling provides a means on internalizing such knowledge between peers without necessarily formally externalizing this information (Sims, 1999).

The advantage of this social interaction is not only the transfer of tacit knowledge between members of the informal, social network but can also be used as a means of encouraging individuals to communicate, interact and work together more readily and effectively on a daily basis. Providing a more open and comfortable environment makes

knowledge sharing more acceptable and commonplace thereby improving the work environment for everyone (Brown and Duguid, 1991; Gherardi, 1991).

2.3.2 Externalization

Externalization is the process where individuals share knowledge with each other. (Huysman, 2002). This may occur in a variety of ways, both formally and informally (McAfee, 2009) and the mechanism in which this manifests itself may include formal meetings, discussions with project groups or other such gathering of people, or informally through conversations or lunch break chats (Huysman, 2002).

The process itself can leverage infrastructures provided in the environment such as telephones, intranet applications such as blogs, emails, wikis and other such forums that promote communication. Explicit knowledge, according to Huysman (2002), can be formulated using formal and systematic language, however not all knowledge is explicit.

Academics such as Nonaka and Takeuchi (1995) propose that tacit knowledge can prove to be a hindrance to the externalization process, and as a result lead to substandard learning processes. Knowledge needs to be externalized for the purpose of reuse and to benefit the development of new knowledge (Huysman and DeWit, 2002).

2.3.3 Objectification

Objectification is the process of globalizing local knowledge (Von Krogh et al., 2000). The exchange of knowledge and information is not a measure of how successfully this knowledge will be accepted in the wider community. Knowledge needs to be accepted by a community's members before it can be considered organisational (Huysman and De Wit, 2002; Von Krogh et al., 2000).

The process of objectification is not always an intentional one, and in many cases takes a while to take place (Von Krogh et al., 2000). Huysman and De Wit (2002) illustrate these delays in acceptance by using the example of a group of technicians who have developed a new way of fixing a 'machine'. This operational knowledge will remain locally in their peer group until, it is accepted by the organization for example as published manuals in the training of new comers.

Huysman's knowledge sharing cycle consists of three interdependent processes, the longest running of which tends to be objectification. Table 1 shows how these processes are categorized and how each relates to knowledge sharing and the learning process of the business (Zaffar and Ghazawneh, 2013).

2.4 Wikinomics and the Mass Collaboration

Zaffar and Ghazawneh (2013) suggest that mass collaboration occurs when a large number of people work independently from each other but act collaboratively towards a single goal – for example on a single project. There are four main characteristics involved in any mass collaboration exercise (Tapscott and Williams, 2006), namely: *Peering*, *Sharing*, *Openness* and *Acting Globally*.

- *Peering* (or peer production): replacing existing hierarchical models for a flatter, more collaborative environment, providing conditions that allows users to take part in the process of development of products and services, and jointly share, classify, and rate contents that enhance the production (Tapscott and Williams, 2006; McKercher and Mosco, 2007; Wilkinson, 2008)
- *Sharing*: the creation of new products which can be improved by sharing knowledge (Tapscott and Williams, 2006)
- *Openness*: according to Tapscott and Williams (2006), refers to having flexible boundaries that embrace open standards and content as well as financial transparency and an open attitude towards external ideas and resources.
- *Acting globally*: acquiring new information and knowledge by promoting the ideas of the mass collaboration available to many through web 2.0 technologies.

2.5 Factors affecting knowledge sharing

Scholars have invested a lot of interest in knowledge sharing these past decades which helped them to provide a broad overview of factors affecting knowledge sharing. (Riege, 2007; Paroutis and Al Saleh, 2009). Most of these researches and theories derive

from multidisciplinary studies including organizational studies, social psychology, sociology or even behavioral economics (Riege, 2005; Paroutis and Al Saleh, 2009; Mansour, 2012; Hadjerouitt, 2014; Md Shiful, and Rajib 2014). Literature provides a considerable amount of knowledge sharing facilitators and barriers which have been identified in different scientific perspectives (Nonaka and Takeuchi, 1995; Argote, 1999; Dixon, 2000; Seba et al., 2012). This section provides a general overview of knowledge sharing barriers and facilitators made from organization research tradition. We will reflect on two theoretical approaches with close connection to organizational studies to get a good analysis: theory on social identity and social dilemma of knowledge sharing (Kimmerle et al., 2008; Cabrera and Cabrera, 2002).

2.5.1 Theory on social identity

Social identity theory provides a possible insight into why people are reluctant to share their knowledge with others. The theory is based around ideas of social psychology whose main premise is that people tend to classify themselves and their work colleagues into different social categories (Tajfel and Turner, 1985; Tajfel, 1978; Smith et al., 2014). The desire to improve one's social identity within the workplace manifests itself by aligning oneself with those employees seen to be part of "in group" while at the same time distancing oneself from the rest of the employees "out group". This segregation serves two purposes; it partitions and orders the workforce based on personal associations and secondly individuals are able to define themselves within this social environment (Ashforth and Mael, 1989, pp.20-21).

The use of social identity theory can be seen in many organizational studies (Argote, 1999, p.177; Ashforth and Mael, 1989, p.20; Smith et al., 2014). The categorizing of individuals within a business into distinctive groups, units or departments produces intergroup competition. Consequently, attempts to promote group identity inside of a large organization, may actually lead to more competition between these same business units. Kramer (1991) noted that when a department is perceived as high performing, it implies to other departments that this high performing group is superior, thereby increasing competitiveness between these departments with a view to gain superiority or at least to level out the social standing. The negative side to this is an increasingly competitive environment in which departments become less likely to share knowledge with their perceived rivals, and are more likely to acquire knowledge for their own ends

to improve their own relative performance. Argote (1999, pp. 177-178) states that this internal competition between business units is a key barrier that limits knowledge sharing.

When looking into employee participation in organizational knowledge sharing, social identity theory together with this group competition provides an explanation for employee barriers. Organizational culture can be seen as a key factor affecting employees' behaviour and motivation when it comes to knowledge sharing. For businesses where there is a tradition of cooperation, employees are more likely to share their knowledge with their close colleagues. The degree to which work colleagues, and departments within a business, cooperate will affect the ease and quality of the knowledge that is shared.

2.5.2 Social dilemma of knowledge sharing

Social dilemma refers to a paradoxical situation in which individual rationality leads to a collective irrationality. Knowledge sharing can be described as a particular manifestation of social dilemma (Cabrera and Cabrera, 2002; Kimmerle et al., 2008). Individual attempts to maximize pay-offs can result in collective damage.

When employees improve their performance at work by using ideas and methods provided by other employees, it does not diminish their potential value to others (Cabrera and Cabrera, 2002, pp. 692-693; Casimir et al., 2012). Ideally employees would actively share their own ideas and use the information provided by others to improve their performance. However, this is not always the best solution from individuals' viewpoint. As stated by Cabrera and Cabrera (2002, p.693), there could be instances where individuals do not cooperate in sharing their knowledge thinking that *"if everyone else cooperates and I do not, I enjoy the good for free. If no one else or very few others cooperate, I will be saving the wasted contribution"*.

After evaluating the costs and benefits resulting from their actions, employees may decide that it is a more rational choice not to share knowledge. In the case of knowledge sharing, costs may include such things as the cognitive effort required, the amount of time invested or the fear of embarrassing oneself to their peers. The higher the expected costs as perceived by the individual, the more likely the individual will be not to share knowledge and the stronger the knowledge sharing dilemma. (Kimmerle et al., 2008, p.386; Renzl, 2008, p.207; Casimir et al., 2012)

Considering knowledge sharing as a social dilemma provides a theoretical basis for understanding why some employees are reluctant, or even refuse, to participate in the sharing knowledge process. The relative costs and benefits as viewed by the individual will need to be weighed up before a conclusion can be made as to whether that individual will share their knowledge. Individuals need to establish that the expected benefits to sharing their knowledge outweighs any potential costs. Considering knowledge sharing as a social dilemma has inspired many authors to investigate factors increasing employees' knowledge sharing behaviour (Kimmerle et al., 2008, p.386; Md Shiful and Rajib, 2014).

Treating knowledge sharing as a social dilemma and the application of social identity theory provides the basis for understanding employees' knowledge sharing behavior. Various factors such as organizational culture, benefits and costs have been identified as potential influencing factors.

We will build a theoretical framework based on knowledge sharing as social identity and social dilemma and investigate the factors affecting employees' knowledge sharing behavior. Both the theoretical perspectives presented above and practicalities of existing studies are considered. We will focus on organizational research and empirical studies indicating the similarities with the case study on SoftX's employees.

2.6 Theoretical framework

There are many factors which affect knowledge sharing within a business and many of these have been highlighted in past studies. The outcomes of these studies have indicated that these reasons may be categorized as either being technological, organizational or personal (Ardichvili et al., 2006; Barson et al., 2000; Cabrera et al., 2006; Riege, 2007; McDermott, 1999; Paroutis and Al Saleh, 2009; Mansour, 2012; Hadjerouitt, 2014; Md Shiful and Rajib, 2014).

Riege (2005) identified several factors that could fall into each of these three categories:

Personal or human Factors

- Lack of trust in one colleague and peers as well as a lack of trust in the knowledge sharing process or the integrity of the knowledge sharing system.

- Fear of power loss resulting in personal influence within peer and social groups within the company which can be perceived as having a detrimental effect on the individual's position or stability within the company.
- The act of sharing ones knowledge with a wider audience may not produce the expected benefits from an individual's career or peer-status point of view.

Organisational Factors

- Poor leadership and control over the knowledge sharing process can lead to a reduced uptake by staff members, leading them to feel the knowledge sharing process serves them, or the business, no benefit.
- The potential benefits of contributing knowledge can be seen as receiving a little or no reward in return from the business, thereby making the process appear biased in favor of the company and putting individuals in a weakened position.

Technological factors

- A lack of effective training can make the introduction and adoption of new systems arduous and dissuade employees from sharing their knowledge in this way. Poor training can result in employees not fully understanding the system properly and therefore not be fully aware of the features and functionalities that it can offer.
- The knowledge sharing system needs to adopt technologies that are relevant and appropriate for the task at hand and be designed with the target audience in mind. The system should be as intuitive as possible for employees at all levels within the business. Usage should be possible with a minimum of effort and encourage use and experimentation rather than to introduce barriers caused by a poorly thought through design and badly implemented systems.

Our study treated the wiki as a tool to promote knowledge sharing within a business. Figure 2 shows how the aforementioned classification may be applied in our specific case. Our theoretical framework consists of the impact of personal, organizational and technological factors on the use of the SoftX's wiki.

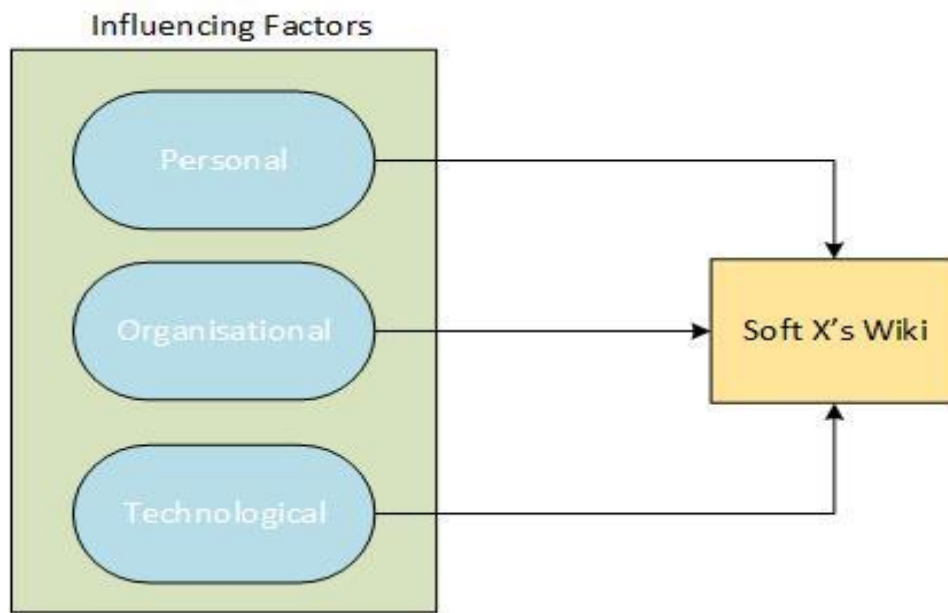


Figure 2: Theoretical Framework

3. Research Tradition

This third chapter describes the research tradition together with those factors that affect knowledge sharing based on previous studies. A number of previous studies in the field of wikis as a knowledge sharing tool are discussed to establish a framework for this current study.

3.1 Factors affecting knowledge sharing

We focused on those factors which we considered to effect knowledge sharing within SoftX by considering the goals of our thesis as determined by our research questions together with previous research that had been undertaken in similar areas.

The area of social media is a relatively new field of research, however due to its popularity and topicality many studies have already been published in this field. Since ‘social media’ is a broad topic for investigation previous studies have tended to focus on different aspects of the knowledge sharing process with regards to social media. These areas of interest have broadly tended to be focused in four areas:

- Organisations (Lin, 2007; Paroutis and Al Selah, 2009; Tohidinia and Mosakhani, 2010).
- Virtual Communities (Kosonen, 2008; Lin et al., 2009; Ardichvili et al., 2003).
- Firm-Hosted Communities (Jeppsen and Frederiksen, 2006)
- Open Innovative Communities (Antikainen et al., 2010)

We decided to focus on three particular studies which focused their research on a similar aspect of social media to our own. The three cases below all study different elements of people’s readiness to share knowledge outside of their immediate close circle of friends and colleagues, as well as their immediate peer group, within a structured environment. These are discussed briefly below:

Study #1: (Ardichvili et al., 2003)

An early study into the factors that motivates employees to share knowledge with their peers and the nature of the barriers that prevent or reduce collaboration to using social media to promote this sharing process. The approach taken in this study made use of

qualitative interviewing of employees at Caterpillar Inc., to investigate how virtual communities within the company share knowledge. The aim of the study was to determine factors which influenced whether an individual was more or less likely to contribute to sharing within the business' virtual community. Informal communities were used within the business based on common areas of interest or common work patterns or practices and these 'communities of practice' and their interrelationships were used as the basis of this study (ibid. p65).

These communities used the Internet-based and computer-mediated communities to provide a distributed, geographically widespread environment across different physical business locations and as such involved very little face to face communication. Community members had access to basic capabilities; to communicate with other group members and participate in multi person group discussions on topics of specific interest or particular knowledge areas. Considering the time at which the study was undertaken in relation to the evolution of social media these informal groupings may be considered as early incarnations of content communities and social media.

This study indicated the following results (ibid. pp.69-75).

- *The motivation to contribute to the virtual communities of practice:* Employees were more likely to contribute their knowledge when they saw doing so as contributing to the common benefit, whether that be personal benefit or benefit to their community. Management felt that new employees should be introduced into these communities at an early stage as a means of sharing knowledge from senior group members – almost a form of informal mentoring. Consequently, the authors of the study emphasized the role of the business culture in encouraging knowledge sharing and establishing mutually supportive relationships between members of these community groups. This informal hierarchy within groups allows people to become seen as domain experts within these communities which in turn promoted knowledge sharing (ibid, pp.69-71)
- *Barriers that contribute to the virtual communities of practice:* Trust played a major part in this study as a key barrier to knowledge sharing. Contributors were cautious about what and when they posted information to these communities due to a lack of understanding about what was acceptable and what was not, and whether their shared knowledge would

have a negative effect on the community. The study found that this uncertainty was a result of unclear guidelines from management and the confusion that this created. Interviewees indicated concern about how others may use knowledge that has been posted within these communities and the effect that knowledge misuse may have. As a result a degree of skepticism with regards the reliability and objectivity of the available information was seen by some of those interviewed. (ibid, pp.69-71.)

