

2008

Harnessing Wiki technology for knowledge management in learning organisations

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Recommended Citation

Pfaff, Charmaine C., Harnessing Wiki technology for knowledge management in learning organisations, Doctor of Philosophy thesis, Faculty of Commerce, University of Wollongong, 2008. <http://ro.uow.edu.au/theses/1745>

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HARNESSING WIKI TECHNOLOGY FOR KNOWLEDGE MANAGEMENT IN LEARNING ORGANISATIONS

A thesis submitted in fulfilment of the requirements for the award of the degree

DOCTOR OF PHILOSOPHY (PHD) IN INFORMATION SYSTEMS

from

UNIVERSITY OF WOLLONGONG

CHARMAINE C PFAFF, MIS, GRAD. DIP. IS, B.SC. (HONS), CERT ED

FACULTY OF COMMERCE

2008

Certification

I, Charmaine C. Pfaff, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Faculty of Commerce, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

Charmaine C. Pfaff

31 March 2008

Publications

Meloche, J., Hasan, H., Pfaff, C.C., Yan, Q. and Willis, D. 2009. Co-creating Corporate Knowledge with a Wiki, *International Journal of Knowledge Management*, Vol. 5, Iss. 2.

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List of Special Names and Abbreviations

| | |
|----------------|--|
| ADMINS | Administrators |
| ANT | Actor Network Theory |
| BLOGS | Weblogs |
| CEO | Chief Executive Officer |
| CIO | Chief Information Officer |
| COP | Communities of Practice |
| CRM | Customer Relationship Management |
| CSCW | Computer-Supported Cooperative Work |
| DWR | Developmental Work Research |
| GNU | GNU's Not Unix |
| ICT | Information, Communication and Technology |
| IS | Information Systems |
| KM | Knowledge Management |
| KMS | Knowledge Management Systems |
| KW | Knowledge Workers |
| PAR | Participatory Action Research |
| RSS | Really Simple Syndication |
| SECI | Socialisation, Externalisation, Combination/Creation and Internalisation |
| SNS | Social Networking Sites |
| ST | Structuration Theory |
| WYSIWYG | What You See Is What You Get |
| ZPD | Zone of Proximal Development |

Abstract

Can a corporate Wiki support knowledge work? Do organisational culture and leadership styles affect the suitability of corporate Wikis for all organisations? What factors contribute to Wiki failure and what steps can be taken to reduce the rejection of Wikis? The success or failure of any corporate Wiki project is dependent on having these difficult questions answered. This thesis describes a comparative study of six Australian and British organisations to discover the potential for corporate Wikis to support knowledge work in organisations. Since Information Systems (IS) is dynamic and subject to continuing changes, conventional empirical methods, such as surveys and questionnaires are inappropriate for many of the issues IS researchers need to address in the study of IS in organisations. Hence, a multi-method approach using case study research, participative action research (PAR) and Activity Theory is more effective. The research focus in this thesis relies on a mix of data gathering approaches including self-administered questionnaires, semi-structured interviews and observation. The title and the research questions of the thesis evolved as a result of two years of research, paper publications, valuable critique from colleagues and ongoing reflection on the number of issues posed by Enterprise 2.0 technologies such as Wikis, blogs, podcasts, social bookmarking to support knowledge work in the work environment. The research study was conducted in two phases. Phase One of the research study aimed to study the introduction and testing of corporate Wikis in two primary cases, a knowledge intensive organisation and a non-governmental organisation in Australia. Seizing the opportunity to implement the corporate Wikis in these two organisations, it was decided to set up these two primary cases as PAR projects because the researcher will be actively liaising with other members of the corporate Wiki project building and testing the corporate Wiki. Case studies will be built up throughout the research process from the initial design to the final presentation of results and discussion of the project members' action implications. Phase Two comprised of four supporting cases of corporate Wiki usage in successful learning organisations. They consisted of a public utilities company, a global research and development company and a marketing and technology consulting company from the U.K. The fourth supporting case was a government organisation from Australia. The aim of Phase Two research study was to explore how and why do enterprises adopt and use corporate Wikis, so as to investigate the causal issues that

contribute to corporate Wiki adoption/implementation success. Data was gathered through email questionnaires and semi-structured interviews and formulated into case studies and findings interpreted. The novelty of this work lies in applying Activity Theory to uncover the hidden activities of knowledge work so that organisations can determine what knowledge is of value and how to acquire, access and disseminate organisational knowledge. This work contributes to the body of work in Knowledge Management that sees technology as a social technical system. It argues that the corporate Wiki is capable of developing improved knowledge capabilities to answer to the basic challenge facing many organisations today, which is how to acquire, access and disseminate organisational knowledge capture, in particular tacit knowledge, to fulfil requirements of their clients and staff, while improving the quality of its products and services within the constraints of a fixed resource base. Research findings have uncovered the salient features of successful Wiki adoption methods so that it can provide guidance to organisations which are embarking on corporate Wiki implementation projects. Based on the Activity Theory analysis and empirical research, it is observed that learning organisations are successful in Wiki adoption and implementation because they have an open culture, supportive leadership style, and allow technology to be user-driven. The corporate Wiki is proposed to be the next generation Knowledge Management Systems (KMS) to meet the urgency and demand for a more rigorous approach to the exploitation of knowledge as an organisational resource.

Acknowledgements

I would like to thank my Supervisor, Associate Professor Helen Hasan. I could not have imagined having a better advisor and mentor for my PhD, and without her common-sense, knowledge, perceptiveness and support I would never have finished. I would like to say a big 'thank-you' to all the people who agreed to be interviewed by me for this thesis in some form or another. Finally, I have to say 'thank-you' to my family, particularly my Mum and Dad; and, most importantly of all, to my husband Scott, for his love and support.

Charmaine C. Pfaff

1 February 2009

The new currency won't be intellectual capital. It will be social capital, the collective value of who we know and what we'll do for each other. – James Kouzes and Barry Posner (2007), The Leadership Challenge.

Chapter One Introduction

This thesis addresses contemporary issues of 'knowledge' as a critical element in human enterprises of today and tomorrow. The research began two years ago when the presence of social technologies such as Wikis in formal organisations was rare and controversial, with no rigorous published research on the topic. As will be explained below the candidate recognised the potential of such tools to radically change the ways all members of an organisation were involved in its collective knowledge management (KM). Since then, the subject of Wikis and other Web 2.0 applications in organisations has captured the attention of the IS research community with tracks in conferences and special issues in journals on Enterprise 2.0 (the appropriation of Web 2.0 in organisations). The work of the candidate has contributed to these efforts as shown by the list of publications from this thesis on pages 3 - 4. The findings reveal the challenges associated with this phenomenon in understanding knowledge work in organisations now and into the future. However these challenges can be overcome by some rigorous definitional ground rules and a clear set of statements that will help the reader understand the candidate's stance about knowledge and KM in Chapter 2. The definitions will be precisely tied into the empirical work in Chapter 4 so that the reader can easily trace these categorisations through to the conclusions that the thesis draws upon.

This thesis thus represents part of the exciting direction within the field of KM (Nonaka & Takeuchi, 1995; Davenport, 1995; Sveiby, 1997; Davenport & Prusak, 2000) to leverage the use of newly emergent Enterprise 2.0 (McAfee, 2006) technologies for more efficient KM. This thesis adopts the Australian Standard (AS5037, 2005) definition of KM:

“A trans-disciplinary approach to improving organisational outcomes and learning, through maximising the use of knowledge. Knowledge

management is concerned with innovation and sharing behaviours, managing complexity and ambiguity through knowledge networks and connections, exploring smart processes, and deploying people-centric technologies (Standard AS 5037—2005)”.

Turbulence in the business environment and the globalisation effect of the Internet are bringing intense pressure to organisations causing them to react quickly and creatively in order to gain and sustain competitive advantage (Turban et al. 2000). Truex and the others (1999) suggest that these new economic realities have made organisations ‘emergent’ because they need to continuously adapt to shifting environments. This turbulent environment challenges organisations to re-define themselves and become learning organisations which is defined as:

“organisations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together.” (Senge et al., 1994, p.3)

Learning applies to both humans and organisations (Schön, 1967) and that any organisation (companies, social movements and governments) can be a learning organisation (Schön, 1967), provided they perceive the need to learn in the face of uncertain change in the environment. A number of learning organisations have resorted to developing knowledge management systems (KMS) in order to become more flexible, adaptive and productive and excel in a competitive business environment (Maholtra, 2004). However, there is a wide perception that such KMS have not delivered benefits to organisations which are in line with the tremendous sums spent on them (Weber, 2007; Lam & Chua, 2005; Malhotra, 2004; Wagner, 2003; Storey & Barnett, 2000). This has put forward various ideas in effect for a next generation KMS, namely, the corporate Wiki which belongs to the family of Enterprise 2.0 technologies (Pfaff & Hasan, 2006a). The term ‘democratisation’ is used throughout the paper to describe the necessary culture change for managers and knowledge workers in organisations as the Wiki affords a new approach not only to contributing knowledge but defining its structure and scope (Hasan & Pfaff 2007b).

The term Web 2.0 denotes the recent phenomenon where the Internet provides a platform, for a growing variety of end-user applications on myriads of connected devices. According to O'Reilly (2005 p.1),

“Web 2.0 applications deliver software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an ‘architecture of participation’, and going beyond the page metaphor of Web 1.0 to deliver rich user experience.”

The term ‘architecture of participation’ describes the nature of systems that are designed for user contribution (O'Reilly, 2005). Its content can be more easily generated and published by users, and encourages more democratic use (Boulos & Wheelert, 2007). Web 2.0 is considered to be a very loose term. It confuses people and annoys cynics in equal measure – the former do not know what to make of it, while the latter think it is another fad. My definition of Web 2.0 is:

“Using the Internet and other connected services as a global platform that promotes interactive user interfaces and encourages the democratic process of user directed and generated software and content.”

However, the specifics can be narrowed down to the term, Enterprise 2.0 because it directs our attention away from Web 2.0 towards a very real set of concepts, technologies and approaches that is implicitly devoted to the work environment and can make a real difference to many businesses around the world. McAfee (2006) states that Enterprise 2.0 technologies “focus only on those platforms that companies can buy or build in order to make visible the practices and outputs of their knowledge workers.” Swisher (2007, p.34) goes further to explain that these technologies “are almost completely user-driven,” “networked web applications and databases that are designed to adapt to the needs of its users, based upon how they actually use it, not on how vendors or employers want them to use it” which leads to a “convergence via the web of an ecosystem of communities of users, business, tools and digital media, in such a way

that the whole system becomes more useful and less difficult to manage the more it is used.”

1.1 Research Problem

The business environment has changed dramatically over the last several years requiring greater flexibility and agility to respond to this change. This work provides a good starting point for academics and practitioners who are evaluating suitable KMS for adoption and implementation in this uncertain environment; and are dissatisfied with the current offerings. A number of authors have reduced KMS to the use of expert systems in the corporate world (Okafor & Osuagwu, 2007; Gottschalk, 2006; Gottschalk & Khandelwal, 2003; Malhotra, 2001; Walker et al. 1990). However, these KMS fail to deliver because of contextual factors (Weber, 2007; Lam & Chua, 2005; Malhotra, 2004; Wagner, 2003; Storey & Barnett, 2000). Those implementing KM initiatives have predominantly retained a bureaucratic perspective of work as performed by individuals in a formal organisational structure (see section 2.1.4.2.5.1) where knowledge is viewed as a static resource or asset that can be treated in much the same way as any other commodity (Storey & Barnett 2000). Others may succeed if the cultural and contextual factors are given the same attention as the technical issues (Pfaff & Hasan, 2006b; Wagner, 2003). As long as organisations retain this perspective of knowledge as a static resource, the real nature of knowledge work remains hidden, and thus inaccessible to those who are trying to improve organisational outcomes through KM practices (Linger & Warne, 2001).

This thesis explores the rationale for the formation of the corporate Wiki as a new and emergent technology innovation and its implications for the internal organisational culture and the leadership styles adopted by the organisation’s managers. A knowledge worker’s daily routines and work processes form a vital component but they are often overlooked in the general scheme of knowledge work. Using a corporate Wiki to give knowledge workers an advantage in the current environment seems obvious to those in the know. As such Wiki evangelists, who are good writers and experts in their specialised fields can come to a consensus on what the encyclopaedia should look like

and ‘seed’ the corporate Wiki and help those who are not comfortable with technology or are not fluent writers (Pfaff and Hasan, 2007). But how can Wiki evangelists persuade their own traditional organisations overcome the major hurdle of smoothing the transition of accepting new technology? Studying the collaborative contributions of knowledge workers to the corporate Wiki will shed greater light on evaluating practical successful Wiki implementation and the corporate Wiki’s role in democratising organisational knowledge through bottom-up adoption and emergent behaviours. However there are many unanswered questions and criticism about the applicability of the corporate Wiki and associated Enterprise 2.0 technologies in the work environment.

Many of the Wiki concepts related to technology innovation (King et al. 1994), social networks and KM are highly relevant in Information Systems (IS) can address real-life KM problems and the immediate concerns of practitioners. Barnes (1954) first used the term social networks to describe an association of people drawn together by family, work or hobby. Today’s social networking has made the move online where it is becoming increasingly common for a group of people who use the Internet to communicate with each other about their personal and professional lives. Social networking sites include dating sites, friendship sites, business networking sites and a combination of these various sites.

Yet, paradoxically, when the research project started for this thesis in February 2006, the IS/IT academic community has almost totally ignored the rationale for and implications of Wiki usage in the organisations (Wagner & Bolloju, 2005; Cortese, 2003; Weidlich, 2003). With the exception of a growing literature in media studies and cultural studies (Tkaoz, 2007; Purushotma et al. 2006; Pfeil et al. 2006; Lih, 2004), the use of Enterprise 2.0 technologies such as Wikis, blogs, podcasts, and YouTube (Stone, 2007; Wales, 2007; Wagner, 2006; Pfaff and Hasan, 2006b, Mattison, 2003), which have been introduced and adopted in increasing numbers in mainstream organisations, remain a phenomena largely observed in the media (Pfaff & Hasan, 2006a). This thesis attempts to correct this transgression.

1.1.1 Research Questions

In order to investigate the problem described above, the key research question that this thesis set out to investigate is:

Does a corporate Wiki support knowledge work?

The other questions that flow from this main question are:

- What is the nature of knowledge in a corporate Wiki?
- How does organisational culture impact on corporate Wiki implementations?
- Is a corporate Wiki more suitable to a specific type of organisation or industry sector?
- Why do corporate Wikis fail in some organisations?
- How can a learning organisation (Senge, 1990) take steps to decrease the possibility of a corporate Wiki rejection?
- How can Activity Theory be used to analyse the potential of the corporate Wiki and other Enterprise 2.0 technologies to support knowledge work by democratising organisational knowledge?

The thesis aims to fill an important void in the Enterprise 2.0 landscape and the implication of its use in KM. The introduction of a new technology such as the corporate Wiki does not mean that prior research on other new technologies is irrelevant. This research focuses on what is new about Wikis beyond other innovations and if there are any differences. In particular, it aims to address the gap between theory and method by using Activity Theory (Engeström, 1987; Vygotsky, 1962) to analyse the corporate Wiki as a tool to see whether it can support knowledge work.

1.2 Research Direction and Approach

The thesis represents an interesting piece of empirical work based on a set of suitable case studies interpreted through the application of Activity Theory. In order to address the research questions in Section 1.1.1, this thesis takes up the challenge of investigating whether a corporate Wiki is able to support knowledge work in organisations and be the next generation KMS to meet the urgency and demand for a more rigorous approach to the exploitation of organisational knowledge, in particular tacit knowledge, as an organisational resource. As part of this investigative process, it takes into account the nature of knowledge in a corporate Wiki, organisational culture (section 2.1.4.2.5), and suitability of corporate Wikis to all types of organisations; Wiki failure and steps to reduce Wiki rejection so that it can provide guidance to organisations which are embarking on corporate Wiki implementation projects.

Activity Theory (Engeström, 1987; Vygotsky, 1962) is chosen to articulate a theoretical framework for understanding the collaborative aspect of knowledge work and the role knowledge workers, managers, organisational culture and leadership styles play in the activity system of the corporate Wiki. Activity Theory is a theoretical approach (see section 3.2.4) that underpins the case study (see section 3.2.1) and participatory action research (PAR) (see section 3.2.2) methodologies used in the research study (see section 3.3.3.2). While case study and PAR focus on the broad patterns of activity (Marshall & Rossman, 1989), Activity Theory is used to narrow down the fragments of activity that will give the overall picture and direction of the activity (Nardi, 1996b). For example, an activity notation method (Mwanza, 2001) is utilised to decompose the main activity system into smaller manageable units or sub-activity triangles to generate specific questions from the case studies aimed at obtaining meaningful data.

The purpose of using Activity Theory as a practical and conceptual tool is two-fold - to study the dimensions of volatility of environmental change and the type of inter-collegial relationship involved (collaborative or transactional). The argument is that we must consider people, task, process, and environment (both internal and external) when considering how best to implement technology into our organisations.

The Activity Theory approach provides a rich framework for considering the KM strategy, implementation and evaluation in the corporate arena. First, contextual issues are considered. The social relations between the participants, the infrastructure which supports the corporate Wiki and the historical context are all of importance. Context can also be considered at multiple external and internal levels (Nardi, 1996b). Second, process is considered. This involves the investigation of the ongoing culture and politics within the organisation. Of particular interest here are the interactions between subcultures and the corporate Wiki, and the way in which the boundaries between the subcultures are changed by the corporate Wiki. In this dimension, Activity Theory provides a useful focus into the study of knowledge workers engaged in knowledge work on the corporate Wiki.

In order to integrate the findings from the case studies, Activity Theory is applied to provide a holistic unit of analysis of knowledge work within the framework of an activity system. A general Activity Theory analysis of the corporate Wiki used for KM is presented. The analysis begins with the core activity, for which a Wiki is used. This is not KM per se but rather what is referred to as knowledge work. In the activities of the knowledge worker there is an obvious dialectic relationship between knowledge and work, i.e. thinking and doing or what employees do and what they know. This dialectic is expressed by a synthesis of the concept of experiential learning with that of informed actions, i.e. experience in a continuous cycle of doing through which learning occurs resulting in more knowledgeable doing and so on. Activity Theory analysis also gives us an indication of the auxiliary activities that affect organisational performance which are linked to the core knowledge work activity.

Activity Theory consists of a set of basic principles that constitute a general conceptual system that adds depth to the analysis. The basic principles of Activity Theory that is particularly relevant to knowledge work are:

- Consciousness (Nardi, 1996b)

Observing the everyday practices of knowledge workers co-creating work related knowledge that results in learning and making them more knowledgeable and this in turn, affects their performance (Chapter 5, Section 5.4.1),

- Tool Mediation (Engeström, 1987)

A framework for understanding the role that a tool such as a corporate Wiki plays in mediating the work of KM as a KMS (Chapter 5, Section 5.4.2); and

- The Dual Concepts of Internalisation/Externalisation (Kaptelinin & Nardi, 1997)

The concept of internalisation/externalisation represents two corporate Wiki activities. Internalisation takes place when content is created in the corporate Wiki. Externalisation occurs when collaboration between several knowledge workers requires their work activities to be performed externally in order to be coordinated such as the contents of the corporate Wiki being used in knowledge work.