The authors emphasized the need to remove these barriers in order to support organizational knowledge sharing. The focus of the study was on removing existing knowledge sharing barriers based on the currently available infrastructure within Caterpillar Inc. and not to create a knowledge sharing platform (ibid. pp.75-76).

Study #2: (Tohidinia and Mosakhana, 2010)

This second study also examined the factors affecting knowledge sharing behavior in an organizational environment. Businesses within the Iranian oil industry were assessed and a sample of 502 questionnaires was completed by employees representing highly developed ICT workers across several businesses. This demographic was chosen because the study wanted to investigate businesses with an existing efficient infrastructure and track record of knowledge sharing across units within the individual organizations (ibid, pp.615- 616). The study itself didn't explicitly discuss the use and effect of social media technologies, the tools measuring ICT included some Web 2.0 related technologies and so relevance to our study (e.g. intranets, virtual communities and groupware tools).

The study demonstrated various significant individual and organizational knowledge sharing promoters. A perceived self-efficacy and reciprocal relationships between group members had a positive impact on attitudes towards knowledge sharing. The organizational/political climate in terms of internal cooperation and the level of information and communication technology were discovered as an aid to knowledge sharing. (ibid. pp.617-622) This study supported many of the assumptions made in previous literature especially when it came to the main individual and organizational factors effecting employees' knowledge sharing potential.,

Given the context of the study and the use of Iranian oil industry companies, the authors suggested a need for further research and consideration of cultural influences before any concrete conclusions could be drawn from their study (ibid, p.623).

Study #3: (Paroutis and Al Saleh, 2009)

The third and final study involved conducting a qualitative study into the determinants that effected an employees' knowledge sharing specifically when using Web 2.0 technologies. The study focused on the multinational services company TechCo where the authors conducted a small number (eleven) of in-depth interviews with its employees. Paroutis and Al Saleh found that the contributing factors that came out of these interviews could be divided into three broad groups in a similar was to other studies namely, *personal*, *organizational* and *technological* factors (ibid., p54). From this the authors identified four key determinants of knowledge sharing which could be considered both as barriers to knowledge sharing or indeed motivations for the employees using social media tools for knowledge sharing (ibid., pp. 57-60). These four determinants were:

- *Historical Influence:* How does existing methods of working affect the use of social media tools? Do employees see new ways and tools as an erosion of traditional methods and techniques and does this mindset produce a barrier to adoption? Does the age and geographic location have any bearing of the adoption of social media tools - Interviewees representing older generations explained they would prefer traditional communication (e.g. face to face) instead of adapting to new social media tools. (ibid., pp.57-58)
- *Employee expectation:* What do employees expect from using social media? Are there any preconceived ideas and how accurate they? Do employees have any idea of expected consequences of the use of Web 2.0 technologies influences people's willingness to share knowledge.

Positive expectations such as effective communication or personal knowledge management encourage employees to share knowledge, whereas skeptical and negatively perceived expectations prevent employees from sharing their knowledge. If social media tools are to be widely used as a means of communication between employees, then it is understandable that employees

should expect to see some clearly defined benefits from their use otherwise they will be less inclined to contribute. (ibid. pp.58-59)

- *Organizational and management support*: Managerial support can manifest itself in many ways in order to achieve this goal., such as employee encouragement through promoting the benefits and advantages of the social media tools, providing training for the employees as well as rewarding the participation of the most active users. (ibid. pp.59- 60)
- *Trust*: The quality and integrity of the information being shared plays a large role in determining whether an employee is willing to share their knowledge. Individuals who suspect that the social media tools are unreliable sources of information or that their knowledge maybe misused by others are less likely to contribute to the social media applications. (ibid, p.60).

When considering each of these four determinants, Paroutis and Al Saleh highlighted the importance of managerial support in producing a successful knowledge sharing environment. Leadership roles in encouraging employees, communicating the benefits, and providing training are all responsibilities of management. Without clear support and guidelines by managers employees will not be motivated to use social media. (ibid. pp.60-61)

Together these three studies provided a number of key insights into what promotes knowledge sharing within businesses as well as factors which can deter knowledge sharing by employees.

These three studies focused on the employees within different organizations and how social media was used as a tool for promoting knowledge sharing. Other studies investigating knowledge sharing factors were considered in order to gain a broader understanding of these contributing factors however, instead of detailing these studies, the purpose here is to classify the most significant results.

The key factors coming out of these studies were personal benefits, trust issues and organisational implications. These appear to be recurring factors in studies that focus on this aspect of knowledge sharing and have been highlighted as significant in studies performed by Ardichvili et al., 2003; Tohidinia et al., 2010; Paroutis and Al Saleh, 2009. Technological factors were often considered as having less of an influence on knowledge sharing than the other three factors. An employee's choice to contribute to organizational knowledge sharing is more dependent on individual or organizational

factors, than on the technological aspects as such. (Coakes, 2006; McDermott, 1999; Paroutis and Al Saleh, 2009).

3.2 Categorizing the factors

The previous section presented the relevant empirical studies concerning social media and knowledge sharing within an organization. This study attempts to classify the discovered empirical results based on the three categories identified above and are presented in the Table 2.

| | Factors | Description |
|----------------|---------------------------------------|---|
| Personal | Benefits | Personal and collective utilities |
| | Trust Issues | Lack of trust and fear of misuse |
| | Costs | Time |
| | | Negative impact on professional image |
| | Experience and Skills with Technology | Frequency of using wiki in private life |
| | | Frequency for using internet for work purposes |
| | | Skills in using company's wiki |
| Organisational | Managerial | Understanding company's wiki as part of my responsibilities |
| | | Manager's activeness |
| | | Scoping of training possibilities for employees |
| | Culture | Organisational guidelines for using wiki |
| | | Colleagues activeness and participation |
| | | Dependency in decision making |
| | | Dependency in time distribution on active tasks |
| Technological | Web 2.0 | Collaboration in and across business units |
| | | Degree of user friendliness of web tools |

Table 2: Determinants to Sharing Knowledge Using Social Media

- *Personal Factors* describes the expected benefits and costs, trust issues, experience and skills associated with technological tools and understanding of an individual's responsibilities. Personal benefits may include the aiding an employee's daily work whereas collective utilities refer to the usefulness of the contributions to the whole community.

Costs to an employee refers to the negative impact of knowledge sharing on the individual. This may include excessive amount of time spent by

the employee to share knowledge or any negative impacts on a person's professional image.

Trust-related issues refers to any perceived lack of integrity or accuracy in the content of social medias well as fears over the potential future use of the data once it is stored in some knowledge repository.

- *Organizational Factors*: includes managerial implications and organizational culture. Managerial implications covers the responsibility of providing sufficient training, giving positive feedback, valuing an employee's efforts, contributions and participation in the sharing process; together with organizational guidelines for using social media tools. Organizational culture places an emphasis on employee feedback and valuing contributions by colleagues, participation of colleagues, and the level of collaboration in and across business units.
- *Technological Factors*: refers to the company's social media tools. Since the technological factors do not form the central focus of this study, as indicated by the summary of finding above, the only technological aspect considered is the user-friendliness and accessibility of the company's social media tools.

Each of these three main factors may be considered as both motivations and barriers, depending on the reader's perspective, potentially either increasing the employees' use of social media as well as decreasing it. Managers need to be seen to take a positive role in encouraging employees by acting as a role model in the knowledge sharing process ("leading by example"). Failure to take the lead in a supportive capacity could be interpreted as a barrier for their subordinates' behavior.

Some of the factors identified by Riege (2005) represent multidimensional factors, meaning that they could be placed under more than one of the above defined categories depending on personal perspective. Experience and skills with technology includes aspects that could be argued represent similarities with technological factors, but could equally be viewed that having an understanding the company's social media tools as a responsibility is not necessarily a personal factor, but it could be argued to represent an organizational factor instead.

The classification of knowledge sharing factors into three defined groups should not be treated as definitive, but should be considered as no more than a working theoretical

model based on a summary of the current research tradition. This model is unlikely to cover all the possible factors affecting employees' use of social media and other factors between the personal and organizational group should be taken into consideration. Based on the extensive mapping of the existing studies and theoretical perspectives, the factors presented above are considered to provide a legitimate focus for our thesis.

4. Research Methodology

This chapter focuses on the method used in our research and the justification of their choice. The structure of this chapter is as follows: research design and strategy, population and sampling, data collection method, data analysis method, validity and reliability of the data collected and finally ethical considerations.

4.1 Research design and strategy of inquiry

Although there are many different ways to establish research structure, using the most suitable method in respect of the research problem and purpose will definitely help in achieving the desired results. A researcher could always choose between a quantitative or qualitative method (Leech et al., 2009). However there is a third method, which is the combination of the above two called the mixed method (Leech et al., 2009).

4.1.1 Qualitative research method

Qualitative research intends to provide the researcher with a deep understanding of the social reality of individuals, groups and cultures. Holloway (1997, p.2), defined qualitative research as a:

“form of social inquiry that focuses on the way people interpret and make sense of their experiences and the world in which they live”.

Qualitative research aims to solve the questions asked by a research problem. As argued by Neville (2005), qualitative studies involve analysis and reflection on the less concrete aspects of a research study, and are for that reason more subjective than quantitative researches, which main focal point is to collect, analyze and measure numerical data. This makes qualitative method more appropriate for research questions that are difficult to resolve through statistical analysis.

According to Mack et al. (2011) there are three common qualitative research methods each of which are suited in obtaining a specific type of data:

- *Participant observation* is appropriate for readily collecting data based on perceived behavior in their usual environment.
- *In-depth interviews* are best for collecting data on individual's personal experiences, perspectives and histories, particularly when sensitive topics are being researched.
- *Focus groups* are effective in collecting data on the educational standards of the group and in generating broad overview issues of interest to the social groups or subgroups represented

4.1.2 Quantitative research method

A quantitative research method is better suited to capturing the dynamic processes and relationships between phenomena, allowing mathematical transformations to be applied on the data allowing comparisons to be made and explanations to be given more readily. It uses numerical data to investigate the “how much” and the “how many” of a specific classification as suggested by Sjöberg and Svensson (2012). Empirical data gathered must be quantifiable. According to Harmant (1998), Examples of data collection models when carrying out a quantitative research are surveys and questionnaires.

There is a clear difference between the qualitative and quantitative research methods as shown in Table 3.

| Qualitative research | Quantitative research |
|---|--|
| The aim is a complete, detailed description. | The aim is to classify features, count them, and construct statistical models in an attempt to explain what is observed. |
| Seek to explore phenomena | Seek to confirm hypothesis about phenomena |
| Researcher may only know roughly in advance what he/she is looking for. | Researcher knows clearly in advance what he/she is looking for. |
| Recommended during earlier phases of research projects. | Recommended during latter phases of research projects. |
| The design emerges as the study unfolds. | All aspects of the study are carefully designed before data is collected. |
| Researcher is the data gathering instrument. | Researcher uses tools, such as questionnaires or equipment to collect numerical data. |
| Data is in the form of words, pictures or objects. | Data is in the form of numbers and statistics. |
| Subjective - individuals interpretation of events is important ,e.g., uses participant observation, in-depth interviews etc. | Objective seeks precise measurement & analysis of target concepts, e.g., uses surveys, questionnaires etc. |
| Qualitative data is more 'rich', time consuming, and less able to be generalized. | Quantitative data is more efficient, able to test hypotheses, but may miss contextual detail. |
| Researcher tends to become subjectively immersed in the subject matter. | Researcher tends to remain objectively separated from the subject matter |
| Open-ended | Closed-ended |

Table 3: Qualitative research vs. Quantitative research. Source: (Neil, 2007; Mack et al., 2011)

4.1.3 Mixed research method

According to Johnson et al. (2004), mixed methods research is defined as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study. Combining these two approaches helps the researcher to leverage the benefits of one approach to address the weaknesses of another approach as noted by Bryman and Bell (2007). According to Tashakkori et al. (2003), there are three reasons to use mixed research approach:

- Because it answers questions that other method cannot

- Provides stronger deductions
- Provides a greater diversity of views

Furthermore, Johnson et al. (2004) pointed out that the degree of mixture of mixed research method can be viewed in another dimension which form a continuum from a mono-method design to fully mixed method, with partially mixed design falling between single-method design and fully mixed methods. Single-method or non-mixed method approaches consist of the sole use of either the quantitative or qualitative research approaches in a study. Anything besides that is either considered a partially mixed method or a fully mixed method.

According to Leech et al. (2009), fully mixed method designs represent the highest degree of mixing research method and research paradigm characteristics. Fully mixed methods consist of the combining qualitative and quantitative approaches at one or more levels of the research process or across all the levels unlike partially mixed methods. In partially mixed methods on the other hand, qualitative and quantitative data are conducted concurrently or sequentially in their entirety during the research process before mixed at the data interpretation stage. But not within or across the levels of the research process (Leech et al., 2009).

Based on the typology of mixed research by Leech et al. (2009) in Figure 3, the research method in our research study is a partially mixed concurrent dominant status method with the qualitative research as the dominant phase. In order to get feedback from as many employees within the business as possible in a manageable timeframe we decided to use online questionnaires to create a structured framework for collecting their views and opinions. This structured approach defined a quantitative style to our research, whereas a qualitative aspect was introduced during the data gathering and analysis reflected in our attempts to understand employee behaviour and the reasons for such behaviour with regards to wiki adoption. The strategy used in our research study is described in the next section.