As this is an emerging topic of current interest in the dynamic environment of modern corporations, the research is based on real cases of organisations adopting or considering the adoption of a corporate Wiki to support their KM efforts which is presented in Chapter 4. Much of the argument and output underpinning this research is based on empirical work to discover whether Wikis are relevant to only learning organisations or to all organisations.

The research project consists of a study of six organisations from Australia and the U.K. with corporate Wiki initiatives in the service, legislative, utilities, research and development, and technical consulting industries both in the private and public sectors. Research was carried out between February 2006 and September 2007. Interviews and questionnaires with key actors such as corporate Wiki users, project managers and other executive staff were carried out and case studies built up. Through the analysis of the interview material, it was recognised that there was considerable overlap in the findings and that some comparison was valuable. The research is designed to address the research objectives so as to answer the primary research question, “Does a corporate

Wiki support knowledge work?” and other related research questions in Section 1.1.1, by adopting a multi-method approach which is a combination of case study research (Klein & Myers, 1999; Orlikowski & Baroudi, 1991), participative action research (PAR) (Lewin, 1946) and Activity Theory (Engeström, 1987; Vygotsky, 1962). A mix of data gathering approaches is used including self-administered questionnaires, semi-structured interviews and observation. The evidence is formulated and findings interpreted into case studies.

The research is conducted in two phases. Phase One consists of two primary cases, case organisation A which is a knowledge intensive organisation (see section 4.1.1), and case organisation B which is a non-governmental organisation in Australia (see section 4.1.1). It is decided to set up case organisation B as a PAR project because of our involvement (my Ph.D. Supervisor and I) as consultants and researchers in implementing a corporate Wiki for case organisation B. A case study is built up throughout the research process from the initial design to the final presentation of results and discussion of case organisation B's Wiki project members' action implications.

Phase Two of the research consists of four supporting cases: Case organisation C is a public utilities company in the U.K., case organisation D is a global research and development company in the U.K., case organisation E is a government organisation from Australia; and case organisation E is a marketing and technology consulting company in the U.K. The research investigates the causal issues that contribute to successful corporate Wiki implementation in learning organisations.

Activity Theory underpins the case study and participatory action research methodologies. Activity Theory is used for all case organisations A - F. While case study and action research focuses on the broad patterns of activity (Marshall and Rossman, 1989), Activity Theory is used to narrow down the fragments of activity that will give the overall picture and direction of the activity (Nardi, 1996b). The knowledge worker that uses the corporate Wiki becomes almost completely immersed in a computing environment. This new reality dramatically alters the methods by which organisations must manage, learn, represent knowledge, interact, solve problems, and

act. Hence, the learning organisation (Senge, 1990) emphasises on the internalisation of knowledge, through experience and action and generation of new knowledge through social networking. More is discussed about the examination of key theories (see section 3.2) that might be relevant and how the research design is constructed (see section 3.3).

1.3 Contributions to Theory and Practice

The main achievement of this thesis is a set of findings on the emerging phenomenon of KM using the corporate Wiki from the study of several actual cases in forward looking organisations. Activity Theory is used to uncover the hidden activities of knowledge work so that organisations can determine what knowledge is of value and what how the Wiki can be an appropriate tool to support these activities. Activity Theory has helped to gain better insights into knowledge work activities including all operations within the business process such as generation, storage, distribution and application of knowledge (Mertins et al. 2003), that result from the use of the corporate Wiki.

The application of Activity Theory to the use of Enterprise 2.0 technologies for KM gives a richer understanding in the study of knowledge work within the intricate dynamic context of the modern corporate environment. Activity Theory explores how learning and knowledge creation may occur in these micro-environments. This work contributes to the body of work in KM that sees technology as a social technical system. The research findings support my belief that the next generation of KM will focus on knowledge work activities to reveal the processes of how knowledge workers identify and analyse individual knowledge and available organisational knowledge, produce new knowledge by intuitively adapting to changes and possibilities. Similarly to object oriented programming, knowledge (both explicit and tacit) and human behaviour cannot be separated. More will be discussed in Section 2.1.2.3.

The use of the case studies and the application of Activity Theory draw out the implications of the use of a corporate Wiki and analyse the complex interactions involved. As an Activity Theory analysis is essentially interpretive and iterative, one begins with the core activity for which the corporate Wiki is used and come back to the

broader issues of organisational culture and performance at the end of the analysis. The distinctive attributes of a corporate Wiki identified in the case studies are now used to give us an indication of the auxiliary activities that link to the core knowledge work activity. It reveals several implications for the associated activities related to knowledge work such as management, social, technical and legal issues. Next, Activity Theory is employed to discover and point out contradictions in the corporate Wiki and ask questions which the other theories cannot. For example, if a different type of computer support is preferred. Analysing other Enterprise 2.0 technologies can provide opportunities for the development of new computer tools to support a particular activity system such as the corporate Wiki.

Research findings present the corporate Wiki as a democratic technology which is able to democratise organisational knowledge. Organisations C - F demonstrate that corporate Wikis can support the activities of knowledge work such as knowledge creation and distribution. Case organisations C – F show that a corporate Wiki thrives in an open culture where everyone is accountable for and values knowledge as an asset. These organisations attach an importance to the value of team socialisation and of the contribution that employees have to make. A corporate Wiki thrives on ‘collective intelligence’ (Surowiecki, 2004) where a loosely group of individuals contributes to a much larger, more complex project which becomes part of the organisational knowledge. The corporate Wiki is proving itself to itself to be a valid KM tool in organisations C - F.

In practical terms the case studies (Chapter 4) are presented together with their critical analysis (Chapters 5), to stimulate further reader interest in the topic and the information presented here will be useful for current and future research project and adopted as best practices in industry. Research findings have uncovered the salient features of successful Wiki adoption methods so that it can provide guidance to organisations which are embarking on corporate Wiki implementation projects.

The research findings demonstrate that a careful evaluation is needed to see whether a corporate Wiki suits the existing organisational culture to reduce rejection of corporate Wikis. Case organisations A and B exhibit the barriers of traditional organisational

culture which reflects knowledge hoarding rather than knowledge sharing, proving detrimental to the ability of knowledge workers to make new connections, creativity and collaborations.

In practice, knowledge workers are motivated by incentives to maintain activity in the corporate Wiki in order to create value that encourages further participation, which in turn creates further value. It is observed that learning organisations are successful in Wiki adoption and implementation because they have an open culture and supportive leadership style to nurture leadership qualities in knowledge workers. The new business environment requires a business model that will perform better based on fewer rules, some specific information and greater freedom. More successful learning organisations allow technology to be user-driven. It is important to note that unlike other technologies which are technology-driven, Enterprise 2.0 is almost completely user-driven which is evident in case organisations C – F.

It is noted that the Wiki champions who are motivated by a business need for a better KMS in case organisations C – F, are junior managers and not top level managers. Encouraged by the success of their corporate Wikis, organisations C - F are keen to adopt other Enterprise 2.0 technologies to increase greater business value. Paradoxically, the research shows that management support is also crucial. It is clear that introduction of a KM collaboration tool is not sufficient by itself. After analysing the goals and motives of case organisation A and B's users and the context in which the corporate Wiki exists, the Wiki stalls because a lack of management support. It is important the senior management provides the permission and budget but lets the knowledge workers manage the corporate Wiki. Case organisation A and B's Wikis fail mostly because the Wiki did not meet their individual and organisational needs. The research shows that the most likely driver of adoption is positive feedback from users. If decision-makers see high value from one Enterprise 2.0 tool, then they are more likely to take on a second, third or fourth.

Network-centric approaches (Hasan et al. 2007b) are particularly well-suited for examining the social and technical dimensions of Enterprise 2.0 technologies, especially collaborative KM technologies such as the corporate Wiki. The concept of the sensible

organisation (Hasan et al. 2007b) employs a network-centric view which is closely related to the sense-making view of organisations (Cecez-Kecmanovic & Jerram, 2002; Weick, 1995). Sense-making is concerned about “making information available to everyone who needs it, in a form that they can use, in a secure and timely manner”; and that “turning pieces of information into situation awareness requires the expertise and experience of many” (Albert & Hayes, 2003). This research is concerned with the sense-making that occurs at the intermediate team/group/unit level which is considered most apparent in knowledge work activities. There is a requirement for sense-making points to be network-centric where information and knowledge sharing and simultaneous collaboration are encouraged in flatter hierarchies and de-centralised decision-making environments. A network-centric approach promotes informal, network-centric interaction and activity between people, allowing and enhancing informal access to create and distribute organisational knowledge which is part and parcel of knowledge work activities. According to Nonaka (2005, p. 163), “organisations continuously create new knowledge by reconstructing existing perspectives, frameworks or premises on a day-to-day basis.”

No doubt, the sensible organisation (Hasan et al. 2007b) that employs the network-centric approach to KM and predominantly the impact of Enterprise 2.0 technologies on work and organisations can be viewed as major evolutionary steps. However, this evolutionary change should not be mistaken for a small change. It is big enough for organisations to leverage KM and leap to the next generation of business solutions. The corporate Wiki has introduced new patterns of communication channels in organisations, altering the structure and culture of the organisations. In the Enterprise 2.0 era, organisational managers face special challenges that are previously unfamiliar, such as the modifications in power relationships and the way the corporate Wiki can bypass conventional hierarchies. These issues should be topic for future research.

1.4 Thesis Structure

This thesis will explore whether a corporate Wiki is able to support knowledge work by looking at the benefits of using corporate Wikis as a KMS. There are eight chapters in

this thesis including the introduction. In addition, the thesis includes an Appendix containing the email questionnaire and interview questions.

- **Chapter Two: Literature Review**

Chapter Two is divided into three main areas: KM and knowledge work, social technologies focusing on the corporate Wiki and technology innovation. The aim is to provide evidence of key bodies of research, demonstrate the significance of the knowledge gap and lessen this gap. This thesis will first explore the nature of knowledge and whether a corporate Wiki has the potential to support knowledge work by looking at the benefits of using corporate Wikis as a next generation KMS. It then looks at the common challenges and areas in which current KMS has fallen short of its promises. The next section looks at social technologies and its characteristics that support an innovative, socio-technical systems response. It focuses on the corporate Wiki which has materialised a method in which contributors are able to build their own knowledge repository through collaborative problem-solving, working together in formal or informal teams to complete tasks and develop new knowledge through corporate Wikis. Technology innovation considers the ubiquity of Web 2.0 and the associated development of Enterprise 2.0 technologies contributing to the rise of participatory culture in formal and informal online communities centred around various forms of media, such as Facebook, MySpace, or discussion forums; producing new creative forms, such as YouTube and mash-ups; and shaping the flow of media such as RSS, podcasting, and blogging.

- **Chapter Three: Research Approach and Design**

This chapter looks at three major theories, case study research, participative action research and Activity Theory to provide a focused and critical analysis which can help researchers analyse knowledge work in the corporate Wiki environment, especially processes which can lead to instability and conflict, with a view to support the corporate Wiki with other Enterprise 2.0 technologies that will progress knowledge work.

- **Chapter Four: Case Studies**

Chapter Four examines two failed initiatives to introduce the emergent next generation KMS, the corporate Wiki; and four other successful adoptions. It seeks to highlight the importance of contextual and cultural issues by presenting six case studies for comparison, using research from corporate companies from different industries and countries, organisations from the public and private sectors, each with different organisational structures (see section 2.1.4.2.5.1).

- **Chapter Five: Activity Theory Analysis**

An explanation is given on how Activity Theory is used to elaborate on the mediating role of the corporate Wiki as a tool during the knowledge work process; and how management decisions and organisational culture can influence tool adoption by knowledge workers. An Activity Theory model is used to pinpoint contradictions on the Wiki design and implementation and generate recommendations for changes to the activity, including computer support, such as other Enterprise 2.0 technologies.

- **Chapter Six: Outcomes – Emerging Models**

Chapter 7 establishes ground rules for implementing the corporate Wiki for knowledge creation and distribution. It suggests recommendations to improve the viability of the corporate Wiki and the potential areas of application of other Enterprise 2.0 technologies within the organisations. To harvest the benefits and overcome the obstacles, two types of Wiki software solutions have emerged: proprietary e.g. MS SharePoint and Confluence; and open source e.g. MediaWiki. It highlights the potential for future research in the area of network centric organisations and its implication for social learning. The task is to educate organisations on the benefits of effective social networks inside and outside the organisation, and how best to support it.

- **Chapter 7: Conclusion**

The closing chapter concludes by discussing how the research has addressed the research questions as well as the limitations of the research. It shows how the research in this thesis helps to extend KM, picking up and developing an emergent Enterprise 2.0 technology strand such as the corporate Wiki that is becoming successful in enterprises but not well developed in academic literature. The application of Activity Theory analysis reveals that successful Wiki adoption/implementation outcomes is dependent on a bottom-up and ecological approach, thinking about the interrelationship among all of these different Enterprise 2.0 technologies as an ecosystem, the cultural communities that grow up around them, and the knowledge activities they support.

Chapter 2 Literature Review

This chapter presents a review of literature relevant to the research questions posed in Section 1.1.1 of the Introductory Chapter. It is an essential part of preparing for research and for interrogating tentative research findings. Chapter Two is divided into a four main areas: knowledge work and Knowledge Management (KM), social technologies focusing on the corporate Wiki and technology innovation. The aim is to provide evidence of key bodies of research, demonstrate the significance of the knowledge gap and lessen this gap. The first section focuses on how KM has evolved and why it has become important for an organisation to create and retain organisational knowledge as an organisational asset. It outlines the current challenges of KM and the implications for organisations if they do not pursue the goals of investing and managing organisational knowledge. It analyses the key factors that contributes to the failure of current Knowledge Management Systems (KMS). It looks specifically at the concept of the knowledge worker and knowledge work; and the role of the knowledge worker within the organisation. The second section seeks to understand the evolution of emergent social technologies. Social technologies are based on these premises: support for conversational interaction between individuals and groups, support for social feedback such as stories and storytelling, and support for social networks. The third section focuses on technology innovation and explains why technology cannot be separated from social and other non-technological elements in socio-technical environments. It traces the rise of Web 2.0 and its associated development of Enterprise 2.0 technologies to demonstrate the potential they offer to knowledge workers and the corporate environment. A comparative analysis on Wikis, weblogs (blogs) and discussion forums is done to ascertain why the Wiki is more ideal as a KMS for knowledge workers to collaboratively create a central repository of knowledge. It elaborates how Enterprise 2.0 technologies can introduce new and potentially quite different knowledge-based and embedded additions to improve the viability of the corporate Wiki and minimise the risks to corporate Wikis as a KM solution.

2.1 Knowledge Management Explained

The aim of this section is to introduce and critically analyse the key concepts of KM that relate to my research into corporate Wikis. It provides a brief description of key terms required for an organisation to move from information management to KM. It considers discussions in the literature about the ‘reification’ vs ‘social constructionist’ views of knowledge. Determining who will do the work in a corporate Wiki has important implications both for the allocation of resources within the organisation and for the design of novel collaborative KMS. Consequently, this section undertakes a thorough examination of the situation of the knowledge worker to identify the issues and research directions discussed in Chapter 5, Section 5.1.

A brief synopsis of organisational learning and the integral role it plays in organisational culture and leadership style is presented. This is later taken up in Chapter 4, where its implications on the case organisations are examined in greater detail. In discussing KM in relation to IS research it needs to be emphasised at the onset that this thesis is concerned about the general theory of KM rather than a theory specific to IS. The aim of this research is to understand KM in its broadest sense.

2.1.1 What is the Nature of Knowledge?

Existing studies in IS literature have not addressed the issue of whether the corporate Wiki can support the knowledge worker in the daily processes of knowledge work. To answer this main question, one needs to begin with what is the nature of knowledge in corporate Wikis? Is the nature of knowledge different in different contexts, for example, across the different cases which will be presented later in the thesis in Chapter 4? What really happens to work, and to knowledge workers, when management takes an active interest in ‘knowledge’?

The challenges associated with defining different types of knowledge, and its management, are always complex because further complications arise due to both consensus and a lack of consensus regarding definitions of knowledge and information in the literature. However this difficulty can be overcome by some rigorous definitional

ground rules and a clear set of statements which will help the reader understand my stance about knowledge and KM. The definitions will be precisely tied into the empirical work in Chapter 4 so that the reader can easily trace these categorisations through to the conclusions that the thesis draws upon.

2.1.1.1 Data, Information, and Knowledge

Before I can begin my discussion on knowledge work, it is important to distinguish between the terms ‘data’, ‘knowledge’ and ‘information’. Different research traditions have developed several typologies and classifications of knowledge among scholars and practitioners (Snowden, 2002; Davenport & Prusak, 1998; Nonaka, 1994; Polanyi, 1958). However, this thesis takes the stance that data, knowledge and information are three distinct terms, and that each affects the other (Stenmark, 2002). Zeleny (1987) simplifies this difference by equating data, information and knowledge into various knowledge forms: ‘know-nothing’, ‘know-what’ and ‘know-how’ respectively. Data does not have meaning in itself. Data represents unorganised and unprocessed facts (Awad & Ghaziri, 2004). Information is tangible because it is an external representation, and therefore capable of being captured and managed (Wilson, 2002). Knowledge is intangible (Alavi & Leidner, 2001), distinguished from information because it requires a combination of experience, context, interpretation and reflection (Davenport et al. 1997).

Knowledge is commonly divided into two types: tacit knowledge and explicit knowledge (Nonaka, 1991). Tacit knowledge or knowledge know-what, is undocumented, hard-to-articulate knowledge (Polanyi, 1958). Examples include insights, facts, and solutions to common problems. For example, Research and Development (R&D) teams in the biotechnology and pharmaceutical industries require tacit knowledge to make key decisions. About 70% of the data used by these knowledge workers is unstructured e.g., internal reports and scientific literature (Brocklehurst, 2001). Explicit knowledge or knowledge know-how is considered tangible because it can be captured, documented and externalised (Nonaka & Takeuchi, 1995). These include patents, software code, databases, technical drawings and blueprints, chemical and mathematical formulas, business plans, and statistical reports, or rule based, i.e.,

expressed as rules, routines, and procedures (Stenmark, 2002). Choo (1998) observes that organisations commonly use explicit and articulated knowledge in the form of written memos, graphs illustrations which are used in decision-making processes, or institutionalised as operating procedures. Explicit knowledge can be externalised i.e. measured and therefore, can be managed, as opposed to tacit knowledge, which is often difficult to measure and cannot be managed (Cortada & Woods, 1999; Davenport & Prusak, 1998; Nonaka & Takeuchi, 1995).

From an IS perspective, knowledge is the top of the data, information and knowledge hierarchy where information is meaningful, processed data and knowledge is information that is actionable (Pfaff & Hasan, 2006b; Pan & Leidner, 2003; Handzic & Hasan, 2003). My conclusion is that it is this actionable quality that distinguishes knowledge from information. I take the view that knowledge is an on-going process of the re-interpretation of data and information based on a person's skills, experiences and emotions that go into decision-making and intuitively adjust to changes and possibilities.

2.1.1.2 Knowledge Work

Knowledge work is increasingly regarded as an important contributing factor to business survival and success (Drucker, 1999). The majority of authors who use the term 'knowledge work' seem to agree, broadly, that there is a form of work which we can categorise as knowledge work (Efimova, 2004, Alavi & Leidner, 2001; Kelloway & Barling, 2000, Drucker, 1999, Collins, 1998). Kelloway & Barling (2000, p. 287) defines knowledge work as comprising:

“the creation of knowledge, the application of knowledge, the transmission of knowledge, and the acquisition of knowledge. Each of the activities is seen as discretionary behaviour. Employees are likely to engage in knowledge work to the extent that they have the (a) ability, (b) motivation, and (c) opportunity to do so.”

Much of the work of finding, interpreting and connecting relevant pieces of information, negotiating meanings and eliciting knowledge in conversations with others, creating

new ideas and using them to come up with a final product, happens in the head of a knowledge worker or as part of communication or doing work (Efimova, 2004). The invisible nature of knowledge work makes it difficult to recognise and measure. Along with this, outcomes of knowledge work are often unique (Drucker, 1999), thus making establishing benchmarks even a more challenging task.

2.1.1.3 Organisational Knowledge

Organisational knowledge is about what employees understand about historical knowledge inherent in the organisation such as the knowledge about customers, products, processes, errors, and successes (Hasan & Pfaff, 2007b). Knowledge work is linked to organisational knowledge, in that the knowledge of the workforce comprises an organisation's knowledge base, which in turn represents the organisation's 'intellectual capital', which directly affects the value of the firm (Kelloway & Barling, 2000). If organisational knowledge is equated with the collective wisdom of the organisation when this knowledge is collected and shared (Rich & Duchessi, 2000), then the value of knowledge as an asset to organisations increases because organisational knowledge is seen as essential to the running of a responsive business with tight control of costs and high market sensitivity.

2.1.2 Who are Knowledge Workers?

When the term knowledge worker was first invented by Drucker in 1959, knowledge workers were considered specialists who were supported by colleagues that provided the secretarial and records management services so that knowledge workers could focus on their primary duties. Collins (1998) in contrast offers a far wider definition, where all workers are knowledge workers and have skills and working knowledge, rather than claiming it as the possession of a minority group. Collins (1998) adds that knowledge workers possess valuable skills which have been acquired over a prolonged period and permits considerable discretion in the tasks they choose, and how these tasks are managed to completion.

I take the view that knowledge workers are a group of more elite workers who are highly intelligent and who already possess considerable knowledge and who, most

importantly, have skills associated with the identification of knowledge that is relevant, can access that knowledge, and who can share it effectively with others. According to this definition, this makes managers and corporate Wiki users knowledge workers.

Drucker (1998, p. 2) predicted that organisations of the future will consist of specialists or knowledge workers grouped together in transient task forces, coordinated rather than managed, and united by a common objective. The continuous expansion of knowledge workers' roles is not restricted to self-directed work practices of individuals and teams in almost every industry who continuously engage in processes that create and exploit knowledge, but also include an activity system "located within the space defined by the doing, thinking and communicating dimensions" (Burstein & Linger, 2003).

2.1.3 What is Knowledge Management?

As knowledge has been identified as a source of competence and as a competitive resource (Huang et al. 2001), determining what knowledge is of value and how to acquire, access and disseminate it will be more and more challenging. Tobin (2004) argues that the intangible assets of KM can manifest itself by improved efficiency, effectiveness and innovation, increasing asset value, benefits potential and cost effectiveness. Increased asset value is realised through increasing the value of existing products and services by embedding industry-specific knowledge in KMS for knowledge workers in order to differentiate and enhance a firm's competitive advantage. Enhanced effectiveness is achieved in terms of better efficiency or best practices, or increased revenue generation from existing knowledge assets (intellectual property licensing, trademarks, and copyrights). Enhanced knowledge makes the organisation more adaptable via the filtering, gathering, and interpreting of competitive intelligence, or making more efficient use of knowledge assets through best practices, etc. (Skyrme, 2001).

Snowden (2002) identifies three generations of KM. The first generation views knowledge as a commodity (Swan et al. 1999) where KM is associated with increased Information, Communication and Technology (ICT) capabilities, focusing on timely information provision for decision support. KM is merely a process of capturing storing

and disseminating knowledge; a view, which implies that knowledge, can be abstracted from one context and applied to another.

In the light of the ‘tool-based’ perspective encouraged by Activity Theory which will be discussed in Chapter 3, it is important to review the ‘reification’ vs the ‘social constructionist’ views of knowledge. Of particular interest, are tools that are made or used by groups, such as the corporate Wiki, which is a tool centred on supporting collaborative knowledge work. The second generation adopts a ‘reification’ view of knowledge and views KM as a belief system. It emphasises the Socialisation, Externalisation, Combination/Creation and Internalisation (SECI) model (Nonaka, 1994) which focuses on the tacit-explicit knowledge conversion in organisations. Wenger (1998, p. 58 - 59) introduces the concept of reification as:

“covering a wide range of processes that include making, designing, representing, naming, encoding and describing as well as perceiving, interpreting, using, reusing, decoding and recasting.”

In essence, reification is to give concrete form to something that is abstract (Hildreth & Kimble, 2002). Desouza (2003) adds that tacit knowledge is deeply rooted in the human psyche of a person’s actions and experiences, wrapped up in their ideals, values, and emotions. If knowledge is defined as an individual’s interpretation of information based on personal experiences, skills, and competencies over a course of time (Bollinger & Smith 2001), then this knowledge can be shared or flowed between employees. Consequently, organisational knowledge is viewed as the collection of knowledge possessed by each employee. However, this view ignores the possibility that additional knowledge resides in the relationships between employees and in the legacy of previous employees embedded in organisational memory and culture.

The emerging third generation adopts the community view or the ‘social constructivist’ approach to knowledge (Swan et al. 1999). According to this tradition, it is impossible to define knowledge universally; it can only be defined in practice, in the activities of and interactions between individuals (Stenmark, 2002). A KMS is not seen as an IT artefact but as an environment of people, organisational processes, business strategies,

and IT, where the objective is to leverage and advance the knowledge of those people (Galliers & Newell, 2001).

I believe that next generation of KM will focus on knowledge work activities to reveal the processes of how knowledge workers identify and analyse individual knowledge and available organisational knowledge, produce new knowledge by intuitively adapting to changes and possibilities. Similarly to object oriented programming (OOP), knowledge (both explicit and tacit) and (human) behaviour cannot be separated. The evolution of programming languages from procedure-oriented languages which were dependent on the creation of sub-routines to compute, to OOP where programs are independent objects containing all the information needed to manipulate a data structure, gives an indication of how the next generation of KM will evolve.

In OOP, the main program uses the various services available from various objects to achieve its objective. Interestingly, it should not matter if the object is rewritten using a better algorithm, as long as services provided do not change (Mahabala, 2000). The traditional view sees a program as a group of tasks or sub-routines which are portions of code within a larger program that perform specific tasks to compute, as opposed to OOP where OO languages provide a way to think of very complex systems by breaking them down into subsystems with a comprehensive set of responsibilities (Mahabala, 2000). OOP groups operations and data into modular units called objects which can be combined into structured networks to form a complete program (Martin & Odell, 1992). Every object has both state (data) and behaviour (operations on data).

The class of an object provide the organisational structure and definitions for objects. Classes are instantiated to create objects (instances). Each class has the same capabilities and attributes (Pressman, 1997). As with human organisations, there may be differences among the capabilities of different objects within the same broad organisational structure. These are known as specialisations in the class structure (March, Wood & Allen, 1999).

OOP has a design feature known as inheritance. It works in a similar fashion such as human inheritance where a child inherits his/her parent's attributes e.g. hair or eye

colour. All objects in a class inherit all capabilities from their superclass(es) (March, Wood & Allen, 1999). An object does not know how other objects respond to its messages, only what messages it can send to which objects. The organisational structure defined for objects is based on common capabilities and attributes, and is similar to the organisational structure of a modern enterprise (March, Wood & Allen, 1999). Knowledge workers are grouped in departments according to the functions that they perform e.g. Marketing or Finance. If knowledge workers from other departments need information from Finance, they need not know how the Finance employee is able to respond, they only know that they can respond. Similarly, knowledge workers need to be given the freedom to execute their work in the most efficient way. One should not have to worry how the work gets done, except to give clear instructions as to what is needed.

Knowledge workers require a different style of management. Despres and Hiltrop's (1995) work considers the problems of managing, motivating and rewarding knowledge workers. In fact, knowledge workers do best in an organisation that supports openness to change/innovation culture where knowledge workers are left alone to work, with sufficient support and resources available when they require them which are consistent with the socio-technical approach. This philosophy of management has also attracted its share of critics. Managers question if giving away the prerogatives of decision making to subordinates will work and make managers appear weak, passive or too permissive (McGregor, 2006).

Just as OOP applies 'decomposition and assembly', to solve a problem with this pattern, people first divide a complex problem into several simpler sub-problems and solve them separately, and then assemble the sub-solutions to form the overall solution (Xia et al. 2007). Faced with a complex project, knowledge workers may choose their own peers of their own choice (self-directed teams) to discharge their own responsibility and encourage collaborative knowledge creation. Self-directed teams are responsible for the management of work methods, task scheduling, process monitoring, and the assignment of group members to tasks (Janz, 1998). Team members may be cross functional drawing together individuals performing defined roles.

The Australian Standard (AS5037, 2005) has led the way by using the concept of a knowledge eco-system to assist organisations to understand the environment best suited for enabling their KM activities. It defines KM as:

“A trans-disciplinary approach to improving organisational outcomes and learning, through maximising the use of knowledge. Knowledge management is concerned with innovation and sharing behaviours, managing complexity and ambiguity through knowledge networks and connections, exploring smart processes, and deploying people-centric technologies (Standard AS 5037—2005).”

The implication is that it is a more scalable and flexible framework for planning, implementing and assessing KM strategies that respond to an organisation's state of readiness and topography. The focus of KM is on group learning and development, as opposed to the individual (Hasan & Pfaff, 2006b). The term, “knowledge management” is a misnomer because it misconstrues the perception that knowledge can be managed. Instead of managing knowledge, an organisation is better off nurturing or encouraging knowledge work activities, networking and sharing behaviours. An ecosystem analysis in section 2.3.6 illustrates how Enterprise 2.0 technologies can be harnessed for KM.

As such, my definition of KM is:

“KM is the nurturing of knowledge work activities and the processes that enhances the utilisation and the creation of knowledge and innovation within an organisation. It takes into account human and technological interactions in an ecosystem that allows knowledge workers to be autonomous to achieve their potential and encourage networking and collaborative behaviours.”

2.1.4 Current Challenges for Knowledge Management

As this thesis draws significantly on aspects of culture and leadership, it introduces a socio-technical approach to KMS implementation with which will help to trace the corporate Wiki development and put into a wider context some of my arguments. It is

argued that the development of the corporate Wiki needs less emphasis on technological aspects of delivery and more on engaging knowledge workers in identifying real needs and participating in democratic knowledge creation and diffusion. Another argument is that the learning organisation and organisational learning are dependent on the social aspects of knowledge and learning and that the corporate Wiki which acts like an information commons (see section 2.1.11) will be able to support the participation of democratic knowledge creation and diffusion.

2.1.4.1 Knowledge Management Systems as a KM Solution

Due to the growing recognition of the inadequacy of the organisational knowledge available to the organisations (Pan & Leidner, 2003), organisations are attempting to leverage knowledge resources by consolidating them into KMS consisting of shared repositories such as expert databases, groupware, data warehouses, project websites, intranets, shared whiteboards, and lessons learned databases (Korth & Silbershatz, 1997). Such repositories are becoming integral to a variety of tasks and to overall organisational functioning (Simon & Marion, 1996).

A KMS is defined as a class of systems developed to support the processes of knowledge creation, storage/retrieval, transfer and application (Alavi & Leidner, 2001). The function of KMS is to support knowledge work activities in some direct or indirect fashion. But of course the degree varies. Usually it is the activities that are carried out with high frequency and relative uniformity such as processing forms, which require explicit knowledge, are better candidates for most KMS (Hildreth & Kimble, 2002). According to this perception, KMS are “developed to support and enhance the organisational knowledge processes of knowledge creation, storage, retrieval, transfer and application” (Alavi & Leidner, 2001, p. 114). Leadbeater (2000, p. 70) argues that organisations “need to invest not just in new machinery to make production more efficient, but in the flow of know-how (tacit knowledge) that will sustain their business.” Seeing KM as the management of explicit and in particular, tacit knowledge, in a corporate Wiki poses a different set of challenges if we want to develop a workable KM solution.

2.1.4.1 Failure of Knowledge Management Systems

This segment highlights the root causes of KMS failure. It serves to address the complexity of KM and highlights a true appreciation of this complexity with respect to knowledge and management. While acknowledging the existence of some important truths within KM literature, it paints a grim picture to what happens when management does not heed the prognosis for KM and fails to comprehend what really happens in knowledge work, and to knowledge workers, and when management does not take an active interest in knowledge.

Due to the extensive publicity given to some spectacular failures, there is a wide perception that KMS have not delivered benefits to organisations which are in line with the tremendous sums spent on them (Hasan & Pfaff, 2006a; Lam & Chua, 2005; Malhotra, 2004). The system cannot be considered to be successful if the technology is not used or the intended level of usage is not achieved because system usage is a reflection of the acceptance of the technology by the users (Amoako-Gyampah, 2007). The expert systems of the 1980s can be seen as failing because they concentrated solely on the harder aspects of knowledge or the reification view of knowledge (Hildreth & Kimble, 2002). The changes expected to be catalysed by some KMS within some organisations have not occurred and the systems have descended into disrepute and disuse (Lam & Chua, 2005).

Analysing the case studies and studying the relationship between organisational culture and KMS in Chapter 4 will lead to a better understanding of the reasons why certain KMS initiatives fail while others succeed. It will also provide guidance to organisations embarking on KMS implementation projects.

The root causes of KMS are linked to:

- Not meeting individual/organisational needs
- Bias towards technology
- Poor perception of knowledge sharing
- Distrust and lack of cooperation
- Organisational culture and leadership styles

2.1.4.1.1 Not Meeting Individual/Organisational Needs

There have been several extensions to the original Technology Acceptance Model (TAM) model (Davis, 1989). These extensions include user involvement, argument for change and prior usage (Jackson, Chow & Leitch, 1997). User involvement is accredited to influence perceived usefulness because people who have contributed to determining the requirements and design of a technology are more likely to believe in the usefulness of the technology (ibid.). The argument for a change in technology needs to come from top management to ensure support and take-up (Amoako-Gyampah, 2007). Prior usage refers to prior experience with similar technologies that result in familiarity. Users who are familiar with such technologies tend to bring positive attitudes and bearings to new technologies (ibid.). Managerial efforts aimed at increasing the users' perceptions of the usefulness and personal relevance of the technology will contribute to implementation success, where success is defined as effectual usage of the technology (Amoako-Gyampah, 2007).

While organisations will benefit from a KMS that can store and access the summed or individual knowledge to enhance the added value of its organisational knowledge assets, it may also possibly affect adversely and erode the benefits of having a KMS. Prakken (2000) argues that a new IS will change the existing information structure and affect the existing power structure. Users who perceive a reduction in their power or influence are likely to frustrate the introduction of this new technology. The use of a new technology will also change nature of knowledge work for its users, either positively or negatively. Some will get better and more challenging jobs, while others will an increase in their workload through the extension of this newly introduced technology (ibid.)

2.1.4.1.2 Bias towards Technology

IT is only an enabler to KM efforts and not the whole process, but some large organisations come to believe that simply making more information available more widely will solve KM problems (Yelden & Albus, 2004). A number of authors reduce the potential of KMS to that of an IT based system which is nothing more than a data processing system (Raman, Ryan, & Olfam, 2006; Gupta & Sharma, 2004; Alavi & Leidner, 2001). Such computerised KMS are based upon heuristics that can be found in procedure manuals, mathematical models or programmed logic and their objective is to capture preferred solutions to the organisation's list of problems (Malhotra, 1997). Artificial intelligence is applied to these systems where neural networks use data to classify cases into categories (Gottschalk & Khandelwal, 2003). Another method is to create an expert based system where the computerised system plays the role of an expert to carry out a task that requires an expertise. According to Churchman (1971), such systems are best suited for a well structured problem situations where there is a general consensus on what the problems are and/or well structured problems where the solution exists in the form of an analytic formula.

2.1.4.1.3 Poor Perception of Knowledge Sharing

Understanding why people share knowledge is relevant to this discussion as well. Fiske (1992) asserts that this is based on combinations of four types of sociality. In communal sharing, all people in the community are equal and knowledge is shared as a public good. In authority ranking, knowledge sharing is treated as a privilege. The higher the rank, the more resources one are entitled. In equality matching, the inequalities are balanced out when a person shares knowledge in return of another person's knowledge. In market pricing, knowledge is being shared is they are rewarded proportionally.

Knowledge hoarding occurs when employees prefer to keep knowledge to themselves, which is anticipated to the poor perception of knowledge sharing (Lam & Chua, 2005). This strong perception may prevent respondents from sharing knowledge, if they are not compensated for sharing knowledge and/or they are afraid of losing power and becoming less competitive. Knowledge workers who like sharing knowledge with

others are afraid of being perceived as ‘showing off’ and/or given a heavier workload (Yao et al. 2007).

2.1.4.1.4 Distrust and Lack of Cooperation

Research studies have found that collaboration and cooperation, as well as trust, are key to understanding implementation, usage, and outcomes of IS (Kumar, van Dissell & Bielli, 1998). Trust is usually created and transmitted through cultural mechanisms. Trust and influence can only be derived through communication where individuals can seek to influence others and vice-versa. Influence indicates mutual understanding and this leads to a sharing of knowledge (Nelson & Coopride, 1996). Distrust has a negative impact on building a KM culture, whereas ‘pleasure in helping others’ has a positive impact (Von Krogh, 1998). Organisations based on cultures of shared ethical values and trust can reduce the need for monitoring or privacy guidelines (Kumar, van Dissell & Bielli, 1998).