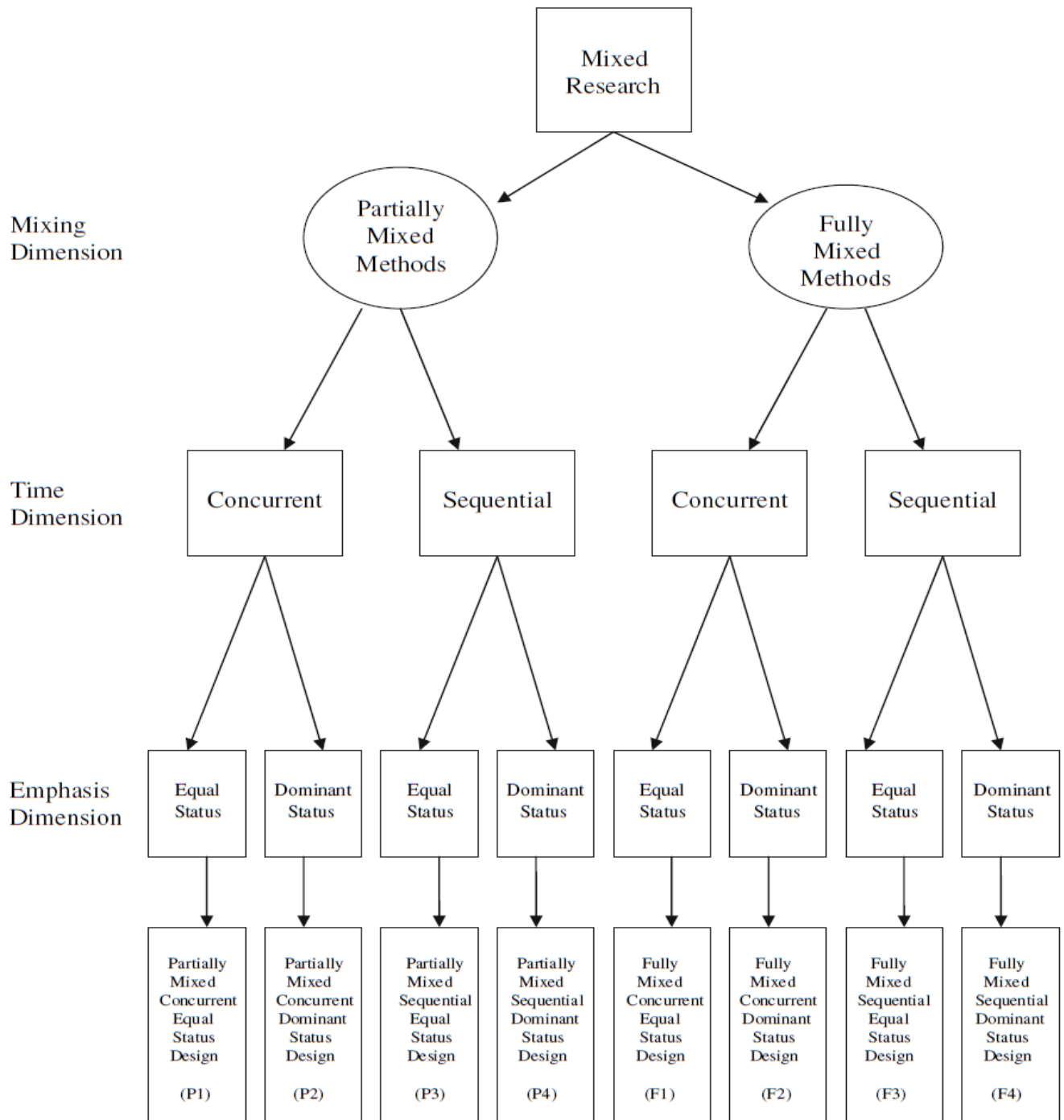


Figure 3: Mixed Research Typology. Source: Leech et al., 2009

4.1.4 Research strategy

The five main research strategies according to Yin (2003) includes: *survey, experiments, archival analysis, histories and case studies*. A research strategy could be a case study according to Yin (1994), if the research questions are answering a “how” or “why” question. Yin defines a case study as “*an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly evident... It allows the investigation to retain the holistic and meaningful characteristics of real-life events—such as individual life cycles, organizational and managerial processes, neighborhood change, international relations, and the maturation of industries.*” Case study, as outlined by Yin (2003), is suitable when exploring contemporary events.

According to Yin (2003) there are three types of case studies;

- an *exploratory* case study is used as a prelude to gather maximum information related to the research topic. It's often used by the researcher to get a better understanding of the research topic. Yin (2003) argues that the use of “what” questions are used in exploratory case study to develop pertinent hypotheses and propositions for further inquiry.
- A *descriptive* case study focuses on defining the problem not its cause. It's often used when the researcher has a fundamental understanding and knowledge about the field of research. Rosengren and Arvidson (2005) mentioned that the basic goal of descriptive research is to define relationship.
- An *explanatory* case study is used to do causal investigations (cause-effect relationship). According to Rosengren and Arvidson (2005), this method is utilized to evaluate what effect a specific change will have on existing norms. In other words, it evaluates whether one variable causes or determines the value of another variable. “How” and “why” questions are suitable for explanatory study when dealing with answering questions involving operational links needing to be traced over time (Yin, 2003).

We made use of the exploratory case study model as our strategy of inquiry in this study because it helped us to explore in depth the knowledge sharing activity and process as suggested by Creswell (2009). Our choice was substantiated by the fact that case study enabled us to study the phenomenon in its natural context and environment in line with the recommendations of Cavaye (1996). Although the case study research included

single and multiple case studies, we made use of a single case study in our research. SoftX was chosen because it stands a good fit to explore the research question.

We adopted a mixed method approach to conduct this study since the aim was to explore the factors that contribute to employees' involvement in the use of wikis for knowledge sharing with the help of interviews as the primary tool and observations. Quantitative aspects of research were employed through surveys together with qualitative elements of research were employed through one-to-one interviews to establish any commonalities between respondents giving us an indication of the factors for success.

4.2 Population and sampling

We chose our sample population in order to provide the most representative cross section of employees as possible (Walliman, 2006).

That target population was restricted to employees working at the SoftX's main office in Manchester but was open to all employees throughout the business who have regular access to computers and the company IT facilities – including technical, training and administrative departments. This capacity was determined as part of the employee's interview process before joining SoftX so ensuring a minimum level of access for all apprentices within the business. We identified a number of defined levels within the business based on business function, role requirements and responsibility within the company. The selection was made so that at least one employee will be chosen from each of the five main identified hierarchical levels within the business namely: *director, recruitment, apprentice, technical and training*. A selection process was setup whereby a person independent of the business, (someone not employed by the company and who knew none of the employees within the business), blindly chose a candidate from each group thereby providing a criteria-based selection of employees for further study. This process meant that each employee had an equal probability of being selected compared to other members of *their group*. (Creswell, 2009). However across the business as a whole employees in smaller groups naturally had a higher likelihood of selection from their group than from larger groups.

Survey candidates were all emailed the same details on how to answer the online survey. The survey itself was anonymous, optional and covered employees across all

departments whether it be technical, managerial, training or administrative. This decision was made as it was determined that all members of staff have the ability to use and contribute knowledge for the better good of the business and so should not be restricted to any one demographic.

The survey was distributed to 133 employees simultaneously and left open for three working days. Out of the original distribution group a total of 99 employees (that is a response rate of 74.4%) had replied by the specified deadline date.

All respondents were informed at the beginning of the survey that any answers they gave would be confidential and anonymous. Replies would not be divulged outside the research group although overall results may be shown to the business management for analysis and planning purposes.

As a result of the previously discussed selection process, one employee was selected from each of the five employee groupings to participate in semi structured face-to-face interviews. The profile of these candidates can be seen in Table 4 below. Each of the five selected candidates agreed to take part in the interview session. Before the interviews were started each volunteer was asked to sign a consent form whereby they agreed to a number of basic conditions under which the interviews would be conducted (see Appendix 3 Section A). The selection was made based on four key criteria:

- Seniority within the business
- Area of specialty and therefore the business unit in which they were employed
- How regularly they used wikis in their daily work.
- The amount of experience in using wikis.

Each of the selected candidates was sent an identical email which invited them to participate in the interview and provided them with a brief summary of what the interview would entail, its general structure and the purpose and focus of the research for which it was being used. All five candidates explicitly agreed to participate in the interview process.

It may be important to note that since one of the selected interview candidates was an apprentice under the age of 18, it was necessary to have a second senior staff member present during the face to face interview in order to comply with British safeguarding legislation, although the second senior staff member played no active role in the

interview process (UKGOV, 2014). The second senior member of staff was not a member of the selected interview candidates and played no other part in the study.

| Role | Years of Wiki Experience | Interview Type |
|---------------------------------|---------------------------------|-----------------------|
| Junior Software Engineer | 2 | Face to Face |
| Director | 6 | Face to Face |
| IT Recruiter | < 1 year | Face to Face |
| Trainer | 2 | Telephone |
| Apprentice | 1 | Face to Face |

Table 4 : Profile of Interviewees

4.3 Data collection methods

An online survey was used to collect empirical data from a number of different user groups within the organization. The questions focused primarily on personal information and demographic related information together with general high level questions regarding experiences with using wikis. Each member of the survey group was given exactly the same questions which allowed us to identify any trends within (and potentially across) each user demographic.

The data used by this study were taken from a number of sources within SoftX. An audience wide online-survey, using Survey Monkey, was sent by email to heads of each department taking part in the survey. Each department head received exactly the same set of questions presented in the same order. Since junior employees were also asked by their superiors, within their departments or reporting hierarchies, to answer this survey a degree of compliance was involved subconsciously into their actions. This may have influenced the way in which they answered the questions differing from a completely unprompted and unfettered set of responses.

Each department head then distributed the survey link to their department members asking them to read the necessary preamble explaining what they need to do to complete the survey and the deadline for submitting responses.

The email sent to all departments' heads was identical, explained the reason and nature of the survey and that all results are confidential and anonymous. This degree of compliance was highlighted to senior staff in two main ways. Representatives of the apprentice workforce repeatedly asked for clarification during staff meetings as to whether the surveys were mandatory or not, and instances of individual apprentices approaching more senior staff members to ask for clarification were observed and reported.

A second phase of the study was to setup a number of face-to-face interviews with a number of representative staff members selected across all departments. The aim of this selection process was to provide a cross section of opinion and views from the all of the employee demographics who had a stake in the success or development of the Wiki as a knowledge sharing tool.

Every effort was made to select a representative cross section of the senior staff from all departments. Each interview was recorded during the interview session using the Windows Sound Recorder tool and later transcribed for a permanent record. This transcription was used as a sanity check to verify that no information was lost from the interviewees answers during the sessions. Each interview lasted between 30 and 45 minutes.

All interviews, both over the telephone and face to face, were conducted in a private meeting room under the same conditions (with the slight exception of the apprentice discussed above), at approximately the same time of day, in the organization's head office.

Both the primary and the secondary sources of information above were used by the researcher as the basis for extracting information related to the research problem. Using both primary and secondary data will help us overcome limitations in one method and give us a better degree of understanding around the research problem as indicated by Creswell (2009).

This approach allowed the researchers to explore those factors that contribute to employees' involvement in the use of wikis for knowledge sharing, and whether their

position within the business hierarchy influences their usage patterns or perceptions of wikis.

As researchers, we played the role of non-participant observers by observing the knowledge sharing activities in a live environment across various departments, following the suggestion made by Creswell (2009), but we didn't take part in answering the survey or interview questions as part of the empirical data.

4.4 Components of the questionnaire

The questions used in this research include questions concerning the role of the respondents at SoftX, questions on the use of SoftX's wiki features and the factors affecting the use of SoftX wiki (Appendix 1 Section C). Groundwork was done with the cooperation of SoftX to establish and optimize the questions that would be included in the survey. This preparatory work focused on the interests of the study, namely on the demographic and experience of the workforce within SoftX. With these aims in mind, and using past training experience of senior management, the questions were created and framed in a context that could easily understood by the workforce. The questions selected were based on several key factors as seen from the SoftX management perspective, primarily on how wikis were seen within the company and whether they could be used as a beneficial tool; whether there was any predisposition for apprentices to use such a tool and whether such a tool helped to spread knowledge within a business in a timely and effective way. The neutral options "*cannot say*", "*neither agree nor disagree*", "*don't know*" or "*unsure*" were uniquely used in questions in which respondents could not answer or did not truly know the answer. For instance, when asking the respondents about the implication of the senior management in the use of the company's wiki, the neutral choice "*neither agree nor disagree*" was offered (see Appendix 1 A).

The first part of the questionnaire concerns optional questions about respondents' role at SoftX, gender and age. These factors are both important within the SoftX business environment and within the context of this study. The majority of apprentices, who make up the bulk of the workforce, are teenagers and as such their views, opinions and experiences may be considerably different to those held by more senior employees. Due to the large number of apprentices compared to the rest of the workforce any consensus

in opinion may unduly affect the overall results. The vast majority of employees in SoftX are male, a trend that is not specific to SoftX but typical of the computer industry. Any gender biased opinions may be obscured by the overwhelming numbers of male respondents and so it could be important to distinguish response by gender to highlight any subtleties in responses.

These questions were used as “ice-breaker” to get the respondents started with the survey. A sensitive question such as age was optional and broken into intervals instead of having the respondent to enter their real age.

The use of SoftX wiki’s features was measured with the aid of a five-point Likert scale. The questions were scaled from 1 to 5, where the minimum value 1 could either be “*strongly disagree*”, “*never*” or “*extremely affect my use*” which represents a total disagreement to the statement and the maximum value 5 which could be either “*strongly agree*”, “Not affect my use” or “*all the time*”. The illustration of the formulation of questions as knowledge internalisation, externalisation, objectification and collaboration can be found in Appendix 1 Section B.

The factors influencing knowledge sharing adopted from previous studies from Ardichvili et al., 2003; Paroutis and Al Saleh, 2009; Tohidinia and Mosakhani, 2010 as described in chapter 4. Details about which factors pertaining to our study are presented in the analysis of the results section (chapter 6).

4.5 Data analysis method

This section of the thesis describe how the researcher filters useful information out of the collected empirical data. According to Saunders et al. (2009), this section may present logical leaps and false assumptions, although it also presents creative and interesting insights. Making use of a framework is therefore recommended in order to correctly process information. Nevertheless, the researcher will still have to make assumptions no matter how small it could be but it they have to be weighed carefully.

In the previous section 3.1, we have selected the mixed method approach by collecting both qualitative and quantitative data as we found this was the best method for collecting data for our study.

Our empirical data analysis is influenced by the theoretical framework established in chapter 2 putting the emphasis on internalization, externalization, objectification,

indicated by Huysman (2002) and collaboration indicated by Tapscott and Williams (2006), as a way to understand potential consequences of the use of social media as a tool of knowledge sharing and collaboration within an organization.

Below is outlined the data analysis method used for each type of the data collected.

4.5.1 Qualitative data

The analytical framework for our empirical data analysis is based on the concept of hermeneutic circle (Cole and Avison, 2007; Klein and Myers, 1999). This concept concentrates on a spiral of understanding of the data that emphasizes that the entire phenomenon can be understood by understanding of each of its constituent parts and their relationships (Cole and Avison, 2007; Klein and Myers, 1999; Butler, 1998). According to Cole and Avison (2007), the objective of the hermeneutic circle is to get a better understanding of the existing knowledge and not to seek out “new” knowledge. Taking this into account, each interview transcript was analyzed and some parts of data were marked and examined based on their importance and connection to the main focus of our research. Analysis of the data was done concurrently with the transcription stage. Themes were associated with essential parts of the text and marked for further analysis. Based on the concept of hermeneutical approach, the text was read to make sure that different parts of the text aligned with the whole phenomenon or qualitative data. Open and axial coding techniques were used in the creation and association of themes specific textual data segments as noted by Rowlands (2003). To be more explicit, meaningful themes and categories were created for definite data segments using open coding and the association of these themes based on their importance and connection to the main focus of the study was done using axial coding, Mansour (2012). These themes were created while taking into account the main purpose of our study, which is knowledge sharing and collaboration by individuals within an organization; specifically using wikis as the social media tool for such exchanges.

The hermeneutical analysis of the data was used to get a better understanding of each component aspect of the phenomenon and connects them with each other. For instance, “...those who possess the most of the company’s knowledge are very often swamped with work, which prevents the individuals from sharing of their knowledge. Wikis functionality is open to anyone, so in case of some individuals being busy, others can easily fill out the blank spots” was interpreted to mean internalization of knowledge.

The four modes (internalization, externalization, objectification and collaboration) developed in the theoretical framework in chapter 2 helped in analyzing various interactions that took place during the interview process.