A lack of cooperation may be due a lack of familiarity with KM concepts and non-committal managers towards KM efforts will encourage knowledge workers not to cooperate with knowledge team members and the KMS project will face some obstacles in progress (Akhavan et al. 2005). A frequent dilemma is often faced by knowledge workers. Should knowledge workers share their knowledge with other knowledge workers or hold it privately? Opportunistic behaviours may erode anticipated benefits of cooperation and result in unevenly distributed value (Hackney & Little, 1999).

2.1.4.1.5 Organisational Culture and Leadership Styles

The following is a discussion of current literature on organisational culture and leadership styles and their impact on the KMS and organisation. Failures in implementing KMS are often blamed on organisational culture (Yao et al. 2007; Davenport & Davenport, 1999). McDermott (1999) assume that the difficulty in most knowledge sharing efforts lies in the issues beyond technology, such as changing organisational culture and people’s work habits. Organisational culture is defined as the collective values and beliefs of the individual members of that organisation (Ladd & Herminger, 2003). Critics contend that organisational culture is hard to change. It rarely

yields to efforts to changes made directly, by manipulating rewards, policies, or to organisational structure. The natural inhibitors of a poor organisational culture include employees who are unwilling to share their ideas or take the time to document their insights.

Proponents of organisational cultural change do not share the same view (Cameron & Quinn, 1999; Pheysey, 1993; Hertzberg, 1968). They point out that people have to become actively involved for behaviour to change, for insight to occur, and for problems to be solved. They emphasise that leadership or leadership style is the key to understanding the culture of an organisation (Cameron & Quinn, 1999). As a result, depending on the type of organisational culture, a particular leadership style will be more prominent and appropriate than others (Cameron & Quinn, 1999). Therefore, to avoid conflicts, it is important that there is alignment between leadership style and organisational culture.

Xenikou and Furnham (1996) identify four types of organisational cultures. Openness to change/innovation culture adopts a humanistic orientation, affiliation, achievement, self-actualisation, task support, task innovation, and hands-on management (Xenikou & Furnham, 1996). Such an organisation is considered friendly and open to change (Ladd & Herminger, 2003). In this culture, the leader is continuously managing conflict, seeks consensus and actively pursues participation, commitment, openness and morale (Cameron & Quinn, 1999). Management is described as participative (Likert, 1967), democratic and existential team-builder (Quinn & McGrath, 1958).

Task-oriented organisational culture adheres to being the best, innovative, attentive to detail, quality and profit oriented, and having a shared philosophy (Xenikou & Furnham, 1996). It is similar to the Kaizen philosophy endorsed by successful Japanese companies that stress cautious and incremental improvement. Such an organisation is considered task-oriented as opposed to people-oriented (Ladd & Herminger, 2003). Power is based on the leader's expertise i.e. knowledge and skills. Status in the organisation is accorded out of recognition of contribution (Pheysey, 1993). Managers thrive on competitive situations and actively pursue goals and targets. Managers constantly give direction and encourage participation of employees. Appropriate

leadership styles within the task-oriented culture are consultative (Likert, 1967) and rational achievers (Quinn & McGrath, 1958).

Bureaucratic organisational culture is based on following concepts: approval, conventionality, dependence, avoidance, and a lack of personal freedom (Xenikou & Furnham, 1996). Ladd and Herminger (2003) describe this culture as formal, with centralised decision making. This organisation is considered conservative or prudent. Leadership style is dominant and is described as autocratic (Lippitt & White, 1958). The manager's power is based on information control, and as a result, documentation and information management are actively pursued (Cameron & Quinn, 1999).

Competition/Confrontation organisational culture typifies oppositional orientation, power, competition, and perfectionism (Xenikou & Furnham, 1996). Since perfection is the main objective of the firm, then individuals may react negatively towards the ideas of others or resist new ideas. This organisation scoring high on this factor may be considered a perfectionist organisation (Ladd & Herminger, 2003). Its organisational structure is typically a hierarchical bureaucracy (Handy, 1985). Leadership style is described as authoritative (Likert, 1967). Managers tell subordinates what to do. Motivation is through fear of punishment, or reward or personal loyalty to an individual (Handy, 1985).

Companies whose cultures promote knowledge-sharing and individual learning have high employee retention, attract high-quality employees, and have a workforce that focuses on fixing the problem rather than fixing the blame (Jafari et al. 2007). The extent to which a propensity to exchange knowledge may be influenced by mutual trust (Connell & Mannion, 2006). According to Fichter (2005), Wikis work best in organisational cultures that provides a high level of trust and control for the users of the system.

Leadership style is a key input to understanding the culture of an organisation (Cameron & Quinn, 1999; Pheysey, 1993; Schein, 1985). As a result, depending on the type of organisational culture, a particular leadership style will be more prominent and appropriate than others (Cameron & Quinn, 1999). There are six distinct leadership

styles on a continuum (Flamholtz, 1986, 1990; Likert, 1961, 1967; Tannenbaum & Schmidt, 1958) that are adopted by managers. The basis of the continuum is the amount of freedom that the leader allows to others in making decisions.

These six styles divide into three style categories: directive, interactive, and nondirective as depicted in Table 2.1.

| Category | Style | Definition |
|--------------|-----------------------|---|
| Directive | Autocratic | Declares what is to be done without explanation. |
| | Benevolent Autocratic | Declares what is to be done with an explanation. |
| Interactive | Consultative | Gets opinions before deciding on the plan presented. |
| | Participative | Formulates alternatives with group, and then decides. |
| Nondirective | Consensus | All in group have equal voice in making decisions. |
| | Laissez-Faire | Leaves it up to group to decide what to do. |

Table 2.1 Leadership Styles and Categories
Source: Sutcliffe (1997)

In the directive style category, the manager states what needs to be done (Sutcliffe, 1997). An autocratic manager dictates orders to their staff and makes decisions without any consultation. The leader likes to control the situation they are in. Decisions are quick because staff members are not consulted and work is usually completed on time. However this type of leadership style can decrease motivation and increase staff turnover because staff are not consulted and do not feel valued. Autocratic leadership is not particularly suited to groups with high level skills and knowledge. The difference with a benovolent autocratic manager is that the leader gives a rationale with the order (Sutcliffe, 1997).

Interactive styles are deployed when the leader asks for the opinions of subordinates before deciding (Sutcliffe, 1997). In the democratic/participative style, the manager asks for group input in formulating plans and then the manager decides. A democratic/participative leadership style enables the manager delegates authority to his/her staff, empowering them by giving them responsibility to complete the task given

to them using their own methods. Involvement in the decision-making process, gives them a sense of belonging and motivation to improve the quality of work. When comparing high and low performing groups, those constantly high performing teams had a more participative and democratic style of leadership compared to low performing teams (Likert, 1961). However, its main weakness is that it can slow down the decision-making process because staff members need to be consulted.

In the consultative style (Likert, 1967) the manager asks for opinions on a tentative plan of action and then decides. A consultative leadership style can be viewed as a combination of the autocratic and democratic style of management. The manager will ask views and opinions from knowledge worker, allowing them to feel involved but will ultimately make the final decision (Vroom & Yetton, 1973). A democratic leadership style can slow down decision-making because knowledge workers need to be consulted. Nudurupati (2003) argues that a more participative and consultative leadership style is achieved due to improved visibility, reduced ambiguity and improved communications.

In the non-directive styles group, the manager lets the subordinates decide what will be done with or without any influence from the leader (Sutcliffe, 1997). In the consensus style, the group decides what to do with the leader participating along with other members of the group. A laissez-faire style is marked by a general failure to take responsibility for managing (Eagly et al. 2003). This French phrase means leave it be and is used to describe a leader who leaves his or her colleagues to get on with their work. In essence, the manager gives little or no direction or input unless directly asked for. Laissez-faire style can be productive when the group is well established and highly motivated with high degrees of skill and knowledge. On the contrary, it is a less useful style if the opposite is true of the group.

The culture of the organisation has norms concerning the appropriateness of leadership styles (Sutcliffe, 1997). Some styles are more highly valued than others (Morris et al. 1998). In organisations where the expectation is more participative, then directive leadership styles are disdained. They consider directive leaders to be dysfunctional, arrogant, and bullying (Sutcliffe, 1997). Other organisations prefer decisive action

because directive leaders are doing their job. These organisations feel some should lead and the rest should follow (ibid.).

2.1.4.1.5.1 Organisational Structure

Organisational structure has been linked as a way of studying culture (Handy, 1985). A flat organisation (also known as horizontal organisation) refers to an organisational structure with few or no levels of intervening management between staff and managers. The idea is that well-trained workers will be more productive when they are more directly involved in the decision making process, rather than closely supervised by many layers of management. This structure is generally possible only in smaller organisations or individual units within larger organisations.

A matrix structure features multiple reporting lines of where people with similar skills are grouped for work assignments (Handy, 1985). Teams are formed to solve particular problems. Power derives from expertise as long as a team requires expertise.

A hierarchical bureaucracy exhibits a role culture (Handy, 1985). Power derives from a person's position and little scope exists for expert power. It supports values such as control, rigidity, predictability, stability and order (Arad et al. 1997).

It is strongly contended that a flat structure, coupled with work teams and autonomy will promote innovation whereas specialisation, formalisation, standardisation and centralisation has the reverse effect (Arad et al. 1997).

2.1.4.1.5.2 Organisation Size

The European Commission (2006) defines small and medium-sized enterprises (SME) as follows. Firms with less than 250 employees and an annual turnover of less than euro50 million are medium-sized firms. Those with less than 50 employees and an annual turnover of less than euro10 million are small firms. Australian SMEs are typically organisations with an annual turnover of less than AUD 20 million and a staff of less than 200 employees (Australian Bureau of Statistics, 2004). Large organisations are those that exceed the above characteristics.

Literature indicates that organisation size is associated with IS success (Raymond, 1985). Burton and Obel's (2004) findings suggest that large companies experience more knowledge constraints than smaller firms. If size is measured by the number of people in an organisation, then it is impossible for everyone to talk to everyone else in a large organisation. Even so, Burton and Obel (2004) caution that the 'boss' in smaller organisations will eventually suffer from information overload. Innovative technologies change the way organisations communicate. Size is not only measured the number of employees but also in terms of the firm's activities related to products and processes (Burton & Obel, 2004). The complexity of organisational decision-making is increased with more people, products and processes. Organisation size increases uncertainty and this leads to an increased need in coordinating knowledge and information resources and may influence the choice of KMS. However, Harvie and Lee (2003) suggest that it is technological opportunities, rather than firm size, that explain firm innovativeness. This research will investigate if organisation size hinders the success of the corporate Wiki to support of knowledge work and reveal different adoption/acceptance outcomes.

2.1.4.1.5.3 Industry Sector

Organisational culture in private organisations and public organisations is said to have obvious differences due to the external environment characteristics shaping the boundaries and expectations of these organisations (Denhardt, 1991). This external environment consists of the economy and competitiveness to encourage continual changes in products, technology and customer preferences. The traditions of a particular industry will also have an impact. For example, airlines have "a combination of military-establishment and pioneering enthusiast spirit" (Normann, 1991, p. 164). Banks and bankers have a risk-averse nature, whereas stockbrokers have a deal-oriented culture (Wilson, 2001). These societal aspects provide the foundations upon which the corporate culture is developed. Most public sector organisations are technically classified as 'service industry' possessing strong cultures i.e. employees share common values (Chatman & Jehn, 1994). Increased pressures to improve the efficiency of government to run more like private entities, and increased public scrutiny of government organisations have led to changes in the culture of public sector organisations (Valle, 1999). This is evident in the Australian public sector which has

undergone a series of managerial reforms since the 1980s to achieve cost efficiency, budget accountability and improved customer service (Dixon et al. 1996).

2.1.4.1.5.4 Location

Wilson (2001) states that there are differences in cultural attitudes between geographical regions. These differences will affect commitment, respect for managers, attitudes towards service and the customer. Another characteristic is entrepreneurial attitude which is differentiated as the emergence of new companies/sectors or in the adoption/diffusion of innovation (Wennekers & Thurik, 1999).

Thorton and Flynn (2003) argue that entrepreneurial environments are characterised by thriving supportive networks that provide the institutional fabric linking individual entrepreneurs to organised sources of learning and resources. A lack of entrepreneurial activity or alertness is therefore directly connected to low rates of innovation, to unused profit opportunities and to risk-averse attitudes (Wennekers & Thurik, 1999). Due to the reduced levels of government aid and intervention, Australian SMEs are obliged to enhance private initiatives and entrepreneurship. Federation of Australian Scientific and Technological Societies executive director Bradley Smith says the Australian Government's policy needs to remain on knowledge transfer, international engagement and human capital development (Healy, 2008). David Henderson, managing director of the University of Queensland's research commercialisation arm, UniQuest, says more research needs to be done on the generation of new knowledge as opposed to the development and refinement of more established technologies because new technologies typically added considerably more value than improvements to old technologies (ibid. 2008). Harvie and Lee (2003) argue the case for government agencies to act as catalysts or facilitators of networks, or as mediators within networks. These networks are similar to innovative networks formed by the SMEs in the U.K. whose networks involve other SMEs to develop technical, marketing and manufacturing relationships and enlisting the aid of universities and private sector research institutes.

The concept of technology leapfrogging is another interesting phenomenon. The specific use of IT to accelerate development and economic growth is often referred to as technology leapfrogging (Davison et al. 2000). While a number of factors contribute to

it e.g. geography, capital markets, immigration and cultural influences, technology leapfrogging is attributed to government support and initiatives and the take up of these initiatives by universities, research institutes, public and private sector organisations. Without government support and funding, the economic development and technological innovation of a country can fall further behind in the globalisation and development race.

For U.K. enterprises, European Union (EU) enlargement demands increasing levels of competitiveness, financial autonomy, economic diversification and entrepreneurial attitude. Rodríguez-Pose (1999) categorises European regions in terms of ‘innovation-prone societies’ as those that initiate Research and Development (R&D) programs based on percentage of resources allocated to R&D, the nature of R&D activity, local economic structure, local productive factors, capacity of assimilating/transforming internal/external R&D into economic potential. The high level of entrepreneurship is a result of EU integration and cohesion policies and ‘imitation’ (Schmitz, 1989). The Lisbon 2000 vision considers ICT as one of its ‘economic pillars’ which is closely connected with the expected productivity gains arising out of a higher ‘ICT intensity’ of the European industry and services, thus helping to bridge the existing gap with the US, Japan and the other Far Eastern Countries (e.g. Korea, India and China) (COM, 2005). The objective of increasing investments in R&D from 1.9% to 3% of GDP by 2010, set out in Lisbon agenda to bridge the gap between Europe and its main competitors, calls for a particular effort (almost two thirds of this percentage rate) from the private sector.

The EU has implemented a Research Framework Programme 2007 – 2013 (FP7) which provides new impetus to increase Europe’s growth and competitiveness, recognising that knowledge is Europe’s greatest resource. The EU proposes in particular to double the FP7 budget compared with FP6, rising to EUR 67.8 billion over the period 2007-2013. The funds will reinforce career prospects and mobility for EU’s researchers in Science and ICT, by stimulating activities supporting individual researchers, referred to as ‘Marie Curie’ actions, to be reinforced with the aim of strengthening the human potential of European research through support to training, mobility and the development of European research careers. Other activities that will be supported to enhance research and innovation capacity throughout Europe include: research

infrastructures; regional research driven clusters; stimulating the research potential in the EU's 'convergence' regions; clustering regional actors in research to develop 'regions of knowledge' by bringing together research partners – such as universities, research centres, enterprises and regional authorities - in a region to strengthen their research potential; research for and by SMEs; 'science in society' issues; 'horizontal' activities of international cooperation (European Commission, 2006).

The EU's open borders policy has made Britain set to become Europe's most highly populated nation within two generations (The Times, 2008). Schwartz and Leyden (2003) stress that the diversity factor gives evidence to ethnic, cultural, lifestyle diversity, all of which leads to 'tolerance', 'openness to change' and 'innovation'. Abramowitz (quoted in Liñan-Alcade & Rodríguez-Cohard, 2004) adds that in the absence of tenacious societal characteristics which accounts for a country's past failure to achieve as high level of productivity as economically more advanced countries, to make the full technological leap, will see the need to catch up.

Margaret Archer characterises globalisation as a "multifaceted process entailing a growing worldwide interconnectedness of structure, culture, and agency and a parallel de-differentiation of traditional boundaries" (Kallaway et al. 1997, p. 114). The phenomenon of globalisation can be viewed from a number of perspectives: flows of goods and services, direct investment and other capital flows, the transfer of knowledge and/or technology, and the movement of people. For the purpose of this thesis, we will focus on the transfer of knowledge and/or technology.

Globalisation is tied to the greater ease with which new knowledge and technologies are transferred across international boundaries. Since the work products in many information-based and knowledge-based industries can be readily transmitted over high-speed computer networks, the physical location of the workforce is increasingly less relevant. Work teams and their work products are connected by the Internet and collaborative Enterprise 2.0 technologies to allow coordination across geographically dispersed entities connected through electronic networks. Firms must compete not only with potential rivals in the domestic market but also with those overseas. Such forces will spur innovation and adoption of technologies and production processes that can

reduce cost. For example, the trend toward vertical disintegration of the firm through outsourcing and the shift to high-performance workplace practices and associated compensation systems can be linked to globalisation (Kanoly & Panis, 2004).

2.1.4.1.5.5 Age of Workers

Generational differences can have a large impact on KM and organisational behaviour. When people learn that they each bring a different set of preferences (such as generational work styles, core values, and communication differences) to the workplace based upon their personal histories, and they apply this newly learned knowledge in all of their relationships, with colleagues, management, and even with clients (Cataldo, 2007). While many researchers disagree on the exact date, much of the current workforce consists of four generations. The workforce can be categorised into generations by their birth years. They are the Veterans/Traditionalists, born before 1945; Baby Boomers (1945 – 1960); Generation X (1961 – 1979); and Generation Y (1980 onwards) (Fuangvut & Hasan, 2005; Jorgensen, 2003).

Generation Y workers are reputed to be technologically savvy, over-confident and easily bored. They expect success and a high salary early in their career (Fawcett, 2008). In contrast, Generation X tends to be sceptical due to corporate re-structuring and the demise of lifetime employment (Bogdanowicz & Bailey, 2002). Generation Xers are technologically savvy and may change jobs to pursue life-long learning. They are highly individual workers who consider their knowledge capital to be personal and not corporate assets. Their knowledge consists of the knowledge of several firms and are likely to take the knowledge when they leave the organisation. Their predecessors, Baby Boomers have conservative values, may have a tendency towards technophobia and they are proficient in firm precise private knowledge (Bogdanowicz & Bailey, 2002). A sure sign that Generation Xers and Baby Boomers are gravitating to Web 2.0 technologies in the social arena, is evident from the way politicians and marketers are embracing them, looking to mine the digital world for votes and dollars. Thousands of politicians worldwide from all political persuasions have posted MySpace pages, from the Labour Party's Kevin Rudd also known by his moniker as Kevin07 on MySpace to Bob Brown of the Greens Party (Howarth, 2007). Social networking sites are projected to get \$280 million in advertisement dollars from political and apolitical sources and

\$385 million for video-sharing sites like *YouTube*. Veterans have a higher level of satisfaction, pride and willingness to go the 'extra mile' for their jobs and value loyalty to employers than younger generations (Fawcett, 2008).

The development and implementation literature advocates user-centred design practices that suggest that analysts must first gain a fundamental understanding of the user, including his or her needs, wants, and expectations about new systems (Morris et al. 2005). Studying the potential effect of age may provide key insights into how different individuals in organisations may think and make decisions differently when it comes to technology adoption and use.

In a technology adoption context, the key behaviour of interest is use of the system; therefore, attitude toward behaviour is an employee's affective evaluation of the costs and benefits of using the new technology (Morris et al. 2005). Younger workers place importance on opportunities for promotion above other job-related factors compared with older workers. Posner (1996) suggests that cognitive abilities decline with age, so older individuals may believe that the relative benefits that might accrue to learning something new (e.g., new technology) may not be worth the incremental effort required which may explain their decision to use (or not use) new technology (Venkatesh et al. 2000).

For older workers, new technology is perceived to be easy to use, if it requires little or no formal training or if the information presented was complex or in a new unfamiliar cognitive domain. They consider it important to receive personal tutoring which includes help and assistance on the job (Morris et al. 2005). User interface design strategies such as using windows or particular types of menu structures may be especially beneficial for older workers in that they decrease the individual's requirements to maintain information in working memory (Morris et al. 2005). These factors will be more important in their decision to adopt or reject that technology than it will for younger workers.

Perceived usefulness of the technology (see section 2.1.4.2.1) is regarded highly by all workers (Morris et al. 2005). This suggests that training and managerial interventions

should be appropriately targeted to ensure that the new technology is received well by all user constituencies. Early perceptions can have a lasting impression on individual intentions and behaviour.

2.1.5 Socio-technical Approach

Authors who see KMS as a computerised solution place too little emphasis on knowledge creating activities (Grundstein & Rosenthal-Sabroux, 2007), that “take place within and between humans” (Davenport & Prusak, 2000, p. 6). Several commentators focus on the nature of knowledge such as the way scientists form and create knowledge and the way social structures and relationships between people are central to the ownership and crafting of knowledge (Roth, 2002; Wenger, 1998). Alavi and Leidner (2001) observe that although IS and KMS may not be very different, but the subtle and important difference is the attitude towards and the purpose of the systems. An IS may process information without engaging the users, a KMS must engage a user perspective to help users understand and assign meaning to the information (Stenmark, 2002). If knowledge is bound up with human cognition, and it is created, used, and disseminated in ways that are inextricably entwined with the social milieu (Thomas et al. 2001), I propose a mixed, people/machines process, a socio-technical process of KM that is more appropriate for KMS implementation such as a corporate Wiki.

From a computerised KMS perspective, there appears to be far more emphasis on technological aspects of delivery than on engaging knowledge workers in identifying real needs and participating in democratic knowledge creation and diffusion (Hildreth & Kimble, 2002). The challenge for research and practice in the field of IS is that it can no longer employ traditional analysis and design approaches to the new socio-technical organisational systems where knowledge workers may choose to use social technologies such as blogs and Wikis to develop them as end-user applications. This may be perceived as a threat to shift the core focus of IS research and practice but may be an opportunity for IS to re-invent itself to be relevant for the 21st century (Hasan & Pfaff, 2006a).

Trist and Bamforth (1951) propose that manufacturing and other systems have technical and social sub-systems that are tightly bound and interconnected and together make up an organisation. The technical system includes machinery, processes, procedures and a physical arrangement needed to transform inputs into outputs in a way which enhances the economic performance of the organisation. The social system includes people and the knowledge, skills, attitudes, values and needs they bring to the work environment as well as the reward system and authority structures that exist in the organisation.

Given the social nature of knowledge and learning and the limitation of computerised KMS to overcome the cultural barrier of giving up personal knowledge (Fischer & Otswald, 2005; Bromme et al. 2005; Bollinger & Smith, 2001; and Scott, 1998), Mumford (1978) extends the socio-technical philosophy with her Effective Technical and Human Implementation of Computer-based Systems (ETHICS) participative and ethical approach to systems development. Work environments need to be perceived from a perspective of socio-technical infrastructures where the technology cannot be separated from social and other non-technological elements (Björkstrand & Lallimo, 2005).

Land (2000) cautions that there are two sometimes conflicting set of values that underlie much of socio-technical thinking. The first is a belief in the importance of humanistic principles which is to enhance the quality of working life and the job satisfaction of the knowledge worker. When these objectives are achieved, productivity and yield will increase and bring added value to the organisation. The second support managerial values which see socio-technical principles as instruments to achieve economic objectives. The second is unconcerned about humanistic objectives but they are condoned if their achievement produces a better performance from knowledge workers fulfilling economic objectives.

I disagree with Land (2000) that these two sets of values are conflicting because the organisation that adopts a socio-technical approach to a corporate Wiki implementation would mean that knowledge workers and managers are both fulfilling their objectives which explains why socio-technical principles influence much of IS thinking even if it is not always referred to as such (Avgerou et al. 2004).

2.1.6 The Learning Organisation

As organisations focus on the key role of managing competition and market forces to encourage profits, efficiency and quality of service, they are subjected to rapid and traumatic changes. These changes penetrate every aspect of organisational management, business processes and accounting. The experience of living in a situation of increasing change came along with the need for learning and the notion of the learning society was born (Schön, 1967). The concept of the learning organisation (Senge, 1990) became popular in the 1990s. This thesis adopts Schön's view that that any organisation (companies, social movements and governments) can be a learning organisation provided they perceive the need to learn and adapt in the face of uncertain environmental changes, but achieve balance between change and stability. This agrees with De Laurentis' (2006) research, even low tech industries such as food production, machinery, printing and publishing, wood products and a range of services can become knowledge intensive and are capable of becoming learning organisations. According to her, these industries are intensively making use of scientific knowledge and their production systems are based on knowledge distributed across agents, institutions and knowledge fields.

For effective learning to take place, an organisational environment that nurtures learning needs to be in place. Li and Montezemi (2003) conclude that an organisation's transfer of knowledge and its ability to become a learning organisation is critical to company innovation and competitiveness. Enterprises cannot change to become a learning organisation automatically because this will introduce tensions and confusion in the complex and dynamic working environment, which are not conducive to organisation learning (Karash, 1994).

The corporate Wiki provides a boundary-less environment that is required by learning organisations to facilitate team collaboration and knowledge sharing. When an organisation develops the continuous capacity to adapt and survive in an increasingly competitive environment because all members take an active role in identifying and resolving work-related issues, it has developed a learning culture. A learning organisation is one that is able to adapt and respond to change. Corporate Wikis are all

about user modification. Corporate Wikis are streams of conversation, revision, and amendment.

2.1.7 Sensible Organisation and the Network-centric Approach

Hasan et al. (2007b) introduces the concept of the sensible organisation which is closely related to the sense-making view of organisations (Cecez-Kecmanovic & Jerram, 2002; Weick, 1995). Sense-making is concerned about “making information available to everyone who needs it, in a form that they can use, in a secure and timely manner”; and “turning pieces of information into situation awareness requires the expertise and experience of many” (Albert & Hayes, 2003). It is at the intermediate level that is, at the team/group/unit, that sense-making is most apparent in knowledge work activities. There is a requirement for sense-making points to be network-centric where information and knowledge sharing and simultaneous collaboration are encouraged in flatter hierarchies and de-centralised decision-making environments.

Network-centricity has six capabilities: global connectivity; real-time collaboration; self-directed teams, de-centralised decision-making, information sharing culture and ubiquitous access, interaction and information sharing that leads to shared situational awareness (Albert & Hayes, 2003). A sensible organisation tries to achieve these goals by having lean or flat hierarchies, where management’s major role is “to create learning-oriented partnerships within the firm and among network members,” and leadership is viewed as “a shared responsibility among colleagues, not as a superior–subordinate relationship” (Miles & Snow, 1995).

In a network-centric organisation, informal social networks spontaneously emerge in response to a given situation and supersede formal organisational structures, such as those depicted in organisational charts (Ali et al. 2004). Rather than issuing orders what, when, where and how to do it, the network-centric model leaves the decision-making process known as self-synchronisation to the team/group/unit to decide for themselves (Albert & Hayes, 2003).

The notion of a sensible organisation which is based on the network-centric model is a more holistic approach that empowers knowledge workers because it encourages

knowledge workers to interact with a KMS automatically and effortlessly as part of their daily activities of acquiring and sharing knowledge and applying this learning to decision-making. They are pooling collective intelligence (see section 2.3.2.3) and stimulating creative thought to improve work performance.

Managers of the sensible organisation will do well to become facilitators of a network-centric world by sharing and aligning the organisation's vision for the future and sustaining a sense of community and strong democratic open culture. While the corporate Wiki has potential benefits for corporate use, conservative organisations have to overcome the hurdles to long-held assumptions about the best way to do things; and continuously seek improvement by allowing knowledge workers to appropriate them as suitable tools for knowledge work activities. However, governance needs to be in place to allay those long-held assumptions, without stifling the emergent, participative nature of how the new tools create value for organisations.

2.1.8 Organisational Learning

The practice of organisational learning involves developing and taking part in tangible activities that will change the way people conduct their work (Senge et al.1994). No one, including a highly charismatic teacher or CEO, can train or command someone else to alter their attitudes, beliefs, skills, capabilities, perceptions, or level of commitment (ibid, 1994). The collaborative effort of building a corporate Wiki is a tangible activity that may bring about technology innovations, and new management ideas and methods, to help knowledge workers develop an enduring capability for change.

There seems to be two ways to look at organisational learning, the technical or social perspective (Smith, 2001). Argyris and Schön's (1978) work on single and double loop learning are identified as the technical perspective. They argue that much of the learning done in an organisation is single loop or adaptive learning because the underlying program is not questioned as it is designed to identify and correct errors so that the job gets done and the action remains within stated policy guidelines (ibid, p. 113). Double loop learning or generative learning means that learning takes place due to continuous experimentation and feedback in an ongoing examination of the very way organisations go about defining and solving problems (Malhotra, 1996).

According to the social perspective of organisational learning, organisational learning can be described as an activity that occurs mainly in a community (Nonaka & Takeuchi, 1995). Knowledge acquisition is seen as an appropriation from others through that social structure (Lave & Wenger, 2000). To understand what social technologies are, we have to understand the social nature of learning that has the tendency to be informal and responsive in nature, and operates within a social and cultural context. We also need to understand the knowledge processes that govern its construction and nurturing in an organisation. Recent writing emphasises the social nature of learning and that people learn best when they are in a social setting (Lea et al. 2006; Oblinger, 2006). It is these characteristics that underpin the concept of Communities of practice (COP) (Wenger et al. 2002).

2.1.9 Communities of Practice (COP)

COP (Wenger, 1998; Lave and Wenger, 1991) take a social constructionist view of knowledge where knowledge is created, nurtured and sustained (Hildreth & Kimble, 2002). Lave and Wenger (2000) depict learning as a legitimate peripheral participation (LPP) in a COP which can assist the creation and sustenance of explicit and tacit knowledge. Learning and participation are not seen as separated but are bonded together (Roth, 2002). Explicit knowledge is articulated and practised through participation i.e. by performing tasks. Tacit knowledge is developed and learnt through social interactions with community members because learning the language and unspoken conventions of the community cannot be learnt by demonstration or instruction. LPP is a process where newcomers enter the community from the periphery and move toward the centre as they become more and more knowledgeable (Bødker & Petersen, 2000). Explicit knowledge can be articulated and may be exemplified by tasks the members of a COP perform (Wenger, 1998).

Creating knowledge in a peer-to-peer community is not unlike engaging in a broad range of collective pursuits that enhance group welfare. Building roads and public transportation, providing national defence, and organising a grassroots community initiative, share elements of a collective action problem. This problem occurs when one person cannot be excluded from the benefits that others provide. Each person is motivated not to contribute to the joint effort, but to free-ride on the efforts of others. If

all participants choose to free-ride, then the collective benefit will not be produced. The fact that well-organised groups of all kinds frequently manage to overcome the free-rider problem suggests that collective action problems can be solved (Tapscott & Williams, 2006).

2.1.10 Communities of Interest

Communities of Interest (COI) are defined as a collaborative group of users who interact online to exchange and share information/knowledge in pursuit of their shared goals, interests, missions, or business processes. The organisation's culture is demonstrated through its social network, whose nodes are individuals and whose links represent various social interactions. COIs organise information/knowledge created to assist in implementing net-centric information sharing. Their members are responsible for making information visible, accessible, understandable, and promoting trust – all of which contribute to the data interoperability necessary for effective information sharing.

The difference between a COI and COP is that a COI is an online community where the primary value is based on the personal or social interests of its members (Morrison, 2006). COI such as Wikipedia (Kolvenbach et al. 2005), Social Networking sites (SNS) and YouTube provide a useful starting point for finding answers to questions regarding content, sharing ideas and comments and meeting people with similar interests. A COP, on the other hand, is an online community, where the primary value is based on professional interests and is created in the course of members performing their jobs (Morrison, 2006). Corporate Wikis are used to support a COP (Kolvenbach et al. 2005).

2.1.11 Information Commons

Traditionally, the channels of information have been controlled by individuals, or corporation cartels which have wealth and influence (O'Reilly, 2005). It is a different story in the Information Age, contends O'Reilly. Enterprise 2.0 tools "have an implicit architecture of participation, a built-in ethic of cooperation, in which the service acts primarily as an intelligent broker, connecting the edges to each other and harnessing the power of the users themselves" (ibid, p. 2). Multi-disciplinary studies (Benkler, 2006; Tapscott & Williams, 2006; Drucker, 1998) have publicised that we are in the midst of a

technological, economic, and organisational perturbation, innovation, and transformation that allows us to rethink, renegotiate, and redefine learning, working, and collaboration. One of the fundamental changes taking place is the democratisation of knowledge creation, innovation, and creativity (Hasan & Pfaff, 2006b; O'Reilly, 2006; von Hippel, 2005) due to the creation of the Internet. The Internet has lowered the entry barrier for participation and taken a break from traditional media (Hasan & Pfaff, 2006a).

Benkler supports the notion of a peer production information commons (Benkler, 2006) functioning as common spaces where people can share experiences and have unanticipated, un-chosen exposures to the ideas of other people. Benkler (2006) says that online cooperation is facilitating a new mode of production called peer production, which lies beyond the two classic pillars of economics, the firm and the market. Peer production refers to open-source software, file-sharing, and customer ranking. For example, Amazon's customer product reviews allow customers to rank products, creating value neither with the assistance of conventional corporate oversight nor market incentives such as payment. The advantage of peer production is in the allocation of human creativity because of the high cost of specifying the resources required to execute a complex task (Tapscott & Williams, 2006). Rheingold (2002) sees a common thread in such disparate innovations as the Internet, mobile devices, and social software/technologies as the makings of a new economic order.

Hardin (1968) who popularised the notion of the tragedy of the commons said that the commons is not sustainable. He notes that public resources, from pastures and national parks to air and water, inevitably get overused as people act in their own self-interest. I disagree. It is my view that a corporate Wiki can become a sustainable information commons. We now live in a world where an information commons can be easily created and efficiently sustained using new tools for collectively creating, modifying and sharing knowledge (Hasan & Pfaff, 2006a). The same democratising effect will be true of social technologies. A corporate Wiki represents the power of many and this power is distributed collectively to improve content quality (Hasan & Pfaff, 2006a). Each author is able to change the contributions of other authors, refining the quality of the

knowledge assets. These new tools need to be taken seriously as a highly efficient and creative force in production (von Hippel, 2005). Democracy raises public awareness of issues such as openness, freedom of information and public accountability (Benkler, 2006).

2.2 Social Technologies

In this section, I begin by focusing and critically analysing social technologies that are relevant to my research. This involves looking closely at some of the human and social factors that are involved in the creation and communication of knowledge. As discussed in Chapter 1, there has been insufficient attention to both research areas and applied techniques in relation to corporate Wikis. The goal is to broaden what is important and relevant for KM.

Social technologies, also known under the rubrics such as social software, social and/or conversational technologies, has received increasing attention over the last few years. Examples of social technologies include discussion forums, Wikis, and Weblogs or blogs (Wagner & Bolloju, 2005). Social technologies provide computer-mediated environments that use applications such as Wikis and various web-based groupware systems like blogs and discussion forums that support new forms of informal, network-centric interaction and activity between people, allowing and enhancing informal access to create and distribute information (Hasan & Pfaff, 2007a). These technologies empower ordinary people to have a global presence for business, political and social purposes representing the rising digital democracy where participants move from playing peripheral to central roles entails the extension, synthesis, and production of new knowledge. They give users a new flexibility and independence to support collective actions, knowledge sharing and decision-making by self-directed teams (Hasan & Pfaff, 2007b).

2.2.1 Stories and Storytelling

Social technologies support the concept of knowledge as the social practice of knowing, where knowledge is considered to be embedded in a community rather than just in one individual (Boyd, 2006). Words gain sense only through actual use in a community, meanings are symbolic and inherently ambiguous, and the power of social processes, storytelling and conversation is emphasised (Boland & Tenkasi, 1995).

Much of the knowledge that is shared among members of communities and organisations is exhibited only in the telling of stories in spoken conversations. For example, business managers instinctively tell stories to help motivate their employees and knowledge workers share knowledge by telling stories in small, face-to-face groups. Stories and storytelling invoke creativity in individuals and groups, and provide a valuable way of presenting and communicating knowledge. To avoid defensiveness and defensive countermeasures that may arise from direct communication, stories are a natural way for small groups of trusted colleagues to exchange information (Boyd, 2006).

While support for storytelling in organisations has been long recognised as important to effective KM (Klein, Connell & Meyer, 2007; Gordon & Ganesan, 2005; Snowden, 2000b), few attempts have been made to specifically support storytelling through technology. The broadest application of story-extraction technology may be in its application to written text particularly when applied to personal accounts of the events in people's lives such as blogs. The role of blog technology is to support the capture of stories from written conversations and present stories or analysis of stories to a wider audience. Gordon and Ganesan (2005) advocates a different vision for KMS to one that is specifically targeted to the capture and use of the stories told in communities and organisations in the context of normal, spoken conversations.

To survive in a world which is fast paced, competitive, and global, Snowden (2000a) believes that organisations need to use technology to take storytelling to the next level. Snowden (ibid) reports of several business cases in which the use of various types of stories has helped to produce breakthroughs where stories are collected and arranged into scenario-based learning systems (Schank, 1997). Stories can be used to help establish or change corporate culture. Stories generating scenarios can be used to help

organise the design process and keep it focused on real customer needs. Scenarios can also be a useful way for team members from different functions to see how they can relate to solve a problem.