4.5.2 Quantitative data

As argued by Christensen et al., (2001), collected data must be coded numerically to be statistically measurable. An audience wide online-survey, Survey Monkey, was used to create the survey and to export statistical reports and analysis. First and foremost, essential variable transformations were made on the data collected. Before carrying out the analysis of the empirical data, the internal reliability and consistency of variables based on multiple items were measured with the help of a coefficient alpha. The questions were scaled from 1 to 5, where 1 (“strongly disagree”) represented a total disagreement to the statement and 5 (“strongly agree”) a complete agreement to the statement. The internal consistency was assessed using Cronbach’s alpha correlation test.

According to Cortina (1993), Cronbach’s alpha illustrates the consistency of the variables which is approached within the value of its reliability coefficient (α). The Cronbach’s alpha generally varies between 0 and 1. Cortina (1993) states that the internal consistency of an item in the scale is considered *great* if it’s α coefficient is closer to 1. Table 5 gives an interpretation of the internal consistency from Cronbach’s alpha based on George and Mallery (2003).

| Cronbach’s alpha reliability coefficient | Internal consistency |
|---|----------------------|
| $0.9 \leq \alpha \leq 1$ | Excellent |
| $0.7 \leq \alpha < 0.9$ | Good |
| $0.6 \leq \alpha < 0.7$ | Acceptable |
| $0.5 \leq \alpha < 0.6$ | Poor |
| $0 \leq \alpha < 0.5$ | Unacceptable |

Table 5: Cronbach’s alpha interpretation of internal consistency, source: George and Mallery (2003)

After the quantitative data were collected, a Cronbach's alpha reliability test was conducted on the questions related to multiple choices around the theoretical framework in chapter 2.

The relationship between the use of the SoftX wiki features for knowledge sharing and the assumed factors discussed in chapter 2 was measured with the help of Spearman's correlation coefficient which is also called Spearman's rho denoted ρ or r_s . As defined by Hauke and Kossowski (2011), Spearman correlation is a nonparametric test used to measure direction and strength of the association that exists between two continuous or ordinal scale variables. Unlike Pearson correlation, Spearman correlation does not require linear relationship between variables which justifies our choice of Spearman over Pearson since the variables used in our research are measured according to the ordinal scale (Weyhenmeyer, 2011). These correlations were useful in establishing the strength of the relationship. When the values of the dependent variables (the use of the SoftX wiki features for knowledge sharing) decrease as the values of the independent variables (assumed factors) increase, the value of the Spearman's rho (ρ) ranges between -1 and 0 and there is therefore a negative relationship between the variables. A positive relationship between the variables is identified when the Spearman's rho ρ ranges between 0 and +1 and thus the values of the dependent variables increase as the values of the independent variables increase, according to Burdess (2010, p.161). Just like Pearson's r , Spearman's rho is defined to lie inclusively in the range, $-1 \leq \rho \leq 1$. We made use of the Cohen's criteria (1988) and the interpretation made by Hinkle, Wiersma and Jurs (2003) to describe the strength of the relationship between two variables as shown in Table 6.

| Size of correlation | Strength of the relationship |
|----------------------------|------------------------------|
| $0.80 \leq \rho \leq 1.0$ | Very strong effect |
| $0.5 \leq \rho \leq 0.79$ | Strong effect |
| $0.30 \leq \rho \leq 0.49$ | Moderate effect |
| $0.10 \leq \rho \leq 0.29$ | Small effect |
| $0 \leq \rho \leq 0.09$ | No Effect |

Table 6: Strength of the relationship between two variables

These correlations were useful in establishing an important foundation for the analysis of the variables. But according to Heikkilä (2002, pp.206-246), correlations do not clarify the causality between variables. Thus the need of additional statistical method to find the causal association between the use of the SoftX wiki and the factors.

A Principal Component Analysis (PCA) was conducted based on the identified important correlations. The main purpose of the PCA according to Jolliffe (2002) is to reduce the number of variables by transforming a large number of correlated variables into a new reduced set of uncorrelated components. The classification of the variables under the components is based on their components loadings and the contextual match with each other. PCA also helped us to avoid multi co-linearity between many variables given that we have uncorrelated variables as a result of the classification according to Jolliffe (2002) and Heikkilä (2002). Once the variables were reduced into components using the PCA, we then applied the multiple linear regression analysis to verify the causality between the dependent (use of soft wiki for knowledge sharing) and the reduced variables (components), Freund and Sa (2006). Heikkilä (2002) states that this will help us find the best combination of factors that will explain the use of SoftX wiki. To do that, we interpreted the significance of the model (R square) and the standardized coefficients (Beta values).

All empirical data collected from Survey Monkey were analyzed using the Statistical Packages for the Social Sciences (SPSS 22). The calculation of the Cronbach's alpha, the Spearman's correlation, the Principal Component Analysis (PCA) and the multiple linear regression analysis were all performed using SPSS.

4.6 Validity and reliability: anticipated threats and how to deal with them

Validity is seen as a strength of qualitative research, but it is used to determine whether the findings are accurate from the standpoint of the researcher, the participant, or the readers (Creswell, 2009, p.223). Data was collected from both observations and interviews to provide a degree of consistency between the results. The final report of transcribed data was sent back to participants for them to check the accuracy by spending prolonged time to impart details about the site and the participants (Creswell,

2009). The strategy used to verify the reliability consisted of having a well-documented procedure and also by collecting and analyzing data concurrently.

4.7 Ethical Considerations

Due to the sensitivity of information we obtained in the course of our research, a number of ethical issues were taken into consideration during the course of the research study:

- We obtained permission from the institution before carrying out the study. In this case the heads of each department were contacted individually and each agreed that employees in their department could be used as part of the study
- We clearly and unambiguously explained the aims and objectives to the subjects. Explained the methods of the research and how the data collected from the study will be used.
- We clearly informed the participants before the interviews about all data collection devices and activities.
- The information's rights, interests and wishes were considered first when choices were made regarding reporting the data,
- Following the guidelines made by Creswell (2009) we made the final report readily available to all contributors.

5. Study Case Description

This fifth chapter describes the environment under which the case study was performed. Detail is given to the structure and hierarchy within SoftX and the processes involved in carrying out the study.

SoftX is a software development consultancy based in the north of England. Its primary role is to develop software solutions for its partners and external customers by leveraging the experience of its senior staff and the enthusiasm of its apprentice workforce. As well as core development services the business offers its customers support and maintenance services on delivered solutions as well as training in software development for customer employees. Long term, SoftX intends to expand the training side of its business from solely developing its internal apprentices to offering similar services to the wider public.

The organization is made up of three distinct, but interrelated departments:

- **Software development unit** consisting of both junior and senior developers. This is by far the largest department and is responsible for all software development and product development functions within the business. The resources within this department are treated as a resource pool and allocated to projects on a needs basis. Senior/experienced staff are assigned as team leaders and a skill-specific team were created below them. The nature of the skills in any given team will depend on the requirements of the project under consideration. Once a team has been created to service a project it shall be assigned to a project manager who shall be the interface between the business and the external customer. The project manager may be responsible for several projects at any given time, but the liaison between the project manager and the team leader is the mechanism used to provide project status both internally to senior management and externally to the customer.
- **Sales and marketing unit** which promotes the company's values and ethics to the potential customers and performs all financial and accountancy processes such as billing customers and chasing up overdue payments.

- **Software maintenance unit** performs the task of maintaining existing software that has already been delivered to customers and is working in a live environment. Separate to the software development department once a product has been released and handed over to the customer, the responsibility bug fixing, providing updates and upgrades and processing change requests to functionality becomes the responsibility of the software maintenance department. Any changes to existing software, generated by the raising of a change request would, once approved, cause the creation of a new project within the software development function and after which would be treated the same as any other development project.

SoftX realizes the importance and significance of knowledge management and knowledge utilization within its business and as such has created a role (knowledge management manager) whose responsibility is to develop the company's Knowledge Management strategy. This strategy is supported by suitable knowledge management tools used by SoftX's employees. These tools are currently limited to a companywide wiki, but part of the knowledge management strategy is to investigate other (more effective?) ways to share knowledge within the organization.

5.1 Background and social ties within SoftX

This section describes the overall vision and strategy of Wikis within SoftX as well as the knowledge sharing and collaboration strategy. Generally there has been little uptake across all levels of the business. Most people seem to be aware that a wiki exists and generally what it is, generally acknowledging the receipt of an email sent by senior management explaining that a wiki has been created for knowledge sharing within the business but little or no guidance has been given on how or when to use it for posting information that may be important to other members of staff.

“A central place that can act as a repository of information for the company that can be accessed by everyone.”

(Senior Trainer)

“They act as a digital encyclopedia, in which everyone can be an article writer regardless of their position or role within the company.”

(Training Director)

When asked what their understanding of a wiki was, there was a noticeable division between training and technical people who knew roughly what a wiki was and those interviewees from non-technical background who didn't.

"I haven't had many dealings with Wiki's – I had an email explaining that I had one and it was linked to another project management software we were currently using called Trello - this was all I know about it and I haven't had any further information since."

(Recruitment executive interview candidate)

This reinforces the premise that wikis aren't used as a primary means of knowledge sharing:

The time and effort that needs to be invested by the company in the short term to establish a wiki-based solution is seen as an unnecessary upfront expense, especially as other free sources of knowledge are readily available.

"Other methods are more widely used to access data so Wikis play second fiddle to Google and books."

(Junior developer)

"Trello seems good for this (knowledge sharing) as an alternative to Wiki. Anything that doesn't have a cost to hinder use and development is a good step forward"

(Training director)

The interviewer asked the Training Director as an aside question, partly based on the responses of previous interviewees, during the interview what his views were

"As this is a relatively new business it has not yet been promoted, however there will be a launch which will then have a sustained requirement for its use."

This could help to alleviate some of the issues raised of lack of promotion and visibility of the current incarnation of the wiki.

6. Analysis of the Results

This sixth chapter centers on the statistical analysis of the survey and interview responses coming out of the case study in the previous chapter.

6.1 Profile of the Respondents

Table 7 shows the profile of the respondents according to their position and experience with using wikis. The number of respondents (99) represents approximately 65% of the total employees within SoftX. The majority of the respondents (86.9%) were apprentices. Table 7 also shows that more than 70% of the respondents have some experience with the usage of the wikis.

| Demographic characteristics | Response count | Percentage |
|-----------------------------|----------------|------------|
| Director | 1 | 1.0% |
| HR/Recruitment | 1 | 1.0% |
| Junior Technical | 6 | 6.1% |
| Level 3 Apprentice | 76 | 76.8% |
| Level 4 Apprentice | 10 | 10.1% |
| Management | 2 | 2.0% |
| Senior Technical | 0 | 0.0% |
| Trainer | 3 | 3.0% |
| Experience with Wiki | | |
| Never | 18 | 18.2% |
| Under one year | 7 | 7.1% |
| 1-3 years | 10 | 10.1% |
| 3-5 years | 22 | 22.2% |
| Over 5 years | 42 | 42.4% |

Table 7: Profile of the respondent (Total: 99)

6.2 SoftX wiki features (dependent variables)

SoftX wiki is the focus of this study. The use of SoftX's wiki was measured in terms of knowledge internalization, externalization, objectification and collaboration criteria described in knowledge sharing theory (see Appendix 1). Conversely, models proposed by researchers such as Huysman (2002) cycle in figure 4 suggests that knowledge sharing consists of only three phases namely, internalization, externalization and objectification. From this we established four variable criteria to be used in our analysis.

As shown in Table 8, the reliability test Cronbach's alpha was 0.7861 for the seven questions regarding internalization. Since $\alpha > 0.7$, the internal consistency is considered "good" according to Table 4. In the same way, the Cronbach's alpha for the questions concerning externalization (9 questions), objectification (14 questions) and collaboration (7 questions) is above 0.9 which makes the internal consistency of those questions *excellent* according to Table 5.

| SoftX wiki features as | | N | Min | Max | Mean | Cronbach's alpha (α) |
|------------------------|---------------------------|----|------|------|------|-------------------------------|
| Knowledge Sharing | Knowledge internalization | 99 | 1.00 | 5.00 | 2.47 | 0.7861 |
| | Knowledge externalization | 99 | 1.00 | 5.00 | 2.51 | 0.9433 |
| | Knowledge objectification | 99 | 1.00 | 5.00 | 2.53 | 0.9658 |
| Knowledge sharing | | 99 | 1.00 | 5.00 | 2.49 | 0.9653 |

Table 8: Dependent variables

When considering rounded numbers of the mean in Table 8, we see that respondents use SoftX wiki features less than a month on average for knowledge internalization, externalization and objectification. The use of the SoftX features for knowledge internalization, externalization and objectification are used to explore the correlations between independent variables (assumed factors from the empirical research Table 6). The use of SoftX wiki features for knowledge sharing represents the central dependent variables which will later be used in the multiple regression analysis.

6.3 Overview of the independent variables (assumed factors)

From Table 9 there were 13 influencing factors (variables) which are likely to affect the use of the SoftX wiki. However it is important to note that that these independent variables were investigated with regards to the total amount of the respondents. Questions were not posed in the form of “frequency for using internet for work purposes” and “dependency in time distribution on active tasks” since we did not see the direct relevance to our study. However, this can be considered for further research in the future. Likewise, “organizational guidelines for using wiki” as we considered this as part of “scoping of training possibilities for employees to use wiki”.

| Factors | N | Min | Max | Mean | α |
|---|----|-----|-----|------|----------|
| Personal and collective utilities (foreseeable benefits) | 99 | 1 | 5 | 2.21 | 0.92 |
| Lack of trust and fear of misuse | 99 | 1 | 5 | 2.78 | 0.68 |
| Time | 99 | 1 | 5 | 3.03 | 0.95 |
| Negative impact on professional image | 99 | 1 | 5 | 2.70 | 0.83 |
| Frequency of using wiki in private life | 99 | 1 | 5 | 3.83 | 0.93 |
| Skills in using company's wiki | 99 | 1 | 4 | 3.40 | |
| Understanding company's wiki as part of my responsibilities | 99 | 1 | 5 | 2.94 | 0.95 |
| Manager's activeness | 99 | 1 | 4 | 2.96 | 0.96 |
| Scoping of training possibilities for employees to use wiki | 99 | 1 | 5 | 2.97 | 0.95 |
| Colleagues activeness and participation | 99 | 1 | 5 | 2.24 | 0.97 |
| Dependency in decision making | 99 | 1 | 5 | 2.14 | |
| Collaboration in and across business units | 99 | 1 | 5 | 2.09 | 0.96 |
| Degree of user friendliness of the wiki | 99 | 1 | 5 | 3.50 | |

Table 9: Overview of the independent variables

From Table 9, we can see that the minimum and maximum values of the independent variables lie in the closed range 1 and 5. In the case of “frequency of using wiki in private life” question, the maximum value is 5 and its mean is the highest (3.83, as rounded value: weekly use). Finally, the relevance of variables formed using the 5-point

Likert scale was verified using the Cronbach's alpha reliability coefficient. The internal consistency of ten of the thirteen independent variables based on multiple choices had a supported Cronbach's alpha ranging from 0.68 to 0.97 (see Table 5). The foreseeable benefits were formed based on personal benefits when participating, relevance of the contribution, usefulness in daily work, collaboration with colleagues and the sense of belonging to the organization when contributing. Trust and cost issues were built on four items based on lack of time to participate, afraid to provide wrong or faulty information, negative impact on professional image and fear that contribution won't be valued. Management's involvements and colleagues involvements were formed based on positive feedback, active contribution, value of contribution and training. Finally, the collaboration in and across business units were built on encouraging peer to peer learning (See Appendix 1 Section B).

6.4 Factors affecting the use of SoftX wiki

The research question is verified in this section with the help of statistical methods described in section 3.6. We started by exploring the correlations between the use of SoftX wiki and the influencing variables. Next, the principal component analysis was used to reduce the number of variables based on the significant relationships amount them. Finally, we investigated the causal relationship between the influencing variables and the use of SoftX wiki.

6.4.1 Exploring the correlations (Spearman's rho ρ)

We can eliminate some of the variables by exploring the correlations to knowledge internalisation, knowledge externalisation and knowledge objectification. We observed that two variables had correlation ρ less than 0.09 to knowledge internalisation, knowledge externalisation or knowledge objectification (Appendix 2, Section A). According to the Cohen's criteria in table 6, there is no correlation and so only those variables with supported results (with significant correlation as described in Table 6) were retained for further analysis and discussion.

Firstly, the lack of time variable shows no significant (negligible) correlation although it was expected to influence the use of the SoftX wiki features. A possible explanation to

that might be the fact that most of the employees are apprentices and they might not see time as an issue if the use of wiki is integrated as part of the day to day work. Secondly, the dependency in decision-making shows no significant (negligible) correlation to the use of SoftX wiki features. This can possibly be explained by the fact that apprentices have been encouraged by some trainers to contribute in them. One interviewee confirmed that “the wiki has been available for quite some time and I have tried to promote to my classes that it is a good idea to use it”. Employees are therefore free to decide whether or not to participate. Even though these two variables appear to have no significant correlation to the use of SoftX wiki, it must be noted that they might be relevant over a longer study period within SoftX, or have more relevance for surveys carried out for other organizations.

As a result of the significant correlation with respect to knowledge internalization, externalization and objectification, eleven variables were retained for the analysis in respect to the SoftX wiki features as knowledge sharing (central dependent variables)

Table 10: Knowledge sharing correlation with variables

| | | N | correlations (Spearman's rho ρ) | Result |
|-------------------|---|----|---|----------------------|
| Spearman's rho | Foreseeable benefits | 99 | 0.560** | Supported |
| | Lack of trust and fear of misuse | 99 | 0.511** | Supported |
| | Negative impact on professional image | 99 | 0.560** | Supported |
| | Frequency of using wiki in private life | 99 | 0.567** | Supported |
| | Skills in using soft X's wiki | 99 | 0.366** | Supported |
| | Understanding company's wiki as part of my responsibilities | 99 | 0.446** | Supported |
| | Manager's activeness | 99 | 0.402** | Supported |
| | Scoping of training possibilities for employees to use wiki | 99 | 0.438** | Supported |
| | Colleagues activeness and participation | 99 | 0.564** | Supported |
| | Collaboration in and across business units | 99 | 0.094 | Not Supported |
| | Degree of user friendliness of the wiki | 99 | 0.438** | Supported |

** . Correlation is significant at the 0.01 level (2-tailed).

In Table 10, ten out of the eleven variables are supported, the exception being the collaboration in and across business units. This was ignored since it has insignificant correlation to knowledge sharing. According to the literature, the use of the SoftX wiki

features for knowledge sharing is expected to increase with the collaboration between business units and colleagues by face-to-face or other traditional communication means. The outcome shown in Table 10 produces a contradictory result to this dogma. One possible explanation for this is that no significance correlation (0.094) could be related to the fact that people are not always willing to adopt new technology or the technology hasn't been totally adopted by all business units.

As pointed out by an interviewee (graduate engineer), “wikis have only recently been introduced to the commercial team as a viable tool for sharing technical knowledge. But the vision is to roll them out across all departments”. In other words, instead of using SoftX wiki for knowledge sharing, many employees may rather prefer to use other means.

So to conclude, the common pattern of variation between the ten supported variables is investigated in details in the next section using the Principal Component Analysis (PCA) statistical method.

6.4.2 Creating new set of variables (Principal Component Analysis (PCA))

The common pattern of variation between the ten supported variables is investigated in details in the next section using the Principal Component Analysis (PCA) statistical method. The main idea here is to reduce the large set of independent variables (interrelated variables) into a new set of uncorrelated principal components (Jolliffe, 2002). So, instead of investigating the causal relationship between ten independent variables (factors) and one dependent variable (use of SoftX wiki for knowledge sharing), we will rather investigate the causal relationship between the reduced number of uncorrelated components and one dependent variable. Table 11 contains the summary of the PCA results (Appendix 2 Section B). The number of components and the grouping of variables among them were determined as per the below recommended guidelines:

- According to Jolliffe (2002), components should have eigenvalues greater than 1. In our case, eigenvalues for components 1, 2 and 3 are respectively 6.8, 1.2 and 1.1.
- Alkula, et al. (2002) recommend a variance explained greater than 5%. Which is the case for the results presented in Table 11.

- Communalities should be equal or greater than 0.31 to be acceptable.

Table 11: Condensed summary of the Principal Component Analysis results

| Variables | Component | | | Communalities |
|---|---------------|---------------|---------------|---------------|
| | 1 | 2 | 3 | |
| Foreseeable benefits | .574 | .739 | -.096 | .885 |
| Lack of trust and fear of misuse | .484 | .615 | .359 | .741 |
| Negative impact on professional image | .118 | .435 | .081 | .895 |
| Frequency of using wiki in private life | -.008 | .873 | -.452 | .566 |
| Skills in using SoftX's wiki | -.036 | -.005 | .545 | .966 |
| Understanding company's wiki as part of my responsibilities | .619 | .033 | -.291 | .431 |
| Manager's activeness | .786 | .536 | .032 | .807 |
| Scoping of training possibilities for employees to use wiki | .811 | .498 | .112 | .719 |
| Colleagues activeness and participation | .854 | -.092 | .479 | .967 |
| Degree of user friendliness of the wiki | .238 | -.021 | .492 | .644 |
| Initial Eigenvalues | 6.8 | 1.2 | 1.1 | |
| Variance explained | 68.10% | 12.26% | 10.84% | |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

These results above support the fact that the ten variables were retained in the analysis. Variables values with higher (strong) component loadings were highlighted since component loadings were mainly used when grouping variables into the components. With the aid of the literature in chapter 2, we were able to match the components with the use of the literature review discussed in chapter 2, in other words, component 1 can be identified to organisational factors, component 2 to personal or human factors and component 3 to technological factors (Table 12). Detailed results of the PCA are found in Appendix 2 Section B.

Organisational factors (component 1): The four variables understanding company's wiki as part of my responsibilities, manager's activeness, scoping for training possibilities for employees to use wiki and colleagues' activeness and participation got the highest component loadings in component 1. And according to the theoretical framework (section 2.6), these variables fall into the category of organisational factors and therefore component 1 is considered to be organisational factors.

Table 12: Summary of the Principal Component Analysis results grouped into components

| | Component | | | Communalities |
|---|---------------|---------------|---------------|---------------|
| | 1 | 2 | 3 | |
| Organisational factors (Component 1) | | | | |
| Understanding company's wiki as part of my responsibilities | .619 | .033 | -.291 | .431 |
| Manager's activeness | .786 | .536 | .032 | .807 |
| Scoping of training possibilities for employees to use wiki | .811 | .498 | .112 | .719 |
| Colleagues activeness and participation | .854 | -.092 | .479 | .967 |
| Personal or human factors (Component 2) | | | | |
| Foreseeable benefits | .574 | .739 | -.096 | .885 |
| Lack of trust and fear of misuse | .484 | .615 | .359 | .741 |
| Negative impact on professional image | .118 | .435 | .081 | .895 |
| Frequency of using wiki in private life | -.008 | .873 | -.452 | .566 |
| Technological factors (Component 3) | | | | |
| Skills in using SoftX's wiki | -.036 | -.005 | .545 | .966 |
| Degree of user friendliness of the wiki | .238 | -.021 | .492 | .644 |
| Initial Eigenvalues | 6.8 | 1.2 | 1.1 | |
| Variance explained | 68.10% | 12.26% | 10.84% | |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

Personal or human factors (component 2): Foreseeable benefits, lack of trust and fear of misuse, negative impact on professional image and frequency of using wiki in private life displayed the highest component loadings in component 2. Based on the theoretical framework, they are considered in relation to individuals. Therefore, both the literature and the component loadings suggest that this second component can be called personal or human factors.

Technological factors (component 3): Finally, skills in using the SoftX's wiki and the degree of user friendliness of the wiki registered the highest component loadings in component 3. The decision to call the third component technological factors is not only supported by the component loadings but also by the literature discussed in chapter 2.

The application of the PCA to the initial 10 independent variables resulted into the creation of 3 new uncorrelated independent variables (Table 13). Each of them can be analysed together since the internal reliability is accepted according to Table 4.

| Independent variables | N | Min | Max | Mean | Cronbach's alpha (α) |
|----------------------------------|-----------|-------------|-------------|-------------|---|
| <i>Personal or human factors</i> | 99 | 1.00 | 5.00 | 2.17 | 0.88 |
| <i>Organizational factors</i> | 99 | 1.00 | 5.00 | 2.93 | 0.65 |
| <i>Technological factors</i> | 99 | 1.00 | 5.00 | 2.88 | 0.93 |

Table 13: New set of independent variables

With the new variables showing congruence with the literature and the empirical research as assumed, the next section will consist of investigating the causal relationship between these variables and the use of SoftX wiki for knowledge sharing.

6.4.3 Investigating causal relationships between independent variables (factors) and the use of SoftX for knowledge sharing (Multiple regression analysis)

Multiple regression analysis is used to assess the causal relationship between the three independent variables (factors) in order to explain the use of the SoftX wiki for knowledge sharing.

In the multiple regression model that we adopted, the predictor variables represent statistically significant causal association to the use of SoftX's wiki. Table 14 contains the summary of useful results from the model. More details about the regression's results can be found in Appendix 2, Section C.

At first, it is important to note that the statistical significance of the overall model is supported since $p < 0.01$. Then secondly, the independent variables are able to explain the 58% of the variability of the dependent variable. This means that organisational, personal and technological factors with 58% value explains the variance in the use of the SoftX wiki. And according to Freund, et al. (2006), efficiency levels with values greater or equal to 30% are considered good supporting the benefit of our results.

Table 14: Multiple Regression Analysis Results

| Predictor variables | Beta |
|--|-------------|
| (Constant) | |
| Organisational factors (wiki as part of my responsibilities, Manager's activeness training to use wiki and colleagues' activeness) | .383 |
| Personal factors (Foreseeable benefits, Lack of trust and fear of misuse, negative impact on professional image and use of wiki in private life) | .366 |
| Technological factors (Skills in using SoftX's wiki and friendliness of the wiki) | .311 |

Dependent Variable: Use of SoftX's wiki feature for Knowledge Sharing

R Square = 0.58; $p < 0.01$

Interpreting the Beta-values according to Alkula, et al. (2002), could help in correlating the influence of predictive variables on the dependent variable. Thus, the higher the beta value the greater the impact of the predictor variable on the dependent variable. As shown in Table 14, there is a positive relationship between all predictive variables and the use of SoftX wiki. Organisational factors have the highest beta-value (0.383), followed by personal factors (0.366) and finally the technological factors (0.311). Since all independent variables were statistically significant we have demonstrated that the organisational, personal and technological factors represent a causal relationship to the use of the SoftX wiki for knowledge sharing.

This aligns with the previous theoretical framework constructed in section 2.6. Figure 4 illustrates a summary of our findings which includes that only variables that were proven to have a statistical significant association with the use of the SoftX wiki. Although sixteen variables were explored in respect to the use of the SoftX wiki, only ten are included in the final specific model to SoftX. It was also inferred that organisational, human and technological factors will each influence the use of the SoftX's wiki.



Figure 4: Factors affecting the use of the SoftX wiki

It was demonstrated that with the use of the multiple regression analysis that organisational factors have more influence on the use of the SoftX's wiki, followed by the personal factors and then the technological factors. The discussion of our findings is done in the next chapter.

7. Summary and Discussion

This seventh chapter discusses our results and summarizes our findings in terms of the suitability of wikis as a knowledge sharing tool. Further we mentioned a number of suggestions for further research in the discussion part.

7.1 Summary of the results

According to the research tradition in chapter 4, three factors were assumed to influence the use of the SoftX wiki. As a whole, sixteen variables were analyzed from personal, organizational and technological factors. We started by investigating the correlation in relation to the use of Soft X wiki as knowledge internalization, knowledge externalization and knowledge objectification on one side. And on the other side we investigated the use of Soft X wiki as knowledge sharing. We ended up with a total of ten supported variables. The remaining six variables were excluded from further analysis because they had no significant association to the use of the SoftX wiki.

Three different groups (*components*) of factors were identified using the ideas of principal component analysis (PCA). These variables fell under similar categories as previous empirical research. The components were designated as *human or personal*, *organizational* and *technological factors* according to the research tradition in chapter 4.

Multiple regression analysis was used to investigate the causal relationship between both the dependent and independent variables. The independent variables were able to explain 58 percent of the variability of the dependent variables. The summary of the main results are as shown in Table 15 below.

| Factors | Details |
|-------------------------------|--|
| Organizational factors | <ul style="list-style-type: none"> • Manager's activeness (feedback, contribution and implication) • Training to use SoftX wiki • Colleagues' activeness (feedback, contribution and implication) • Understanding SoftX Wiki as part of responsibilities |
| Personal factors | <ul style="list-style-type: none"> • Foreseeable benefits • Lack of trust and fear of misuse of the SoftX wiki • Fear of negative impact on professional image • Use of wiki in private life |
| Technological factors | <ul style="list-style-type: none"> • Skills in using SoftX wiki • Friendliness of the SoftX wiki |

Table 15: Summary of the factors affecting the use of the SoftX wiki

From this study, it was revealed that the three main factors of organizational, personal and technological factors, and all their variables had a significant influence and as earlier mentioned were able to explain 58 percent of the variance in the use of the SoftX wiki. The value of the independent variables is *directly* relational to the recurrent use of the wiki in SoftX. As a result, these factors can both increase or decrease the use of the SoftX wiki. These factors can be considered as enablers to employee's use of the SoftX wiki if the independent variables increase as well as a barrier to the employees' use of the SoftX wiki if the influencing variables decrease.

Managers' and colleagues' activeness, training to use Soft Wiki and understanding SoftX wiki as part of responsibilities are considered *organizational* factors. As expected by the literature and using the grading provided in Table 6, managers' activeness had the strongest correlation in relation to knowledge sharing, 0.41, followed by the understanding of *responsibilities* (0.34), colleagues' *activeness* (0.30) and then *training* to use SoftX Wiki (0.15). The correlations of the variables under organizational factors are defined as medium strength according to Cohen's criteria (Cohen, 1988), except the training to use the SoftX wiki which is represented as a small strength. Employees see the feedback and contribution from the senior management and their colleagues, the more regular they will use the SoftX wiki. The more employees understand the SoftX

wiki as part of their responsibilities, the more regular they will make use of the SoftX wiki.

Several important factors have presented themselves as a result of our study at SoftX which could explain the apparent lack of use of their wiki as a means of knowledge sharing within the business.