2.2.2 Conversation

Constructivist learning theorists suggest that KM is not just a matter of getting the right knowledge to the right people at the right time; instead learners need to be given autonomy to pursue learning goals and extend knowledge. People need to engage with knowledge and learn knowledge (Leidner & Jarvenpaa, 1995; Vygotsky, 1962). The process of expressing knowledge aids its creation and conversations benefit the refinement of knowledge. Vygotsky stresses that learning and insight have a significant social component. Dialogue offers learners the opportunity to construct and organise knowledge (Vygotsky, 1978).

Even with the advances in information retrieval, the preferred method for obtaining information is still to ask a colleague. The reason is that conversation is an intrinsic part of being human. People portray themselves through conversation. Personal agendas, personal style, praise, blame and acknowledgements are achieved through conversations. The social nature of talk is not an undesirable side effect, but rather the heart of it: personal motivations fuel conversation and provide the energy for the considerable intellectual work it takes (Thomson et al. 2001).

Hallway conversations and computer-mediated conversations are central in transforming tacit knowledge to explicit and documented knowledge. Conversational KM fulfils this purpose because conversations, e.g. questions and answers, become the source of relevant knowledge (Cheung et al. 2005). Conversation is an essential medium to knowledge creation, validation and dissemination. It is a superb method for eliciting, unpacking, articulating, applying, and re-contextualising knowledge (Thomson et al. 2001). Clark (1996) agrees with the view that the art of conversation is a deeply interactive intellectual process. People turn information into knowledge by making comparisons, thinking about potential consequences, making connections, and discussing the information with other people (Davenport & Prusak, 2000). It is during the process of discussion a common ground of understandings, shared experiences, and

past history are established. During conversation, conversationalists are continuously attempting to interpret what is said, verify what has been understood, and offer new contributions. When misunderstandings occur, conversationalists attempt to correct them by rephrasing their words, or refer to previous conversations to reveal if their perceived understanding was accurate.

Conversation and other types of human-human communication must be exploited in today's KMS so as harness the value of conversation in packaging and transmitting tacit knowledge. In other words, if you can talk about it, you can write about it and if you can write about it, you can share it. The capability of social technologies to capture knowledge through conversations and storytelling by making it permanent is of great importance to the organisation's purposes. Its ability to represent information in plain text and build relationships between content in a knowledge repository (ibid, 2006) lends it a permanent quality. Permanence expands conversation beyond those within earshot, rendering it accessible and supporting collaboration to those in other places and at later times to web-based intimate or vast audiences. Social technologies allow conversations to be searched, browsed, replayed, annotated, visualised, restructured, and re-contextualised, bearing profound impact on social, technical, legal and management practices.

2.2.3 Social Capital

Social technologies “succeed by harnessing communal knowledge and social capital of groups by supporting the natural process of conversation and documenting its results” (Wagner, 2006). According to Baron et al. (2000), social capital is another term for social networks, the reciprocities that arise from these networks and the value of achieving mutual goals. To put it simply, social capital is the collective value of who we know and what we will do for each other (Kouzes and Posner, 2007). Effective community involvement, especially horizontal involvement and networking, are key elements in the building of social capital (Putnam, 2002).

2.2.4 Knowledge Sharing

Knowledge sharing requires a restricted element of learning (Boer et al. 2002). Wasko and Faraj (2000) defines knowledge sharing as a “social process through which

individuals try to establish a shared understanding about reality, by using diverse combinations of signs (e.g., language, gestures, illustrations) and tools (e.g., physical objects, communication technologies, mental models).” The corporate Wiki can be a cognitive learning tool to help novice knowledge workers think in appropriate ways. Cognitive tools include characteristics such as semantic organisation, dynamic modelling, information interpretation, knowledge building and conversational tools (Jonassen, 1996). All these characteristics are inherent in the corporate Wiki and can act as “scaffolds to support the learner’s exploration, articulation and reflection in the environment” (Jonassen & Rohrer-Murphy, 1999).

Corporate Wikis as social technologies encourage more interaction between knowledge workers; a feature that many theorists argue is vital in active learning engagement and builds communities of learning (Wenger, 2000). Repositories for the storing and retrieval of organisational knowledge are of lesser importance than communication. When it comes to developing ways of working with novice knowledge workers to further enhance their uptake of organisational knowledge, organisations need to carefully consider sub-cultural practices and work with existing communities of practice within such populations (see section 2.1.6), rather than just engineer traditional support groups.

Many managers and decision-makers from traditional hierarchies have failed to grasp the gains that can be made by providing social technologies which capitalise on already established social networks. Social technologies based on such networks are well-placed to expose business content and provide value to the organisation. Where the corporate Wiki is concerned, user expectations and demand are growing because it is unconstrained by such organisational structures (see section 2.1.4.2.5.1) and silo mentalities. Organisations are coming under increased pressure to provide such capability to their staff and are now well-established to take advantage of a familiar social tool. It is argued that the corporate Wiki is not affected by weak inter-unit ties with other sub units that will help a project team search for useful knowledge including the transfer of complex knowledge. This allows the collection and sharing of new ideas and practices in a way that leverages pockets of expertise across the workforce.

In essence, the power of storytelling, conversation and social networks is emphasised and social technologies that are considered to support this kind of knowledge sharing are Wikis, blogs and discussion forums (Wagner, 2006). Social technologies facilitate processes where knowledge creation and storage is carried out through a discussion forum where participants contribute to the discussion with questions and answers, or through a blog which is typified by a process of storytelling or through a Wiki using collaborative writing (Hasan & Pfaff, 2006a).

The next section begins by comparing the different technology innovations which comes under the umbrella of Enterprise 2.0 to distinguish what is new about Wikis beyond other innovations and if there any differences. Choosing among competing technology innovations are difficult because most technology innovations require complementary inputs of other technologies and techniques to be useful, and are substitutable in some degree for one another (King et al. 1994). Therefore, the next section will look at past research to see if a Wiki can support knowledge work and if it is a better choice as a KMS as opposed to other social technologies such as a blog or a discussion forum.

2.3 Technology Innovation

Innovation is the process whereby an invention moves into usable form and it is also important to note the inventions' ability to diffuse which is its capacity to produce and/or use an innovation, and its use in practice (King et al. 1994). This research is focused on the technology innovation of social technologies such as the corporate Wikis which are only now moving from the social to the corporate arena.

Organisational learning is increasingly analysed as an *interactive process*, with feedback to and from organised R&D whether in the private or public sector (EC, 2006). To understand this process within organisational environments where outcomes are heavily influenced by internal and external social and technical factors, one must understand that successful innovations are surrounded by a social process of improvement where innovators 'learn by doing' as they build and improve the products

(Arrow, 1962), users of those products ‘learn by using’ the products effectively (von Hippel, 1976, Rosenberg, 1982), and both producers and users ‘learn by interacting’ with one another (Lundvall, 1988).

Organisations do not innovate in isolation, but they rely upon on a continuous and local interaction with other subjects and thus with their environment (Nonaka, 1991). This process can be the result of investments on new technology, but also the outcome of personal interaction with users and suppliers or within networks of firms (EC, 2006). In this case, a key factor in the development of innovations is tacit and not just explicit knowledge (Nonaka, 1991).

2.3.1 Groupware

Although the focus of this thesis is on corporate Wikis, I wish to acknowledge at the outset that social technologies and collaborative work are not new ideas exclusive to Wikis. Groupware is a generic name for computer systems and applications that support collaborative work. There is a whole body of research on technology on innovation on groupware (DeSanctis & Poole, 1994; Orlikowski, 1992a) and Computer-supported Cooperative Work (CSCW) work on collaborative technologies. CSCW (Greif, 1988) is the study of tools and techniques of groupware as well as their psychological, social and organisational effects. Rama and the others (2006) state that time criteria define the restrictions placed on the time of collaboration. Synchronised collaboration must happen in a structured manner at the same time to handle locking and collision detection in real-time e.g. telephone calls. Collaboration can happen entirely unsynchronised. Unsynchronised groupware supports people working together, completely separate from each other e.g. voice mails. Collaboration only occurs when requested from a user, otherwise all work performed does not affect other collaborating users. Mixed collaboration can be either synchronised or unsynchronised e.g. messaging systems. Instant messaging is synchronous while email is asynchronous. Serial collaboration is unsynchronised with the exception that one user must perform a specific task before another user can continue with another task. Microsoft SharePoint is a classic example of serial collaboration.

Studies have been done about the successes in collaborative technologies, such as the web and email and increasing corporate use of Lotus Notes (Twidale & Nichols, 1998; Orlikowski, 1992a). Consider the e-mail and its asynchronous, informal nature. The main impact of email is its flexibility. It enables anyone to disseminate information rapidly and reduce use of fax, post, and telephone. It also transmits documents, increasing the ability to work away from base (Sillince et al. 1998). Lotus Notes is a client-server platform for developing and deploy groupware applications. It combines e-mail and computer conferences with database features allowing users to access, track, share documents (Lou, 1994). Orlikowski (1992) examines the implementation of the groupware product Lotus Notes to investigate whether and how the use of a collaborative tool changes the nature of work and the pattern of social interactions in the office. Change in the use of a collaborative technology or an introduction of a new collaborative technology will have an impact on users because it causes them to make additional changes and adaptations e.g. adjust learning and communication patterns, increase or decrease participation and changes in group cohesion (DeSanctis & Poole, 1994). Orlikowski (1992a) suggests that a particularly central aspect of implementing groupware is to ensure that users perceive the technology as a collective rather than a personal tool.

However, it has been suggested that implementation of such technologies is difficult and yields unexpected challenges than is typically acknowledged (DeSanctis & Poole, 1994; Orlikowski, 1992b). For example, e-mail has limitations as a tool for collaborative work (Creese, 2007). First, it typically managed by individuals. It is hard to track conversations among multiple parties, making it difficult to build institutional memory (Hasan & Pfaff, 2006a). Second, there is no shared information space because it is a point-to-point communication medium. If the recipient list is too large, it contributes to email overload (Easterbrook, 1996). If it is too small, this leads to communication gaps and 'information silos' in the organisation, where one group in the company does not really know what the other group is doing. Third, it is stored separately from artefacts and its contents are more difficult to access. As a result, users must supply more contextual information along with their message (Sproull & Kiesler, 1986). Lotus Notes is often seen to be difficult to understand and to describe, (see e.g.

Bannon, 1993). It has been criticised as not extending productivity beyond any email system and requires mastery of the tool to understand its inherent value (Lou, 1994).

Human Computer Interaction (HCI) research and the design and development of more usable interfaces have been substantially enriched CSCW research. HCI is concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding humans (Hewett et al. 2004). Insights from psychological theory and the methodologies developed allow a deeper understanding of issues in differing circumstances. This allows system designers to design a system that a person will find easy to learn, understand and use.

Disciplines like CSCW and HCI provide some interesting views on the social contexts within which knowledge work occurs, and the social factors that seem to be important in supporting knowledge work. A variety of social factors such as the infrastructure of the organisation, its leadership style (see section 2.1.4.2.5), the grouping of actors within interest groups and the role of common ground may affect the social context of KM and influence IT uptake (Olson & Olson, 2000; Hackney & McBride, 1995). For example, a greater shared background and awareness of a co-worker's activities and mental state contribute to establishing and maintaining common ground. In addition, the social and technical infrastructures need to be considered historically since previous experience will influence current activity. Human emotions play an important role in knowledge sharing and for human behaviour in general. The kind of emotions an individual feels is largely dependent on his/her own experiences or history and cultural environment (Wittgenstein, 1997).

2.3.2 Web 2.0

There seems to be much debate over what is the distinction between Web 2.0 and Enterprise 2.0. Some have said that Enterprise 2.0 is really just an extension of the original ideas of Web 2.0 and does not warrant a special moniker. Others disagree. The distinction between the two terms can be simplified if Web 2.0 is seen as inherently individually or consumer focused while Enterprise 2.0 is inherently organisationally focused. The public is motivated by user centricity when it interacts with Web 2.0

technology while the organisation is motivated by data centricity when it interacts with Web 2.0 technology.

Web 2.0, also known as Social Computing, is based on creating or recreating social conventions and social contexts online through the use of software and technology. Web 2.0 is consumer appealing because it adopts four principles (Wei, 2006):

- architecture of participation;
- social networking;
- collective intelligence; and
- HTML mashup.

2.3.2.1 Architecture of Participation

The term ‘architecture of participation’ describes the nature of systems that are designed for user contribution (O’Reilly, 2005). Its content can be more easily generated and published by users, and encourages more democratic use (Boulos & Wheelert, 2007). Web 2.0 “has an implicit ‘architecture of participation’, a built-in ethic of cooperation, in which the service acts primarily as an intelligent broker, connecting the edges to each other and harnessing the power of the users themselves” (O’Reilly, 2005, p. 2). The Internet has lowered the entry barrier for participation and taken a break from traditional media (Hasan & Pfaff, 2006a) where ordinary people can become journalists and media designers.

2.3.2.2 Social Networking

It is social networking that makes Web 2.0 the people-centric Web because people tend to affiliate on the basis of their interests, preferences and attitudes (Robinson, 2006). Social networks have always been part of the informal structure of organisations and the wider community. The people who are friends, relatives, neighbours, people we come across at work or play, or members of face-to-face communities are part of the traditional forms of social networks. Social networking allow us to create new social groupings and from them, new sorts of social conventions arise. It attracts individuals

who have a desire to affiliate, and to be pulled into groups to achieve their personal goals (Boyd, 2006).

Sunstein (2006) argues that the on-line effort of joining together people with diverse talents and interests to achieve common goals may well provide the best path to infotopia. However in order for that to happen, people must feel they have more to gain from coming together than from being independent. While many websites still support communities of interest, social network sites are primarily organised around people, not interests (Boyd & Ellison, 2007).

Scardamalia (2003) adds that symmetric knowledge advancement occurs when the participants in a network are able to advance their own knowledge-building agendas by helping other participants advance theirs. Given that an online social network plays a critical role in enabling or deterring community, it is essential that researchers re-evaluate the role of online social networks as a way to improve the process of knowledge workers learning and engagement in the organisation.

The social connection of the well organised corporate Wiki community and the obligation that goes with it, are the keys of ongoing corporate Wiki success. Each individual is bonded to the community through personal contact with other members and through acceptance of the common goals. However, personal networks often remain after the project is finished, as people are bound together based on their common work experience. These networks aid organisational members in local coordination. High-care relationships among individuals improve organisational knowledge's synthesis and expansion. (Nonaka et al. 2006).

2.3.2.3 Collective Intelligence/Efficiency

Rather than use the vague term, 'collective intelligence', I prefer the term 'collective efficiency' to describe the flexibility of online social networks that supports communication and collaboration among large groups of people over computer networks and encourages the participation of users based on the cooperation and the information/knowledge transfer. Those who use Web 2.0 technologies assist with their development and are part of the collective efficiency that operate in the social milieu by

helping to connect people with similar interests and ideas, which is harnessed to make the technologies better and more responsive.

The corporate Wiki thrives on collective efficiency to attract a cluster of knowledge workers so as to harness tacit and explicit knowledge such as the collective and individual experiences of knowledge workers and encourage the diffusion of knowledge within the organisation. Such engagement with content promotes a sense of community, empowerment and ownership for users described as wisdom of crowds. Wisdom of crowds comes from a large number of people making small contributions to create a quality product (Surowiecki, 2004). The result is a system where the knowledge of the community is 'larger' than the sum of knowledge and experience of all individuals. For this approach to work, a critical mass (of users in the community) is required (Andrus, 2005).

Metcalf's Law (Metcalf, 1995) says the value of a network is proportionate to the square of the number of users. As more users use the corporate Wiki, the more valuable it becomes, and the more new users it will attract, increasing both its utility and the speed of its adoption by still more users. Increased user contribution leads to the growth of collective efficiency, and re-usable dynamic content. Metcalf's Law is intuitively appealing, because knowledge workers estimate the size of a network based on the uptake of that network among peers and managers. A linear relationship between the perceived size and value of that network can be charted. Users generally see larger communities as more valuable than smaller ones. For example, gamers are attracted to places where there are the most competitors, collectors are attracted to auctions with the most buyers and sellers, and chat users are attracted to destinations where there is likely a critical mass of like-minded individuals (Gallaugh, 2000).

Wikipedia is a good example of collective efficiency. More interestingly, is the organisational design that has arisen around Wikipedia based on a community of thousands of volunteers from all over the world without centralised control to collectively create an intellectual product. A corporate Wiki creates diversity by encouraging quality quantity. Diversity makes for a range of options for tackling

complex issues. Users are encouraged to explore different options given by other users and to appreciate differences between each situation.

Nevertheless, critics have questioned the value of collective efficiency. Problems arise when groups collect and the larger the organisation, the bigger these problems become. Even Wales admits that this is true - the driving force behind the success of Wikipedia is due to a small number of prolific users, rather than a large crowd where only 2% of the registered users on the site made 75% of the edits (Wales, 2007). The majority of Wikipedia visitors are lurkers, merely visiting and experiencing the community passively (Swartz, 2006). This justifies the argument that sensible organisations based on a network-centric approach can reap the benefits of collective efficiency, albeit within a small team/group/unit.

Collective efficiency invites self-policing and community watchfulness, leading to the 'DarWikinism' of corporate Wiki content, where, as a result of the openness and rapidity of page editing, an evolutionary selection process is imposed (Boulos et al., 2006). 'Unfit' sentences and sections are ruthlessly culled and voted against, but when considered 'fit' they are developed, resulting in the evolution of higher quality and more relevant content. Since the corporate Wiki is essentially a closed Web 2.0 environment, it benefits doubly from other forms of policing and moderation, by corporate Wiki administrators.

Drawing on the wisdom of crowds' argument, the corporate Wiki responds more deeply to users than Web 1.0 applications owing to a new form of metadata termed folksonomy (Alexander, 2007). Web 1.0 applications depends on traditional metadata that is usually hierarchical i.e. topics nested within topics, structured and predetermined by content authorities. Folksonomic metadata consists of words that users generate and attach to content. For example, a historian writing about the European colonisation of Australia writes what is meaningful to her, Arthur Phillip, First Fleet, Sydney Cove, 1788. A literature scholar writes according to his interests: Banjo Patterson and Henry Lawson. Folksonomic information discovery allows people to connect to each other through their own shared metadata tags, a unique feature that is not fully developed in pre-Enterprise 2.0 services.

However, there must be something about collective efficiency that is appealing. Often in the work environment, people are expected to provide solutions that are outside of their domain. One of the abilities of collective efficiency is that it is able to aggregate the pockets of sticky intelligence that exist around the world. Mainstream companies like Yahoo Inc. see the value in collective intelligence by allowing outside companies and individuals to co-create new services using Yahoo mail. Yahoo's My Web 2.0 termed as a social search engine allows Web pages that are found useful by one member of a group to be instantly accessible to a network of trusted associates and to their network contacts as well. Yahoo hopes that the service will combat the growing problem of search-engine manipulation by using a collection of human eyes and minds to sort the wheat from the chaff. Yahoo is not alone in its effort to open up Web services using its tools. Major Internet companies including Amazon, eBay and Google to establish software providers such as IBM and Microsoft Corporation have embraced such moves as well (Hardy, 2006).

Most telling, traditional companies, from Procter & Gamble to Dow Chemical, are beginning to flock to the virtual commons, too. The potential benefits are enormous. Companies are opening themselves up to contributions from enthusiastic customers and partners that can help them create products and services faster, with fewer mistakes and at far lower cost, with far less risk. The LEGO Group uses the Internet to identify and rally its most enthusiastic customers to help it design and market more effectively. Eli Lilly & Co., Hewlett-Packard Co., and others are running prediction markets that extract collective wisdom from online crowds, which help gauge whether the government will approve a drug or how well a product will sell (BusinessWeek, 2005b).

2.3.2.4 HTML Mashup

Web 2.0 enables HTML mashup which represents a revolutionary way of managing, reusing and remixing online information and knowledge repositories, in comparison with the traditional Web 1.0 model. Although the technology behind del.icio.us can be easily duplicated via the open-source clone de.lirio.us¹ and the social application building service Ning², just like Yahoo did with My Web 2.0, Yahoo was attracted by

¹ <http://de.lirio.us/>

² <http://www.ning.com/>

the del.icio.us³ community that cannot be duplicated. From this perspective, the Flickr acquisition gave Yahoo even more value for money because they bought great technology and a vibrant community. Yahoo's main competitor, Google is apparently sharing Web 2.0 vision of how groups of people can create, manage and share information online. Google purchased Writely, and launched Google Groups, Google Spreadsheets and Google Apps for Your Domain. Google acquired YouTube for US\$1.65 billion and JotSpot (a company that creates customised corporate Wikis) in 2006 (Howarth, 2007).

Research indicating social networking trends were released by Future of Media Summit (2007). Australians are world leaders when it comes to the use of Wikipedia. Growth in use of YouTube by Australians is a massive 239%, resulting in 20.6% of online Australians accessing the site each month. Australia still lags behind the Americans and Britons, with 30.2% of Americans and US and 25.5% of British accessing YouTube and blogs. It is estimated that half a million people globally will join virtual communities each week, meaning that a population larger than South Korea will be developing online relationships on Facebook (Hadley, 2007). Three of the top five Internet sites visited by Australians are social networking sites (SMH, 2007). To the critics who say that these are mere Internet numbers, then they should take some sage-old advice and follow the money. In September 2006, the Facebook owner was considered odd to reject a billion dollar offer by Yahoo! to buy the company. Facebook is now valued at six to ten billion dollars with Microsoft bidding to buy a five to ten per cent stake in the company. Social networking sites are big business. A web presence for a product advertised on social networking sites is considered core expenditure for the promotion of any product. The expenditure of advertisements in social networking sites are projected to reach two billion dollars in the U.S. a year by 2010 (Walsh, 2007). In August 2006, Google paid \$US900 million to advertise on MySpace.

While Web 2.0 has proven to be extremely effective at connecting people to one another, and helping them to share information, can these tools be extended to the business environment and make them even more powerful, in order to further enhance KM? Can they be improved to dramatically extend knowledge workers' ability to access

³ <http://del.icio.us/>

and manipulate information, giving knowledge workers an opportunity to interact at a deeper level?

We now turn our attention to Enterprise 2.0 to see if organisations that adopt Web 2.0 principles and technologies that are socially appealing to consumers will the ability to revolutionise the business environment and build connections between knowledge workers and their business contacts and customers.

2.3.3 Enterprise 2.0

The term Enterprise 2.0 is a portmanteau of the words Enterprise Social Software and Web 2.0. It covers the spectrum of social software within the enterprise, and the social and organisational changes related to its use. An organisation becomes Enterprise 2.0 when it applies Web 2.0 principles ('architecture of participation', social networking, collective intelligence and HTML mashups) and adopts Web 2.0 communication tools that allow for more spontaneous, knowledge-based business collaboration such as Wikis, blogs, RSS and social bookmarking services (McAfee, 2006).

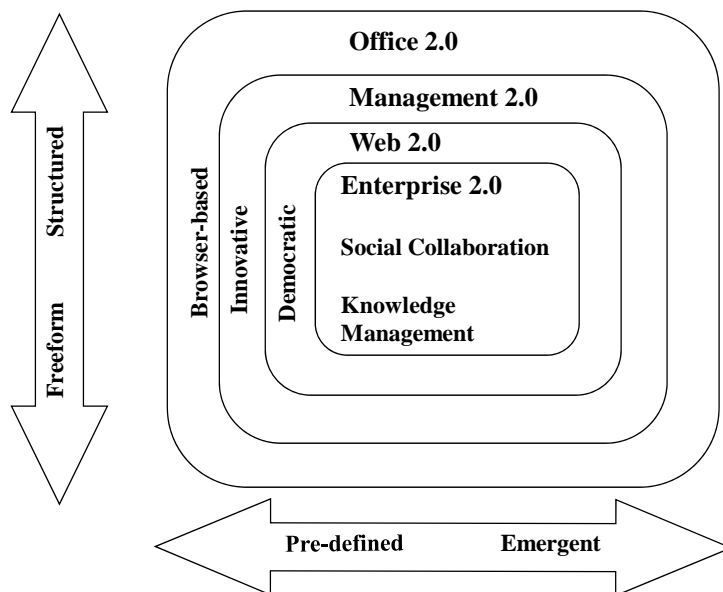


Figure 2.1 The 2.0 Generation
Source: Adapted from Hinchcliffe (2006)

Enterprise 2.0 tools exist on simple, freeform platforms for self expression. They are emergent structures, rather than imposed ones. Hinchcliffe (2006) summarises McAfee's definition by saying that Enterprise 2.0 specifically describes the use of freeform, emergent, and social software to conduct collaboration and share knowledge. The characteristics of Enterprise 2.0 are explained below:

- It is freeform because the Enterprise 2.0 software is optional, free of up-front workflow, egalitarian or indifferent to formal organisational identities, and accepting many types of data.
- It is emergent because it contains mechanisms to let the patterns and structure inherent in people's interactions to self organise and become visible over time.
- It is a social software because it advocates the bottom-up approach to adoption that is lightweight i.e. not difficult to implement or learn and is largely dependent on human issues and not technical ones.
- It requires an innovative management who is willing to redress organisational cultural and behavioural factors that impede collaboration, exploration and innovation.

In the past when it came to adopting new technology, business was driving innovation and consumers were almost an afterthought – with Enterprise 2.0, it is the consumers who take the lead. Google, for example, uses hosted applications designed for consumers to service their own company needs. Google employees use Web-based Gmail and they maintain huge, searchable e-mail databases. To promote ad hoc networking, each employee has a profile page where they keep information on ongoing projects. Today's consumers spend their lives not consuming, but uploading, downloading, recording, sharing and airing their personal experiences – heavily influencing others along the way. There is an increasingly blurred line between the amateur and the professional.

A number of organisations see the potential of Enterprise 2.0 applications and how worthwhile their contributions can be to the business environment. A survey carried out

by CIO Insight reported that 49% of CIOs use corporate Wikis, 48% use blogs and 39% listen to podcasts (Alter, 2007). These organisations have embraced new technologies, from employee blogs to podcasts, because they realise that that customers and employees are becoming ever more segmented.

In contrast to most enterprise applications, Enterprise 2.0 technologies are simple and focus on a few features rather than many. According to Tapscott (2006), low-cost collaboration over the web, using the technologies associated with Enterprise 2.0, will challenge the traditional approach to business. Gartner Research reports that in retail, Enterprise 2.0 will enable consumers to draw on a vast array of information including Wikis, blogs and seeking real-time buying advice from online friends, when making informed buying decisions. Because they will no longer have to rely on the limited expertise of in-store staff, this will have a flow-on effect at the bricks-and-mortar level, with the technology currently used to research purchases at home available in-store. Gartner predicts that within the next 10 years Internet kiosks and self-service cash registers will be available in many retail stores to support the Enterprise 2.0 approach to making purchases (van Wyk, 2007).

Table 2.2 summarises the most popular Enterprise 2.0 technologies that are most adaptable for business use.

| Technologies | Description |
|-----------------------------|--|
| Wiki | A Web based encyclopaedia that encourages users to collaborate knowledge sharing by easily adding, removing and changing the content. |
| Blog | A website where entries called posts is displayed in reverse chronological order. |
| Discussion Forum | A website for people to exchange ideas, post questions and answers on relevant subjects stored on archives so that previous exchanges can be searched. |
| Social Networking Sites | An online meeting place that is used by an online community to socialise, make new acquaintances and find others who share their interests. |
| Social Bookmarking Services | Users can create lists of bookmarks or favourites, to store centrally on a remote service (rather than within the client browser) and to share them with other users of the system. |
| YouTube | An application to upload and share video clips across the Internet through websites, mobile devices, blogs, and email. |
| Podcasts | An audio or video recording posted on a website that can be downloaded and played later on MP3 players. It is distributed over the Internet syndicated to registered interested parties via RSS. |
| RSS | News feeds provide the latest headlines and video as soon as they are published without having to visit the websites the feed is taken from. |
| Mashups | Web applications that combine content from two or more online sources. |

Table 2.2 Enterprise 2.0 Technologies Adaptable for Business Use

| N=150 | |
|---|-----|
| Corporate Wikis | 49% |
| Blogs | 48% |
| RSS | 47% |
| Podcasts | 39% |
| Social networking (e.g., tagging, social bookmarks, SNSs such as del.icio.us, LinkedIn, Technorati & Second Life) | 33% |
| Mashups | 13% |
| Instant mobile updates (e.g., Twitter) | 11% |
| None of the above | 11% |

Table 2.3 Web 2.0 Applications that are Popular with CIOs
Source: Adapted from CIO Insight (August 2007)

The CIO survey above shows the Enterprise 2.0 applications that allow users to power their websites. User-generated content is one trend that will not go away anytime soon. Elements of Enterprise 2.0 will help organisations improve their businesses, by becoming closer to their customers by allowing them to get closer to the organisation. If one remembers that the Internet is an active medium and that visitors to the organisation's website are there by choice, so it is the organisation's responsibility to engage them. According to social technologies researcher Ross Dawson, some information-intensive organisations, including law firms and banks, are the most active in investigating the benefits of Web 2.0 technology, as an extension of ongoing KM developments because traditional websites have been criticised as very one-dimensional brochure-ware, and force users to navigate large amounts of information (Howarth, 2007).

A Forrester report notes that companies with more Enterprise 2.0 technologies (e.g. Wikis, RSS, blogs, podcasts, and social networks) in place get a higher business value than those using fewer tools and achieve the most return on investment (ROI) (Havenstein, 2007). Forrester reports that companies that have deployed all five technologies derive good business value, while those that deploy two or three tools realise the least average value. "This suggests that firms need to adopt a critical mass of Enterprise 2.0 technologies before the deployments truly start to pay off," the report said (Young, Holmes & Lawson, 2007).

The important question for management is which Web 2.0 tools need to be imported from the Internet to the Intranet, to create Enterprise 2.0. The subsequent portion will compare Wikis, blogs, and discussion forums to distinguish what is new about Wikis beyond other innovations and if there any differences. This is done by analysing each technology's characteristics and benefits to assess their suitability as a KMS. Chapter 4's case studies has explained in detail my investigation to see if Wikis can support collaborative knowledge creation and sharing in a corporate environment. By making both the practices of knowledge work and its outputs more visible, it offers practitioners and researchers a choice to select the best Enterprise 2.0 technology as a KMS.

2.3.3.1 Evaluating Wikis among Other Emerging Enterprise 2.0 Technologies

Past literature has determined that the most prominent and best-known social (Enterprise 2.0) technologies are Wikis, blogs and discussion forums (Semple, 2006; Hasan & Pfaff, 2006a; Wagner & Bolloju, 2005). It appears to be a good place to begin with a comparative analysis on these three technologies to determine which is best suited as a KMS.

In Semple's (2006) opinion, blogs and Wikis have dominated the scene because of their appeal to the wider community and their ability to disseminate knowledge. As Head of KM in the BBC, Semple introduced blogs and Wikis into the previously conservative organisation to make the most of this wired-up world of work and learnt how businesses can prepare themselves for the challenges and the opportunities they represent. While he describes the obvious popularity of the General Manager's daily blog, however, blogs are time indexed, set up by an individual and tend to focus on the current topic. One participant usually makes comments and entries at a time.

It is the adoption of Wikis for corporate knowledge management that is particularly compelling (Hasan & Pfaff, 2006a). To understand how organisations can use these Enterprise 2.0 technologies, I have presented the salient characteristics of these three technologies below.

2.3.3.1.1 Wikis

A Wiki is described as an evolving knowledge repository where users are encouraged to make additions to this repository by adding new documents or working on existing ones (Pfaff & Hasan, 2006a). Its aim is to create entries or documents, individual pages as well as the entire Wiki Website. Users design and build the Wiki by creating topics so the nodes change not by time but by way of development.

The Wiki is named after the Hawaiian term 'wiki wiki' meaning quick, fast, or to hasten which is symbolic of the quick changes in the editing processes (Leuf & Cunningham, 2005). A Wiki is therefore a collection of interlinked HTML web pages and has cross links between internal pages where each page can be edited keeping a complete record of such changes. Wikis have a history function, which allows previous versions to be examined, and a rollback function, which restores previous versions.

The Wiki belongs to Enterprise 2.0 because it applies Web 2.0 principles i.e. architecture of participation (where its collaborative encyclopaedic structure has the ability to democratise organisational knowledge), leverages social networking (enables knowledge workers to engage in networks of their preference), collective efficiency (encourages the participation of users based on their cooperative efforts to facilitate information transfer and harvest knowledge capital) and supports HTML mashups (due to its open access). The Wiki contains discussion pages often referred to as talk pages that allow the Wiki community discuss about certain articles such as to include certain information, working toward a neutral point of view, asking for clarification, or simply requesting that someone with more knowledge about a particular aspect of the subject to add it. As a tool for knowledge building, the discussion capability affords consensus building.

The most well known example of a Wiki is the popular English language version of Wikipedia⁴, which was started in 2001 and now has nearly 900,000 articles (Wikipedia, 2006). Its pages dominate Google search results, and the site is in the top 10 in terms of traffic. Beyond discussion pages for articles, Wikipedia offers discussion pages linked to individual user pages and the Village Pump, the community area where Wikipedians

⁴ <http://www.wikipedia.org/>

discuss policies, general Wikipedia issues, and user help (Bryant et al. 2005). It has since spawned off dozens of foreign language editions of Wikipedia. A sister project called Wikia⁵ is where users can create a Wiki of their own and get help managing it. Other offshoots include the Wiktionary⁶, Wikiquote⁷ and Wikispecies⁸, a directory of life.

Countless numbers of Wikis have been created in organisations since then, as KM advantages have become more apparent (Wagner & Bolloju, 2005; Hasan & Pfaff, 2006a). Companies like Yahoo!, Disney, SAP and Motorola are successfully using corporate Wikis that are based on a COP approach (see section 2.1.9) to reap the benefits of economic savings, increased efficiency in understanding the elements of knowledge work and easy dissemination of knowledge to disconnected teams (Pfaff & Hasan 2006b).

2.3.3.1.2 Blogs

A blog is a simplified Web based content management tool made up of regular entries in reverse chronological order. Although group blogs exist, it consists typically of a blog creator monologue which invites audience commentary and links to other Webpages of note. Blogs typically use RSS (Really Simple Syndication) feeds to sort information and alert users to new content and a ‘What You See Is What You Get’ (WYSIWYG) editing format.

According to Mattison (2003) “a Wiki can be a blog, but a blog does not have to be a Wiki.” This refers to the knowledge capture mode for blogs which is static but contextual i.e. situated like the Wiki. Readers find the comments feature available in most blogs useful when they give feedback to turn the monologue into a useful dialogue, furthering the learning of all. It empowers a single user to post his or her knowledge to the community whether the community wants it or not. However, its less

⁵ <http://www.wikia.com/wiki/Wikia>

⁶ <http://www.wiktionary.org/>

⁷ <http://www.wikiquote.org/>

⁸ http://species.wikimedia.org/wiki/Main_Page

collaborative nature makes it more suitable for individual use. This makes blogs difficult to sustain as a KMS since most of the content is created by one individual.

A blog captures changes in thinking or self or ideas, thus its speech is spontaneous, non-revisable and as permanent as memory. Once a blog edition is posted, it cannot be edited. The structure is generally light on cross-linking making it dominantly sequential. Creating internal links is painful and secondary to the text. It is indexed by time i.e. hourly, daily, weekly, so this makes the tool useful for news distribution. But it is not as useful for topics that would be referenced for some time in the future. Blogs are easy to create and contribute by using free services like LiveJournal⁹, Google Blogger¹⁰ and Openserving¹¹.

Knowing what the primary purpose of implementing a blog will help the organisation define what it will write about. Blogs enable real conversation, thus allowing companies to gain valuable feedback from customers, learning what they want, instead of trying to sell them what they do not need. For example, Richard Sambrook's (BBC Director of World Service and Global News) blog writes about the real issues at work, the challenges his department faces, and external factors and influences. This has led to tangible outcomes such as better solutions, products, and strategies for the company. Blogs can help customers find the company when they are searching on Google or other sites. Knowing which words to drop into your posts on a regular basis will help boost search rankings. A good strategy is to learn what words by the competitor or industry blogs on a regular basis that helps place them high in Google's search engine.

2.3.3.1.3 Discussion Forums

A discussion forum is usually Web based and provides ways of archiving and searching for previous exchanges. A discussion forum is suitable for many users and allows users to read what others have written, search out particular subjects and share knowledge by launching new discussion threads related to the forum's theme. The messages are indexed by time so users can track who said what and when, which characteristically helps foster the exchange of ideas, connections, and linkages among people who join in

⁹ <http://www.livejournal.com/>

¹⁰ <http://www.blogger.com/>

¹¹ <http://www.openserving.com/>

the conversation (Fichter, 2005). This makes the tool useful for news distribution. In addition, the discussion forum is useful in contacting the organisation's customer base with company news and promotions. It is an excellent resource for doing quick and short surveys such as vetting product ideas with real consumers before committing finances to its development. The disadvantage is that it is not as useful for topics that would be referenced for some time in the future. It lacks several useful knowledge representations and maintenance features so this means that a thread in a discussion forum often does not incrementally build upon each other. Consequently, the latest post may be as ambiguous as the earlier ones (Wagner, 2006; Wagner & Bolloju, 2005).