7.2 Discussion

The purpose of this study was to examine the contributing factors that affect employees' use of a centralized wiki for knowledge sharing. The current study has some limitations which should be taken into account. It's important to reflect on the reliability, validity as well as the generalizability of our research. Firstly, the questions asked and the techniques used in our online survey and interviews must effectively explore the phenomenon in order to obtain validity (Walliman, 2006, pp.33-34). There must be a logic in the questions asked in order to obtain validity (Alkula et al., 2002, pp.89-94). The survey questions sent to SoftX were based on previous studies and theoretical background and it was assumed that they could be validly applied to the SoftX situation. The use of the SoftX wiki was investigated in terms of knowledge internalization, externalization and objectification as suggested by the knowledge sharing cycle of Huysman & Dirk de Wit (2002). We made use of the Likert scale rating in the online survey and open-ended questions in the interviews. Therefore, basic criteria to obtain validity was taken into consideration when building our questionnaire. Secondly, the latent idea of reliability is that any significant result should be more than a unique discovery and must be inherently repeatable (Walliman, 2006). In the case of SoftX survey, we made use of the web application SurveyMonkey which was used to collect all responses entered by the participants and also offered the ability to export the data in external spreadsheet format. We were therefore able to avoid typographic errors or unnecessary miscalculations. The internal reliability was determined using the Cronbach's alpha. The acceptable level of the Cronbach's alpha was also obtained for the dependent and independent variables. Finally, concerns around the generalizability of the results obtained to a wider population (Williman, 2006, p.34). Generalizability cannot be presumed in this case given that the research carried at SoftX was a case study. The interpretation of the results collected must be done cautiously considering

the data sample obtained. As described in section 4.2, only 99 out of 133 employees (74%) responded to the survey and only 5 employees participated in the semi structured face-to-face interviews. Therefore, the results collected should only serve as *indicative* in respect to the target population at Soft X. A larger target population and/or a higher response rate may contribute to produce different results. Also, the majority of the respondents had personal experience in using wiki as shown in Table 7 indicating a preexisting bias (either positive or negative) based on prior experience and exposure. The idealistic solution would be to have a target audience who had no previous knowledge or exposure to wikis but in practice this may prove difficult to achieve. Therefore, it will be interesting to include case studies from many other organizations in order to bring a wider perspective and test if our research model still reflects the results obtained at SoftX or if they change among different organizations.

Apart from the lack of generalizability, there are still some limitations of the study that should be considered. As illustrated by Alkula et al. (2002), accurate data from surveys can be attained when studying facts. This is not the case when investigating human behaviors, attitudes or opinions. These biases associated with these three human attributes could be magnified when considering samples which have such a big bias towards particular demographics, such as age and experience, as is the case with the apprentice employees at SoftX. Considering that our study focuses on the contributing factors that affect employees' use of the SoftX wiki, the SoftX survey did not only contain questions about facts but also questions about behavior and opinions. Therefore some of the results obtained will unsurprisingly difficult to quantify and may contain errors or anomalies since opinions and behaviour are highly subjective to the individual. But, Alkula et al. (2002) pointed out that these errors could be reduced by cautiously planning and implementing the questionnaire. Nevertheless, the overall accuracy of the results obtained was greatly enhanced given that emphasis was made on the validity and reliability of the study.

As mentioned in section 4.4, p5 and appendix 1 A, respondents were given the possibility to have a neutral reply when they didn't know the answer to a question or simply didn't want to reply. It can be argued that a neutral response could imply more than just the aforementioned reasons. An undecided reply could mean that the respondent doesn't have the expertise or the adequate training to do so. We consider this

to be a limitation in our thesis since this could clearly be the case of those who have no experience to use the wiki in their personal or in the organizational context. Therefore, it will be interesting to take that into consideration in future researches especially when analyzing the technological factors.

In cases where respondents didn't know what to respond or simply didn't want to do so, specific cases where

Regardless of the limitations above, this study is in the field of informatics and greatly contributes to existing literature about social media and knowledge sharing within organizations. The results obtained from this research provide essential understanding of the research question and some elements that can be assumed when carrying out further research. It can thus be confirmed that this research succeeded in finding the contributing factors that affect employees' use of a centralized wiki for knowledge sharing and that the research question in section 1.2 has been answered. It continues to mention that the obtained research model is able to explain 58 percent of the use of SoftX wiki for knowledge sharing. Hence, there are still important factors affecting the remaining 42 percent of the variance in the dependent variables currently not added to the research model. Further research in this area may reveal new factors that were not explored in this study with a view to increasing the coverage of future studies and reducing the variance of dependent variables to provide a more comprehensive model of the SoftX environment.

It would be interesting to test the research model used at SoftX and study if similar factors appear with the same causal relationship in the case of other organizations and samples of respondents. Such a direct application in other environments will either reinforce the validity of the model or highlight shortcomings that should be addressed in future research. Some of the viewpoints that can result from this are:

On one hand, various supported factors obtained in this study can be affected by the management or the organization. For example, providing enough training to the employees and managers' activeness are likely to increase employee's use of the organization's wiki. Technological and organizational factors can therefore be improved by the organization. Despite the fact that foreseeable benefits are listed under personal factors, the management or the organization is still able to influence them. By

explaining the personal and organizational benefits of using the company's wiki to their employees, organizations are capable of making them conscious of the advantages. Failure to clearly advertise those benefits by the organization will mean trusting the employees to make use of the tool without getting any incentive to do so. For instance, management can put in place a system that gives redeemable points to employees for every contribution made on the wiki. Furthermore, organizations can also influence the technological factors by improving the user friendliness of the wiki based on the suggestions received from employees. The managers' activeness and employees' feedback (organizational factors) can be useful in gathering significant suggestions that can greatly improve the features of the wiki and thus make it best suit for knowledge sharing within the organization. This shows how useful this study can be for the management responsible to setup and institute the wiki as a tool for knowledge sharing. Simply having a social media tool in an organization is not enough to motivate employees to share their knowledge. The management and the organization have a significant role to play in that prospect.

Understanding the use of wiki as part of responsibilities should also be taken into consideration. If employees do not see the use of the wiki as part of their responsibilities, it may raise a number of questions around; how important is it to use the wiki to share knowledge? Must I use the wiki to share knowledge? How will my daily routine works be affected by the use of the wiki? Apprentices will easily follow instructions given to them by trainers or the management. This behaviour of following orders without consideration for consequences may be a result of environment at SoftX but just as likely to be due to other factors such as the age and lack of experience of the apprentices. Such a situation would thereby make the current model less portable to other environments where a different employee demographics may exist. In the case of SoftX adding the use of the Soft Wiki as part of the employees' responsibility might greatly improve the use of wiki for knowledge sharing since apprentices constitute the majority of the employees at SoftX. Additionally, introducing the use of wiki to employees as part of their responsibilities at an early stage (e.g time of employment) could greatly affect its use for knowledge sharing. Having all employees participate in the use of the wiki will motivate others to do the same. It will however be interesting to consider further research in this area to compare results obtained on different employees' samples and organizations.

8. Conclusion

In this eighth and final chapter of this research project, we evaluated what we have discovered as a result of our study and reflect on how our findings related to our initial research questions.

Our original research question was to determine what factors influenced an employee's use of a wiki as a means for sharing knowledge within a company. Our research has shown that there are three major factors that play a part in an individual's overall decision namely organisational, personal and technological. The influence of these factors has been shown to exhibit a relationship to the use of the SoftX wiki. The difficulty arises in that this perception will be different for each person and a wiki-based solution needs to offer an incentive for as wide a range of employee's as possible for it to become an effective tool.

It is undisputable that knowledge management and knowledge sharing are emergent and important fields of academic research because of the value knowledge has to an organization. Wikis represents a change in technological focus which in isolation is not able to promote knowledge sharing. New avenues for employee participation and collaboration may be achieved if it is combined with other technologies, both new and established. Knowledge exchange can be promoted with the aid of wikis and other Web 2.0 tools. Generally, information and communication technologies provide infrastructure for knowledge management but this is only part of the solution as the motivation of employees must be understood as a precondition to start knowledge sharing. Organizations need to consider what motivates employees to try out new technological tools and practices. Without resolving these issues related to individuals' behavior, knowledge sharing is not likely to take place within an organization.

More research is required before the best way to engage people in using social media for knowledge sharing can be fully addressed. Technology is continually evolving and it shouldn't be assumed that once the problems associated with modern technologies have been addressed then this problem is totally resolved. Wikis are just one example of

such modern technologies, and is therefore just the current line that has been drawn in the sand to represent the current state of technology. Solutions will need to continue to evolve over time as new technologies appear each creating their own adoption issues.

The development of new technologies and their interest to researchers means that further study in this area is inevitable. Many of the existing studies represent qualitative findings but taking a more mixed approach to the use of wiki as a form for knowledge sharing within companies made lead to an expansion of research in this field.

9. References

- Abrahamson, D. E. and Goodman-Delahunty, J., 2014. *Impediments to Information and Knowledge Sharing Within Policing: A Study of Three Canadian Policing Organizations*, DOI: 10.1177/2158244013519363. Available From: <http://sgo.sagepub.com/content/4/1/2158244013519363#ref-26>. [Last accessed: 22nd April 2014]
- Alkula, T., Pöntinen, S. and Ylöstalo, P., 2002. *Sosiaalitutkimuksen kvantitatiiviset menetelmät (4th Ed.)*. Juva: WSOY.
- Antikainen, M., Mäkipää, M. and Ahonen, M., 2010. *Motivating and Supporting Collaboration in Open Innovation*. In *European Journal of Innovation Management*, 13 (1), pp.100-119.
- Ardichvili, A., Maurer, M., Li, W., Wentling, T., and Stuedemann, R., 2006. *Cultural influences on KS through online communities of practice*, *Journal of knowledge Management*, 10 (1), pp.94-107.
- Ardichvili, A., Page, V. and Wentling T., 2003. *Motivation and barriers to participate in virtual knowledge-sharing communities of practice*. In *Journal of Knowledge Management*, 7 (1), pp.64-77.
- Argote, L., 1999. *Organizational Learning. Creating, Retaining and Transferring Knowledge*. London: Kluwer Academic Publishers.
- Argote, L., McEvily, B. and Reagans, R., 2003. *Managing knowledge in organizations: An integrative framework and review of emerging themes*. *Management Science*, 49(4), pp.571-582.
- Arthur L. J., Jackie A. M., and Mary E. K., 2010. *Social Media at Work: How networking tools propel organizational performance*, 989 Market Street, San Francisco, CA 94103-1741: A Wiley Imprint
- Ashforth, B. E. and Mael, F., 1989. *Social Identity Theory and the Organization*. In *Academy of Management Review*, 14, pp.20-39.
- Sharma, B.P., Singh, M.D. and Neha, 2012. *Knowledge Sharing Barriers: An Approach of Interpretive Structural Modeling*
- Bandura, A., 1994. *Self-efficacy*. Available From: <http://www.uky.edu/~eushe2/Bandura/BanEncy.html> . [Last accessed: Thursday 9th January 2014]

- Bandura, A., 1995. *Guide for Constructing Self-efficacy Scales*, Stanford University, Palo Alto, CA.
- Bandura, A., 1997. *Self-efficacy: The Exercise of Control*, W.H. Freeman and Company, New York, NY.
- Barson, R., Foster, G., Struck, T., Ratcheve, S., Pawar, K., Weber, F., et al., 2000. *Inter- and intraorganizational barriers to sharing knowledge in the extended supply chain*. Proceedings of the eBusiness and eWork 2000 Conference.
- Bock, G., Zmud, R.W., Kim, Y. and Lee, J., 2005. *Behavioral intention formation in knowledge sharing: examining the roles of extrinsic motivators, social-psychological forces, and organizational climate*, MIS Quarterly, 29(1), pp.87-111.
- Brown J. S. and Duguid, P., 1991. *Organizational learning and communities of practice: to-wards a unified view of working, learning and innovation*, Organization Science, 2 (1).
- Bryman, A. and Bell, E., 2007. *Business Research Methods*, 2nd edition, Oxford University Press, United States, New York
- Bughin, J., Chui, M. and Manyika, J., 2012. *Capturing business value with social technologies.*”
- Burdess, N. 2010. *Starting Statistics. A Short, Clear Guide*. London: Sage.
- Burt, R. S., 2005 *Brokerage and closure*. Oxford, UK: Oxford University Press.
- Cabrera, A. and Cabrera, E., 2002. *Knowledge-Sharing Dilemmas*. In Organization Studies, 23 (5), pp.687-710.
- Cabrera, A., Collins, W.C., and Salgado, J.F., 2006. *Determinant of individual engagement in KS*. The International Journal of Human Resource Management, 17 (2), pp.245-264.
- Caputo, A., 2009. *Making the complex simple: For better business decisions*, Business Information Review, 26 (81), pp.28-34
- Casimir, G., Lee, K., Loon, M. 2012. *Knowledge sharing: Influences of trust, commitment and cost*. Journal of Knowledge Management, 16 (5) , pp. 740-753. Available At:
<http://www.emeraldinsight.com/doi/abs/10.1108/13673271211262781?journalCode=jkm> [Last Accessed: 24th September 2015]

- Cavaye, A.L.M., 1996. *Case study research: a multi-faceted research approach for IS*, Information System Journal., 6(5), pp. 310-340.
- Chow, C., Deng, F., and Ho, J., 2000. *The openness of knowledge sharing within Organizations: A comparative study in the United States and the People's Republic of China*. Journal of Management Accounting Research, 12, pp.65-95.
- Christensen, P., 2007. *Knowledge Sharing: Moving Away From the Obsession with Best Practices*, Journal of Knowledge Management, 11(1), pp.36-47
- Cohen, J., 1988 *Statistical power analysis for the behavioral sciences* (2nd Ed.). Hillsdale: Lawrence Erlbaum Associates.
- Cortina, J.M., 1993. *What is Coefficient Alpha? An Examination of Theory and Applications*, Journal of Applied Psychology [Online]. 78 (1), pp. 98-104.
Available from: http://psychweb.psy.umt.edu/denis/datadecision/front/cortina_alpha.pdf
- Creswell, J. W., 2009. *Research design: qualitative, quantitative, and mixed methods approach*, 3rd ed. USA, Library of Congress.
- Dalkir, K., 2005. *Knowledge Management in Theory and Practice*, MIT Press, Cambridge, MA, USA.
- Dalkir, K., 2011. *Knowledge Management in Theory and Practice*. MIT Press. 2nd Edition. Cambridge, MA, USA.
- Danis, C. and Singer, D., 2008. *A Wiki instance in the enterprise: Opportunities, concerns, and reality*, Computer Supported Cooperative Work, San Diego, USA, Nov. pp. 8-12.
- Dean, G. and Gottschalk P., 2007. *Knowledge management in policing and law enforcement: Foundations, structures, applications*. Oxford, UK: Oxford University Press.
- Dixon, N. M., 2000. *Common Knowledge: How Companies Thrive by Sharing What They Know?* Boston: Harvard Business School Press.
- Doolan, M. A., 2010. *Developing a Web 2.0 Pedagogy to Engage the Net Generation Learner in a Community for Learning in Higher Education*. In: The Fifth International Blended Learning Conference: "Developing Blended Learning Communities", June. Hatfield, Hertfordshire: University of Hertfordshire., pp.16-17

- Dougherty, V., 1999. 'Knowledge is about people, not databases', *Industrial and Commercial Training*, 31(7), pp. 262-6.
- Endres M.L., Endres S.P., Chowdhury S.K. and Alam I., 2007. *Tacit knowledge sharing, self-efficacy theory, and application to the Open Source community*
- Ferguson, J., 1994. *The Anti-Politics Machine*, University of Minnesota Press
- Fiol, M. and Lyles, M., 1985. *Organization learning*. *Academy of Management Review*, 10(4), pp.803-13.
- Fiol, M., 1994. *Consensus, diversity, and learning in organizations*. *Organization Science*, vol. 5, pp. 403-37.
- Flick, U., 2002. *An introduction to Qualitative Research*, 2nd Edition, Sage, London.
- George, D. and Mallery, P., 2003. *SPSS for Windows step by step: A single guide and reference*, 11.0 update (4th Ed.). Boston: Allyn & Bacon
- Gliem J.A. and Gliem, RR., 2003. *Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales*, in 2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education, Available At: <http://scholarworks.iupui.edu/bitstream/handle/1805/344/Gliem+&Gliem.pdf?sequence=1> [Last Accessed: 8th October 2014]
- Hadjerouitt, S., 2014. *Wiki as a Collaborative Tool in Teacher Education: Evaluation and Suggestions for Effective Use*, *Computers in Human Behavior*, 32(3),. Available At: <http://www.sciencedirect.com/science/article/pii/S0747563213002422>. [Last Accessed: 24th September 2015], pp.301-312
- Happel, H., and Treitz, M., 2008. *Proliferation in enterprise wikis*", In Proceedings of the 8th International Conference on the Design of Cooperative Systems, Carry le Rouet, France.
- Hauke, J. & Kossowski, T., 2011. Comparison of Values of Pearson's and Spearman's Correlation Coefficients on the Same Sets of Data. *Quaestiones Geographicae*
- Heikkilä, T., 2002. *Tilastollinen tutkimus* (4th Ed.). Helsinki: Edita.
- Hester, A.J., 2010. *Increasing Collaborative Knowledge Management in Your Organization: Characteristics of Wiki Technology and Wiki Users*, Proceedings of the 2010 Special Interest Group on Management Information Systems, 48th Annual Conference on Computer Personnel Research, pp. 158-164.

- Hinchcliffe, D., 2007. *A more refined conception of Enterprise 2.0 for 2007*, Dion Hinchcliffe's blog. Retrieved 2014-04-14,
[Available from: <http://www.zdnet.com/blog/hinchcliffe/>]
[Last Accessed: 6th December 2015]
- Hinkle, D., Wiersma, W. and Jurs, S., 1994. *Applied Statistics for the Behavioral Sciences*, 3rd Edition, Houghton Mifflin, Boston
- Hinkle, D.E., Wiersma, W. and Jurs, S.G., 2003. *Applied statistics for the behavioral sciences*.
- Hinton. B., 2003. *Knowledge Management and Communities of Practice: an experience from Rabobank Australia and New Zealand*, International Food and Agribusiness Management Review, 5(3)
- Holloway, J., 1997. *Basic concepts for qualitative research*, Bournemouth: Blackwell Science
- Huysman, M. and de Wit, D., 2002. *Knowledge sharing in practice*, Kluwer Academic Publisher Norwell, MA, USA.
- Jashapara, A., 2011. *Knowledge management: An integrated approach*. Second Edition.
- Johnson, R. B., and Onwuegbuzie, A. J., 2004. *Mixed methods research: A research paradigm whose time has come*. Educational Researcher, 33, pp. 14–26.
- Jolliffe, I. T., 2002.. *Principal Component Analysis (2nd Ed.)*. New York: Springer.
- Keyes J., 1998. *Identifying the Barriers to Knowledge Sharing in Knowledge Intensive Organizations*. Available From:
<http://www.newarttech.com/KnowledgeSharing.pdf> . [Last Accessed: 10th January 2015]
- Kimmerle, J., Wodzicki, K. and Cress, U., 2008. *The social psychology of knowledge management*. In Team Performance Management, 14 (7), pp.381-401.
- Kosonen, M., 2008. *Knowledge Sharing in Virtual Communities*. Doctoral Thesis. Lappeenranta University of Technology. Digipaino.
- Kramer, R.M., 1991. *Intergroup relations and organizational dilemmas. The role of categorization processes*. In Research in Organizational Behaviour, 13, pp.191-228.

- Lathrop, J., 2013. *Using Social Media to Build Connections & Community*, Enrichment Journal., Missouri, USA. Available At: http://enrichmentjournal.ag.org/201304/201304_022_soc_media.cfm . [Last accessed: 22nd April 2014]
- Le Crom, Y., 2006. *Livre blanc: Le travail collaboratif en entreprise*. Azimut Communication
- Leech, N. and Onwuegbuzie, A., 2009, *A typology of mixed methods research designs*”, Qual Quant (2009) 43:pp. 265–275.
- Lenski, W., 2010. *Information: A Conceptual Investigation*. Information 1, no. 2: pp.74-118.
- Leuf, B. and Cunningham, W. 2001. *The Wiki Way: Collaboration and Sharing on the Internet*, Addison-Wesley Professional.
- Lesser, E., and Storck, J., 2001. *Communities of practice and organizational performance*, IBM Systems Journal., 40(4), pp. 831-841.
- Lin, H. F., 2007. *Knowledge sharing and firm innovation capability: an empirical study*. In International Journal of Manpower, 28 (3), pp.315-332.
- Lin, M. J., Hung, S. W. and Chen, C. J., 2009. *Fostering the determinants of knowledge sharing in professional virtual communities*. In Computers in Human Behavior, 25, pp.929-939.
- Lyles, M., 1988. *Learning among joint venture sophisticated firms*. Management International Review, Vol. 28, pp. 85-98.
- Lyles, M., 1992. *The impact of organizational learning on joint venture formations*. Presented at the Academy of Management Meetings, Las Vegas, NV.
- Mack, N., Woodsong, C., Macqueen, K.M., Guest, G. and Namey, E., 2011. *Qualitative Research Methods: A Data collector's Filed Guide*, Family Health International.
- Malhotra, N. 2010. *Marketing Research*, 6th Ed. New Jersey: Pearson Education.
- Mansour, O., Mustafa A. and Askenä L., 2011. *Wiki Collaboration in Organizations: An Exploratory Study*.
- Mansour, O., 2012. *The Not-So-Open Wikis: Structures of Collaboration at Work*, From Research to Practice in the Design of Cooperative Systems: Results and Open Challenges 2012, pp. 65-80

- McAfee, A., 2006. *Enterprise 2.0: the dawn of emergent collaboration*, In MIT Sloan Management Review, 47 (3), pp. 21-28.
- McDermott, R., 1999. *Why information Technology Inspired But Cannot Deliver Knowledge Management*. In California Management Review, 41 (4), pp.103-117.
- McKercher, C., and Mosco, V., 2007. *Knowledge workers in the information society*. Lanham, MD: Lexington.
- McKinnell Jacobson, C., 2008. *Knowledge Sharing Between Individuals*.
- Md. Shiful, I., Rajib, H. 2014. Exploring the Factors Affecting Knowledge Sharing Practices in Dhaka University Library.
- Merriam, S.B., 1988. *Qualitative research and case study applications in education*.
- Mitchell, S., 2008. *Easy Wiki Hosting, Scott Hanselman's blog, and Snagging Screens*, MSDN Magazine. Available From: <http://msdn.microsoft.com/en-us/magazine/cc700339.aspx> . [Last Accessed: 3rd November 2014]
- Myers, M. D., 1997. *Qualitative Research*, MISQ discovery.
- Neill, J., 2007. *Qualitative versus Quantitative Research: Key Points in a Classic Debate*. Available From: <http://wilderdom.com/research/QualitativeVersusQuantitativeResearch.html>. [Accessed 7th May 2014]
- Neville, C., 2005. *Introduction to Research and Research Methods*, University of Bradford, Bradford
- Nonaka, I. and Takeuchi, H., 1995. *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.
- Paroutis A. and Al Saleh, A., 2009. *Determinants of knowledge sharing using Web 2.0 technologies*. In Journal of Knowledge Management, 13 (4), pp.52-63.
- Pfaff, C., and Hasan, H., 2007. *Collaborative knowledge at the grass-roots level: The risks and rewards of corporate wikis*, In Proceedings of the 11th Pacific-Asia Conference on Information Systems, Auckland, Jul. 3 – 6.
- Polanyi, M., 1966. *The Tacit Dimension*. Doubleday & Company, Garden City Publishing

- Renzl, B., 2008. *Trust in management and knowledge sharing. The mediating effects of fear and knowledge documentation*. In Omega. The International Journal of Management Science, 36 (2), pp. 206-220.
- Riege, A. 2005. *Three-Dozen Knowledge-Sharing Barriers Managers Must Consider*, journal of Knowledge Management, 9(3), pp. 18-35.
- Riege, A., 2007. *Actions to overcome knowledge transfer barriers in MNCs*. Journal of Knowledge Management , 11 (1), pp. 48-67.
- Rosengren, K-E. and Arvidson, P., 2005 ,*Sociologisk Metodik*, [Sociological Methodology], Liber AB, Malmö
- Rowlands, B., 2003. *Employing interpretive research to build theory of Information Systems practice*, Australasian Journal of Information Systems, (10) 2, pp. 3 – 22
- Safko, L. and Brake, D. K., 2009. *Social Media Bible. Tactics, Tools and Strategies for Business Success*, New Jersey: John Wiley & Sons.
- Saunders, M., Lewis, P., and Thornhill, A., 2009. *Research methods for business students*, 5th edition, Pearson Education Limited, England, Essex
- Seba, I., Rowley, J., and Lambert, S., 2012. Factors affecting attitudes and intentions towards knowledge sharing in the Dubai Police Force. *International Journal of Information Management*, 32(4), pp.372-380.
- Sims, D., 1999. *Organizational Learning as the Development of Stories*ll, Easterby Smith, M., L. Araujo and J. Burgoyne (Eds), *Organizational Learning and the Learning Organization: Developments in theory and practice*, Sage.
- Sjöberg, A. and Svensson, D., 2012. *A quantitative study of the attitudes towards loyalty programs among students*.
- Skyrme, D.J., 2002. *The 3Cs of Knowledge Sharing: Culture, Cooperation and Commitment*, pp. 1-6. Available From: http://www.skyrme.com/updates/u64_f1.htm on July 2004 .[Last Accessed: 31st May 2014]
- Smith, H. J., Tyler , T.R, and Huo, Y.J., 2014. "Social identity at work: Developing theory for organizational practice.": pp.155-173.
- Smith A., 2013. *Social Media: A Profitable Way to Develop Your Business Network*, Social Media Today, Available From: <http://socialmediatoday.com/alan-smith/1980301/social-media-profitable-way-develop-your-business-network>. [Last Accessed: 22nd April 2014]

- Soriano, J., Lizcano, D., Canas, M., Reyes, M., Hierro, J., 2007. *Foster Innovation in a Mashup-oriented Enterprise 2.0 Collaboration Environment*, System and Information Sciences Notes, 1(1), pp. 62–68
- Spender, J. C., 1996. *Making Knowledge the basis of a dynamic strategy of the firm*, strategic Management Journal., 17, pp. 45-62.
- Stenmark, D., 2005. *Knowledge sharing on a corporate Intranet: Effects of re-instating web authoring capability*, In Proceedings of the 13th European Conference on Information Systems, Rustenburg, Germany, and May 26 – 28.
- Stenmark, D., 2008. *Web 2.0 in the business environment: The new intranet or a passing hype?* In Proceedings of the 16th European Conference on Information Systems, Galway, Ireland, June 9 – 11.
- Stocker, A., Grantizer, G., and Tochtermann, K., 2009. *Exploring the value of enterprise wikis: A Multiple-case study*, In Proceedings the International Conference on Knowledge Management and Information Sharing, Portugal, Oct. 6 – 8.
- Sunasee, N. and Sewrey, D., 2002. *A Theoretical Framework for Knowledge Management Implementation*, Proceedings of SAICSIT 2002, Rhodes University, Greece, p. 237. <http://idisk.free.fr/iFolder/.NET/.MI7.ORG.UK/PDF/Paper-Knowledge-Theory.pdf> . [Last Accessed: 23rd April 2014]
- Systematic Monitoring of Education For All (SMEFA), 2014. Module A4: *Use of Information in Monitoring, Planning and Management*, UNESCO. Available From: <http://www4.unescobkk.org/education/efatraining/module-a4/3-data-transformation-and-presentation/>. [Last accessed: 2nd June 2014]
- Tajfel, H., 1978. *The achievement of group differentiation*. In Tajfel, H. (Ed), *Differentiation between social groups: Studies in the social psychology of intergroup relations*. London: Academic Press, pp. 77-98.
- Tajfel, H. and Turner, J. C., 1985. *The social identity theory of intergroup behavior*. In Worchel, S. & Austin, W. G. (Eds.) *Psychology of intergroup relations* (2nd ed.). Chigaco: Nelson-Hall, pp. 7-24.
- Tapscott, D., and Williams, A.D., 2006. *WIKINOMICS How Mass Collaboration Changes Everything*. United States of America: Janson Text with Daily News.
- Tapscott, D., 2008. *Grown up Digital: How the Net Generation is Changing Your World*, New York: McGraw-Hill Professional.

- Tashakkori, A., and Teddlie, C. (Eds.), 2003. *Handbook of mixed methods in social and Behavioral research*, Thousand Oaks, CA: Sage
- Tohidinia, Z. and Mosakhani, M., 2010. *Knowledge sharing behaviour and its predictors*. In *Industrial Management & Data Systems*, 110 (4), pp.611-631.
- Treem J.W. and Leonardi P.M., 2012. *Social Media Use In Organizations*, Northwestern University, Communications Yearbook 36, pp. 143-189.
- UKGOV-2014, 3rd April 2014, *Safeguarding children: Keeping Children Safe in Education*, Department of Education, UK Government. Available From:<https://www.gov.uk/government/publications/keeping-children-safe-in-education>. [Last Accessed: 12th April 2014]
- Von Krogh, G., Ichijo, K. and I. Nonaka, 2000. *Enabling Knowledge creation*, Oxford University Press.
- Wacheux, F., 1996. *Méthodes qualitatives et recherche en gestion*, Foreword of ROJOT J., Economica, p. 290
- Wagner, C., and Majchrzak, A., 2007. *Enabling customer-centricity using wikis and the wiki way*, Journal of Management Information Systems, 23 (3), pp. 17 – 43.
- Walliman, N., 2006. *Social Research Methods*. London: Sage Publications.
- Wang, L., Ahmed, K. and Pervaiz, C., 2003. *Organization learning: a critical review*.
- Wasko, M., and Faraj, S., 2000. *It is what one does: Why people participate and help others in electronic communities of practice*, Journal of Strategic Information Systems, 9, pp.155 – 173.
- Watson, K., and Harper, C., 2008. *Supporting Knowledge Creation: Using Wikis for Group Collaboration*, EDUCAUSE, Center for Applied Research. Research Bulletin. Volume 2008, Issue 3.
- Weiss, L. M., Capozzi, M. M., and Prusak, L. 2004. *Learning from the Internet giants*, MIT Sloan Management Review, 45(4), pp.79-84.
- Wenger, E., McDermott, R., and Snyder, W. M., 2002. *Cultivating communities of practice: A guide to managing knowledge*. Boston, MA: Harvard Business School Press.
- Weyhenmeyer, G. (2011). Att hitta samband. Hand-out material in the course "Modeling of aquatic ecosystems" (ss. 1-7). Uppsala: Uppsala University.

- Widhiatstuti, H., 2012. *The Effectiveness of Communications in Hierarchical Communications Structure*, International Journal of Social Science and Humanity, 2(3). Available From: <http://www.ijssh.org/papers/93-CH210.pdf> . [Last Accessed: 10th May 2014]
- Wilkinson, D.M., 2008. *Strong regularities in online peer production*, Proceedings of the Ninth ACM Conference on Electronic Commerce, New York, NY, USA, ACM, pp. pp. 302–309.
- Wiig, K. M., 2000. *Knowledge Management: An Emerging Discipline Rooted in a Long History*. In C. Despres & D. Chauvel (Eds.) *Knowledge Horizons, The present and the promise of Knowledge Management*. Oxford: Butterworth-Heinemann.
- Yates, D., Wagner, C. and Majchrzak, A., 2010. *Factors affecting shapers of organizational wikis*, Journal of the American Society for Information Science and Technology, 61(3):pp. 543–554
- Yin, R.K., 1994. *Case study research: Design and methods*, (2nd Ed.). Beverly Hills, CA: Sage publishing.
- Yin, R.K., 2003. *Case Study Research: Design and Methods*, Thousand Oaks, Ca: Sage Publications.
- Yoo, Y., Lyytinen, K., and Boland, R.J., 2008. *Distributed Innovation in Classes of networks*, Hawaii International conference on Information system, Waikoloa, pp. 58-59
- Zaffar F. and Ghazawneh, A., 2013. *Objectified Knowledge through Social Media: The Case Of A Multinational Technology And Consulting Corporation*, 5(3), p.17

Appendix 1:

A) Survey questionnaire

Which group best describes your role in SoftX?

- ☐ Level 3 Apprentice
- ☐ Level 4 Apprentice
- ☐ Junior Technical
- ☐ Senior Technical
- ☐ Management
- ☐ Hr/Recruitment
- ☐ Trainer
- ☐ Director

Which age bracket are you in?

- ☐ Under 21
- ☐ 21 – 30
- ☐ 30 – 40
- ☐ 41 – 50
- ☐ Over 50

What gender are you?

- ☐ Male
- ☐ Female

Which description best describes your role within the business?

- ☐ Non-graduate
- ☐ Graduate
- ☐ Junior Technical Employee (Under five years technical experience)
- ☐ Senior Technical Employee (Five years or more technical experience)
- ☐ Junior Management (under five years management experience)
- ☐ Senior Management (Five years or more management experience)
- ☐ Director

How easy is it to find relevant information to your work?

- ☐ Very Hard
- ☐ Hard
- ☐ Don't know
- ☐ Easy
- ☐ Very Easy

What do you think about the availability of internal information at SoftX?

- ☐ Very Poor
- ☐ Poor
- ☐ Don't know
- ☐ Good
- ☐ Very Good

Do you feel you have the necessary skills and abilities to use the wiki without assistance?

- ☐ Yes
- ☐ No
- ☐ Unsure

How many years have you been using wikis to gain information or knowledge?

- ☐ Never
- ☐ Under one year
- ☐ 1 – 3 years
- ☐ 3 – 5 years
- ☐ Over 5 years

Have you used the company's wiki before?

- ☐ Yes
- ☐ No
- ☐ Unsure

Please evaluate the following statements from your personal point of view

| | Strongly Disagree | Disagree | Neither agree nor disagree | Agree | Strongly Agree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| I often tell my colleagues about new things I learn | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I ask my colleagues when I am in need of a particular knowledge | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Share my work related tasks and difficulties with my colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I wish to be notified of what my colleagues are working on | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Please assess the following statements from your personal point of view

| | Strongly Disagree | Disagree | Neither agree nor disagree | Agree | Strongly Agree |
|---|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| SoftX Wikis' features facilitate my daily work | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By contributing in the wikis, I can feel myself as member of the organisation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| By contributing, I can collaborate with my colleagues | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Contribute because it is of direct relevance to my work | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I can see personal benefits resulting from my contribution | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My contribution is useful to SoftX | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

How often do you use wikis' features in your organisation?

| | Never | Less than once a month | Monthly | Weekly | Daily |
|---------------------------------------|-----------------------|------------------------|-----------------------|-----------------------|-----------------------|
| Use wiki to view the content | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use wiki to add new pages (content) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use wiki to rewrite whole paragraphs | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use wiki to reorganise a set of pages | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

To what extent would you say that your knowledge-sharing on the company's wiki has helped your organisation to:

| | Not At All | Not Really | Undecided | Somewhat | Very Much |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Facilitate the process of knowledge re-use | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Facilitate individuals acquisition of organisational knowledge | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Encourage peer to peer learning | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Promote an open information culture within the organisation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Encourage employee's contribution towards organisational goal | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

About SoftX wiki's features. Please evaluate the following aspects

| | Poor | Fair | Cannot Say | Good | Excellent |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| User-friendliness of the features | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My personal abilities in using the features | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

What do you think about your contribution(s) to the company's wiki?

| | Strongly Disagree | Disagree | Neither agree nor disagree | Agree | Strongly Agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Lack of time prevents me from contributing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| My contribution might negatively influence my professional image | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I'm afraid to contribute wrong or faulty information | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| I'm afraid my contribution can be misunderstood | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

How accurate do you believe the statements below are with regards to the implication of senior staffs in the use of the company's wiki?

| | Strongly Disagree | Disagree | Neither agree nor disagree | Agree | Strongly Agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Senior staff give positive comments for contributing | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Senior staff actively contribute to the wiki | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Senior staff value contribution | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Employees should be trained on how to use the company's wiki | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Would the following points make a difference to your use of the company's wiki?

| | Extremely decrease my use | Decrease My Use | Cannot say | Slightly Decrease My Use | Not Affect My Use |
|---|---------------------------|-----------------------|-----------------------|--------------------------|-----------------------|
| Lack of senior staff encouragement would... | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Feeling that my contribution to the wiki is not valued would... | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| The fact that others do not contribute would... | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Being criticized for providing wrong information would... | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Lack of incentive would... | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

B) Formulation of questions as knowledge internalization, externalization, objectification and collaboration

SoftX wiki features as Knowledge Internalisation

To what extent would you say that knowledge sharing on SoftX's wiki has helped the organization to facilitate the process of knowledge re-use?

To what extent would you say that knowledge sharing on SoftX's wiki has helped the organization to facilitate individual's acquisition of organizational knowledge?

How often do you use SoftX wiki's features to view its content?

SoftX wiki features as Knowledge Externalisation

How often do you use SoftX's wiki's features to add new content?

Please assess the following statement from your personal point of view: I often tell my colleagues about new things I learn

SoftX wiki features as Knowledge Objectification

To what extent would you say that your knowledge sharing and collaboration on SoftX's wiki has helped to promote an open information culture within SoftX?

C) Factors measurements

| <i>Factors</i> | Measurements |
|---|--|
| <i>Benefits</i> | I get personal benefits when participating My contribution is of relevance to SoftX SoftX wiki's features facilitate my daily work I collaborate with my colleagues when contributing I feel as a member of SoftX by participating |
| <i>Costs and trust issues</i> | Lack of time prevent me to participate My professional image might be negatively impacted by my participation Being criticized for giving wrong or faulty information I am afraid my contribution won't be valued |
| <i>Experience and skills with technology</i> | Skills and abilities in using wiki in my personal life Skills and abilities in using the SoftX wiki features |
| <i>Understanding of Responsibilities</i> | Contributing to the SoftX wiki is of direct relevance to my work |
| <i>Managerial involvement</i> | Senior staff give positive comments for participating Senior staff actively contribute to the SoftX wiki Senior staff value contributions Employees should be trained on how to use the SoftX wiki |
| <i>Organizational culture</i> | Colleagues give positive comments for participating Colleagues value contributions I'm able to make independent decisions Encourage peer to peer learning |
| | User-friendliness of SoftX wiki's features |

Appendix 2

A) Correlations to knowledge internalization, knowledge externalization and knowledge objectification

| | | Knowledge Internalisation | Result |
|----------------|---|---------------------------|----------------------|
| Spearman's rho | Foreseeable benefits | 0.558** | Supported |
| | Lack of trust and fear of misuse | 0.445** | Supported |
| | Lack of time | 0.076 | Not supported |
| | Negative impact on professional image | 0.580** | Supported |
| | Frequency of using wiki in private life | 0.543** | Supported |
| | Skills in using company's wiki | 0.363** | Supported |
| | Understanding company's wiki as part of my responsibilities | 0.463** | Supported |
| | Manager's activeness | 0.318** | Supported |
| | Scoping of training possibilities for employees to use wiki | 0.410** | Supported |
| | Colleagues activeness and participation | 0.582** | Supported |
| | Dependency in decision making | 0.048 | Not supported |
| | Collaboration in and across business units | 0.181** | Supported |
| | User-friendliness of the features | 0.410** | Supported |

** . Correlation is significant at the 0.01 level (2-tailed).

| | | Knowledge Externalisation | Result |
|----------------|---|---------------------------|----------------------|
| Spearman's rho | Foreseeable benefits | 0.563** | Supported |
| | Lack of trust and fear of misuse | 0.549** | Supported |
| | Lack of time | 0.087 | Not supported |
| | Negative impact on professional image | 0.471** | Supported |
| | Frequency of using wiki in private life | 0.510** | Supported |
| | Skills in using company's wiki | 0.393** | Supported |
| | Understanding company's wiki as part of my responsibilities | 0.401** | Supported |
| | Manager's activeness | 0.429** | Supported |
| | Scoping of training possibilities for employees to use wiki | 0.381** | Supported |
| | Colleagues activeness and participation | 0.475** | Supported |
| | Dependency in decision making | 0.039 | Not supported |
| | Collaboration in and across business units | 0.060 | Not Supported |
| | User-friendliness of the features | 0.381** | Supported |

** . Correlation is significant at the 0.01 level (2-tailed).

| | | Knowledge Objectification | Result |
|----------------|---|---------------------------|----------------------|
| Spearman's rho | Foreseeable benefits | 0.495** | Supported |
| | Lack of trust and fear of misuse | 0.451** | Supported |
| | Lack of time | 0.074 | Not supported |
| | Negative impact on professional image | 0.580** | Supported |
| | Frequency of using wiki in private life | 0.532** | Supported |
| | Skills in using company's wiki | 0.383** | Supported |
| | Understanding company's wiki as part of my responsibilities | 0.423** | Supported |
| | Manager's activeness | 0.320** | Supported |
| | Scoping of training possibilities for employees to use wiki | 0.419** | Supported |
| | Colleagues activeness and participation | 0.573** | Supported |
| | Dependency in decision making | 0.048 | Not supported |
| | Collaboration in and across business units | 0.275** | Supported |
| | User-friendliness of the features | 0.419** | Supported |

** . Correlation is significant at the 0.01 level (2-tailed).

B) Principal Component Analysis (PCA)

Communalities

| | Initial | Extraction |
|---|---------|------------|
| Foreseeable benefits | 1.000 | .885 |
| Lack of trust and fear of misuse | 1.000 | .741 |
| Negative impact on professional image | 1.000 | .895 |
| Frequency of using wiki in private life | 1.000 | .566 |
| Skills in using SoftX's wiki | 1.000 | .966 |
| Understanding company's wiki as part of my responsibilities | 1.000 | .431 |
| Manager's activeness | 1.000 | .807 |
| Scoping of training possibilities for employees to use wiki | 1.000 | .719 |
| Colleagues activeness and participation | 1.000 | .967 |
| Degree of user friendliness of the wiki | 1.000 | .644 |

Extraction Method: Principal Component Analysis.

Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|---------------------|---------------|---------------|-------------------------------------|---------------|---------------|-----------------------------------|---------------|---------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 6.811 | 68.109 | 68.109 | 6.811 | 68.109 | 68.109 | 3.934 | 39.336 | 39.336 |
| 2 | 1.226 | 12.262 | 80.370 | 1.226 | 12.262 | 80.370 | 3.828 | 38.285 | 77.621 |
| 3 | 1.084 | 10.841 | 91.211 | 1.084 | 10.841 | 91.211 | 1.359 | 13.590 | 91.211 |
| 4 | .433 | 4.325 | 95.537 | | | | | | |
| 5 | .152 | 1.517 | 97.054 | | | | | | |
| 6 | .107 | 1.074 | 98.128 | | | | | | |
| 7 | .102 | 1.018 | 99.146 | | | | | | |
| 8 | .041 | .408 | 99.554 | | | | | | |
| 9 | .025 | .250 | 99.804 | | | | | | |
| 10 | .020 | .196 | 100.000 | | | | | | |

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

| | Component | | |
|---|-------------|-------------|-------------|
| | 1 | 2 | 3 |
| Foreseeable benefits | .574 | .739 | -.096 |
| Lack of trust and fear of misuse | .484 | .615 | .359 |
| Negative impact on professional image | .118 | .435 | .081 |
| Frequency of using wiki in private life | -.008 | .873 | -.452 |
| Skills in using SoftX's wiki | -.036 | -.005 | .545 |
| Understanding company's wiki as part of my responsibilities | .619 | .033 | -.291 |
| Manager's activeness | .786 | .536 | .032 |
| Scoping of training possibilities for employees to use wiki | .811 | .498 | .112 |
| Colleagues activeness and participation | .854 | -.092 | .479 |
| Degree of user friendliness of the wiki | .238 | -.021 | .492 |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

C) Multiple Linear Regression Analysis Results

Model Summary

| R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|-------------------------|-------------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
| | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| .762^a | .580 | .567 | .42893 | .580 | 43.804 | 3 | 95 | .000 |

a. Predictors: (Constant), technological factors, personal factors, organisational factors

ANOVA^a

| | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|----|-------------|--------|-------------------------|
| Regression | 24.178 | 3 | 8.059 | 43.804 | .000^b |
| Residual | 17.479 | 95 | .184 | | |
| Total | 41.657 | 98 | | | |

a. Dependent Variable: Use of SoftX's wiki feature for Knowledge Sharing

b. Predictors: (Constant), technological factors, personal factors, organisational factors

Coefficients^a

| Predictor variables | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|------------------------|-----------------------------|------------|---------------------------|---------------|-------------|
| | B | Std. Error | Beta | | |
| (Constant) | -.306 | .167 | | -1.830 | .070 |
| Organisational factors | .287 | .074 | .383 | 3.851 | .000 |
| Personal factors | .265 | .049 | .366 | 5.379 | .000 |
| Technological factors | .164 | .053 | .311 | 3.099 | .003 |

a. Dependent Variable: Use of SoftX's wiki feature for Knowledge Sharing

Appendix 3

A) Research Consent Form

RESEARCH CONSENT FORM

Form: CONS1

Full title of Project: Social Media and the impact of business hierarchy on knowledge sharing within an organization (Masters thesis)

Researchers: Colin Wilcox, Linnaeus University,
email: cw222gd@student.lnu.se

Philippe Tchape, Linnaeus University,
email: pt222df@student.lnu.se

Please Initial Box

I confirm that I have read and understood the reasons for the above study and have had the opportunity to ask questions

☐

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.

☐

I agree to take part in the above study.

☐

I agree to the interview/focus group/consultation being audio recorded.

☐

I agree to the use of anonymous quotes within publications relating to this study

☐

Name of Participant

Signature

Date

Name of Researcher

Signature

Date

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