2.3.3.1.4 Which Enterprise 2.0 Technology is best for Knowledge Management?

Critics admonish that corporate Wikis are used best for sharing unstructured information associated with ad hoc or ongoing projects and processes, but not for structured information retrieval (Nass & Levitt, 2007). As most business processes rely on access to the appropriate structured data in real-time, business processes have to be supported by other enterprise applications, databases, and directories. When information is stored in different locations, the relation between the data is not obvious, and this is only well understood by the knowledge workers themselves. To this purpose, organisations adopt blogs to increase human interactivity in a vendor/customer or management/employee relationship and/or a corporate Wiki to create a KMS where any employee can contribute to enhance knowledge capital.

Table 2.3 summarises the major differentiators between a Wiki, a blog and a discussion forum.

| Characteristics | Wiki | Blog | Discussion Forum |
|-----------------|---|---|--|
| Purpose | Knowledge sharing | Opinion sharing | Knowledge sharing |
| Information | Encyclopaedic | Time Sensitive | Time Sensitive |
| Communication | Many-to-Many | One-to-Many | Many-to-Many |
| Forum | Collaboration based | Conversation based | Conversation based |
| Organisation | Uses bottom-up approach, enables people to organise themselves into a network based on their preferences. | Uses top down approach, blog creator's monologue with readers' commentary. | Uses top down approach, forms people into groups, assigning memberships. |
| Structure | Encourages cross linking: dominantly structural, a-temporal. Express ideas as relationships between pages. | Light on cross-linking making it dominantly sequential. Chronological organisation | Chronological organisation |
| Text | Considered, revised, and as permanent as print. | Spontaneous, non-revisable and as permanent as memory. | Non-revisable and as permanent as memory. |
| Knowledge | Situated, contextualised and topically indexed. Provides chronology of changes. | Situated, contextualised and time indexed. Works around indices and archives. | Situated, contextualised and time indexed. Works around <i>sticky</i> messages. |
| Maintenance | High | Low | Low |

Table 2.4 Comparison of Characteristics of Wiki, Blog and Discussion Forum
Source: Adapted from Wagner and Bolloju (2005)

The diagram below demonstrates the similarities and differences between a Wiki, a blog and a discussion forum.

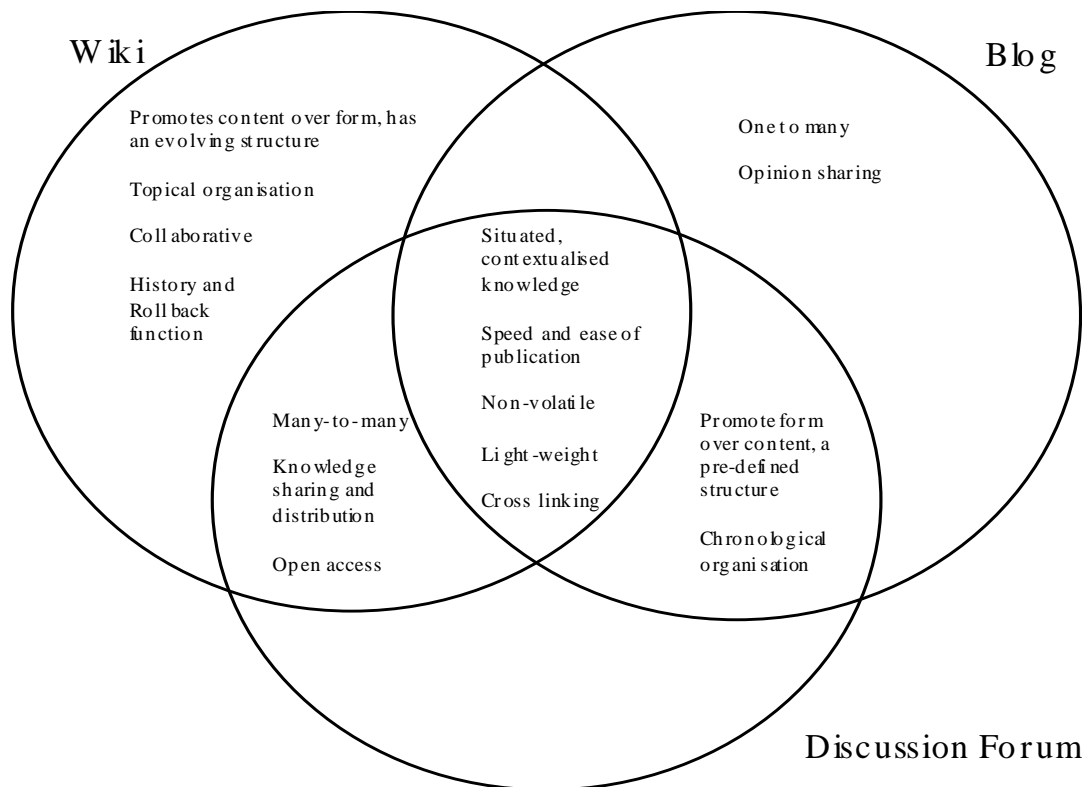


Figure 2.2 Similarities and Differences between a Wiki, a Blog and a Discussion Forum

Based on the comparative analyses of these three social technologies, Wikis have been touted as being most attractive to businesses (Pfaff & Hasan 2006b; Wagner & Bolloju, 2005) and best suited to be a next generation KMS (Hasan & Pfaff, 2006a) and better collaboration tools (Wagner & Bolloju, 2005).

The Wiki has several characteristics that are central to its power and ubiquity. First, it is browser based which allows multiple users to write collaboratively, where they can continue to add to or edit the content of documents and immediately publish them. Second, it is versatile. Documents can be anything with hyperlinks to anywhere on the World Wide Web, including text, image and video. Linking deepens the conversational nature of the Wiki and its sense of immediacy. It also helps to facilitate retrieval and referencing of information on different websites. Third, it is easy to manage. Neither special software nor a third-party webmaster is needed to post content. Wikis are organised according to hierarchical topics which makes it easy to search for particular

topics. This characteristic enables the Wiki to rate favourably for KM. The Wiki's editing function means that the most current and improved form of a topic's content is always displayed. Wikis also track the history of prior changes with author, date, and related information. Any change can be easily reverted to any of its previous states. Finally, it takes advantage of the concept that learning does not occur in isolation but in teams of people working together to solve problems. Providing access to a shared information and knowledge-building tool such as the corporate Wiki helps knowledge workers collaboratively construct social shared knowledge. In addition, it facilitates dialogue and knowledge among the work unit or organisation community.

2.3.3.1.5 Why Do Organisations Create Corporate Wikis?

Emerging models of the next generation KMS will set the foundations for learning organisation to pursue life-long learning agendas (see section 2.1.6). Knowledge workers will learn while creating and by creating. These individual learning activities will weave together with others in complex patterns, shaped by participation in diverse networks of creation and the interaction of these networks of creation in even broader networks afforded by Enterprise 2.0 technologies.

Attracted by the corporate Wiki's ability to accomplish the tasks of managing knowledge quickly, inexpensively and with the use of existing personnel, the organisations that took part in this study saw the corporate Wiki as a panacea to their KM problems. All six organisations before the uptake of the corporate Wiki were troubled by their problems of acquiring, filtering, storing and accessing organisational knowledge and overcoming the low participatory rates for their existing KMS.

All the organisations in the case studies face the reality of an aging workforce and the erosion of shared knowledge within the organisation. Although new knowledge workers are learning and contributing to the knowledge base, the studies indicate there is a real possibility that a critical core of information and expertise will be lost. Case organisations B to F launch corporate Wikis in an effort to mitigate the loss of expertise caused by budget cuts, downsizing, and an aging workforce.

The research data suggests a widespread need for the creation of easy-to-use and accurate content for the knowledge repository. There are huge amounts of informal electronic notes e.g. Short Message Service (SMS) and email messages exchanged among employees which represent forms of knowledge. The notes, emails and organisation processes do not support reuse of the knowledge in their documented form. The knowledge captured in the notes can only be reused by those who read the correspondence and choose to save the information for personal reference. Even if the information from notes and emails are captured, this will remain only as information and not be converted into organisational knowledge unless it is “value added by people – context, experience, and interpretation – that transforms information into knowledge” (Davenport & Prusak, 2000, p. 129).

Wiki technology and the Wiki way of collaboration is a good example of the network-centric approach that demonstrates a feasible model for knowledge acquisition and maintenance (see section 2.1.7). The open source approach to KM appears to work, partly because it can engage increasing numbers of participants to deal with a growing task domain (see section 2.3.4.5.1). And of course, people trust their peers, and so developing these conversations with the help of a corporate Wikis instil the inherent power of group participation and draws on the wisdom of crowds (see section 2.3.2.3). Knowledge workers tend to seek content from one another and trust the opinions of their peers over other sources. Knowledge and skills will be enhanced at all levels, innovation championed, and good performance rewarded. A new generation of knowledge workers will bring with them new ideas and experiences and who challenge established ways of doing things.

2.3.4 Choice of Wiki Software

Organisations can choose from a variety of Wiki software to implement their corporate Wikis from sophisticated packages purchased from Socialtext¹², and Confluence¹³ that provides custom made corporate Wiki software for organisations, which prefer a ‘plug and play’ option, to free Wiki software like Mediawiki¹⁴ and Google Sites¹⁵. An

¹² <http://www.socialtext.com/>

¹³ <http://www.atlassian.com/software/confluence/>

¹⁴ <http://www.mediawiki.org/wiki/Download>

¹⁵ <http://www.google.com/sites/help/intl/en/overview.html>

organisation may choose to host its Wiki on its own servers or alternatively, an organisation can host the corporate Wiki on a corporate Wiki farm for a small fee (Raman, 2006). Companies such as Socialtext, JotSpot and Confluence offer organisations the ability to outsource the hosting of their corporate Wiki outside the business environment. This means that technical decisions and support issues will be handled by these companies, leaving the organisation to concentrate on knowledge collaboration. For organisations that are time-poor and have heavily burdened IT staff, Socialtext and Confluence will install the corporate Wiki on the organisation's intranet.

2.3.4.1 Socialtext

Socialtext claims that it is a good solution to e-mail overload and groupware such as IBM's Lotus Notes, by enabling the use of the Wiki among groups of collaborators, while still being as simple to use as e-mail. Users can set up accounts, then write and revise their collaborative work (BusinessWeek, 2004). Socialtext has the ability to block access to selected pages except by passwords, narrowing the pool of potential collaborators.

2.3.4.2 Confluence

Confluence is an enterprise Wiki which claims that it is used by over 4,000 organisations in more than 75 countries around the globe such as Fortune 1000, public enterprise, science and technology sectors. Confluence has a unique combination of features that include improved security with space and page level permissions, easy linkage for multiple linked Wikis, blog creation within the Wiki, and email integration.

2.3.4.3 Google Sites

Google Sites previously known as JotSpot was recently acquired by Google. Eyeing the potential of Jotspot and wanting to grow beyond its capacity as a search engine, Google decided to buy Jotspot to offer free Wikis to the public. Google is relying on JotSpot to host Wikis for customers and has discontinued the downloadable Wiki Server (beta), a version of the service used by large companies that want to host the Wiki on computers inside their own firewalls to ensure better security (Ames, 2006).

Google Sites is riding on the coat tails of the successful Socialtext to create Wiki software that assembles basic components such as mailing lists and calendars. Data and services from other Web sites can also be automatically tapped and deposited on the Wiki. For instance, a custom Wiki program tracks prospective customers by accessing financial data from Hoover's read stories from Yahoo! and use Google's search engine. The software also allows e-mails to a Wiki page, which automatically organises the information in the message (Hof, 2004). It offers an online spreadsheet and calendar that multiple people can edit.

2.3.4.4 Microsoft SharePoint

SharePoint Services 3.0¹⁶ is Microsoft Corporation's answer to the Wiki. The Web software for collaboration is gaining in popularity inside companies (Rama et al. 2006). SharePoint is a collaboration tool which combines Microsoft Windows SharePoint Services 3.0, Microsoft Office SharePoint Portal Server 2007 and Microsoft SharePoint Designer to enable users to create, manage, and build their own collaborative Web sites and make them available throughout the organisation (Microsoft, 2008). MS SharePoint's ability to allow knowledge workers to share information and documents, maintain version control for these documents, and create information sources for teams and workgroups, are extremely valuable and critical to business function. Furthermore, the ability to collaborate and share information in real time is a major benefit. Because MS SharePoint is tied to the MS Office suite of productivity programs like Word, Excel, PowerPoint and Outlook, which are familiar to hundreds of millions of workers (Lohr, 2006), it can share information with a variety of internal users to obtain information, coordinate schedules through their Outlook calendars and perform other tasks. This includes knowledge workers who are involved in the collaborative work process of workgroups which are likely at multiple locations, often in different time zones.

Some of SharePoint features include: Wikis, blogs, workspaces, document management, file sharing, group decision support and central architecture where collaboration is managed at a central server. Business information that will otherwise be hoarded en masse within Microsoft Office documents of every description, e-mails, and data files

¹⁶ <http://office.microsoft.com/en-gb/sharepointtechnology/default.aspx>

stored privately in user's computers, accounts, and home directories — thereby severely curtailing its utility to the rest of the organisation — can and often be easily opened up and shared. More importantly, it can easily maintain version control for these documents and roll back changes across the SharePoint site helps to correct errors quickly. It also provides single sign-on capabilities, as well as indexing and search functionality, across a wide variety of servers and applications.

2.3.4.5 MediaWiki

An alternative zero-cost option is MediaWiki. MediaWiki software is open source, so developers can use it and modify it without paying any licensing fees (see section 2.3.4.5.1). The term 'open source' originates from the open source software development whose code is made available to be appropriated and modified by anyone, promoting collaboration among programmers as they share ideas on how to improve the software. The best-known example of such a project is the one that continues to develop the Linux operation system.

MediaWiki is a good option for organisations that need a corporate but do not have the funds to outsource its creation or management. MediaWiki's strong localisation capabilities and the success of Wikipedia (which uses MediaWiki) has made it into a familiar tool and transformed it to be one of the most popular free Wiki software engines available today. It is now used by several other projects of the non-profit Wikimedia Foundation and by many other Wikis such as non-English/foreign-language editions of Wikipedia from Dutch to Swedish. Organisations, notably Novell have used MediaWiki to run their corporate Wiki as a KMS and content management system to operate several of its high traffic websites. Novell has implemented a Wiki for the Novell Developer Community¹⁷. Moreover, Novell has sponsored two projects, the openSUSE¹⁸ project that is a worldwide community program that promotes the use of Linux and the iFolder¹⁹ project to back up, access and manage the user's personal files from anywhere, at any time. There are also a growing number of sites which offer free

¹⁷ http://developer.novell.com/wiki/index.php/Developer_Home

¹⁸ http://en.opensuse.org/Welcome_to_openSUSE.org

¹⁹ http://www.ifolder.com/index.php/Main_Page

hosting to anyone who wants to create a free public community Wiki such as EditThis.info²⁰, Pbwiki²¹ and Wikispaces²².

2.3.4.5.1 Leveraging the Principles of the Open Source Movement

The idea of open source has spread to many other types of content and has come to signify a whole movement against restrictive copyrights and for free or low-cost sharing of information or resources, which often generates collaboration. Benkler (2006) says that the Open Source Movement (OSM) can “provide a potential source of knowledge materials from which we can build the culture and economy of the 21st century.”

As corporate Wikis have their roots in the OSM, understanding the principles of the OSM will help organisations understand how successful and productive a corporate Wiki can be. For example, MediaWiki software is open source. Users simply download the software, using their own telephone connection, their own computers, and their own electricity. The marginal cost of each ‘copy’ of MediaWiki that the Wikimedia Foundation²³ has given away is not effectively zero, it is actually zero.

Eric Raymond (1998) compares two styles of software development using his own experience as illustration to formulate the principles of the OSM - the traditional top-down (Cathedral) approach and the bottom-up (Bazaar) approach - and emphasises on how Internet-enabled cooperation has contributed to the Bazaar approach which is highly efficient for software development. The benefits of open source software development include: fast development speed; the ability to develop large applications, lower error rates; and accelerated development, and high maintainability of the source code (Markus et al. 2002). The case studies in Chapter 4 help to determine whether these same benefits can be experienced in the corporate Wiki.

The first OSM principle states that “Good programmers know what to write. Great ones know what to rewrite (and reuse)” (Raymond, 1998). Linus Torvalds did not write

²⁰ <http://editthis.info/>

²¹ <http://pbwiki.com/>

²² <http://www.wikispaces.com/>

²³ http://en.wikipedia.org/wiki/Wikimedia_Foundation

Linux from scratch. He adapted the code and ideas from Minix, a tiny Unix-like OS for 386 machines. Likewise, organisations can minimise reinventing the wheel without building a KMS from scratch.

If “every good work of software starts by scratching a developer's personal itch” (Raymond, 1998), then organisations need to find knowledge workers who relish in taking up the leadership challenge as Wiki evangelists and administrators of the corporate Wiki where they can oversee the development of organisational knowledge by the corporate Wiki community, and nurture interest in the corporate Wiki until it becomes self-sustaining. Inherent in every corporate Wiki is the ability to develop large applications, how large and fast the knowledge repository can grow is dependent on the corporate Wiki community. Corporate Wiki evangelists and administrators must have a strong interest in the subject matter. This is important because corporate Wikis need editors to give them life, and no one is going to edit something they do not care about.

The corporate Wiki leverages on the law of large numbers to correct errors imbuing Linus’ (Torvalds) Law which states that “given enough eyeballs, all bugs become shallow” (Raymond, 1998). In other words, having so many people focus on identifying and fixing problems and by having a transparent process, the corporate Wiki can achieve levels of quality that are otherwise impossible to achieve. The thesis has already established that Wikipedia is a convincing example of what a crowd can achieve (see section 2.3.2.3); given enough eyes, the articles on Wikipedia become more and more up-to-date, complete and consistent. Wikipedia is an inspiration to anybody who wants to revitalise KM within an organisation. On the same vein, the corporate Wiki depends on what economists call accelerating production functions. The first contributions make only a small difference, but each contribution increases the probability of success, which encourages subsequent contributions (Tapscott & Williams, 2006).

Another principle, “release early, release often and listen to your customers” (Raymond, 1998) can be applied to the corporate Wiki as well. By cultivating the corporate Wiki community and leveraging the corporate Wiki for collaboration, the organisation can tap into the corporate Wiki’s quick-turnaround time to enable knowledge workers to document their knowledge in the corporate Wiki and incorporate user feedback. It is

experiencing the benefit of 'high maintainability of the source code'. The corporate Wiki is able to garner knowledge acquisition efforts through multi-user involvement, incremental changes, and quick releases in an environment that enables conversational knowledge acquisition (Wagner, 2006). Corporate Wikis simplify team collaboration and knowledge collection. The problems which are associated with tracking file versions or passing hard copies of memos and documents around the office will soon be passé. The worry of working on the wrong copy of a document will be alleviated. In addition, the costs of maintenance are low since the burden of maintenance is shared.

The next portion presents some well-known and commonly used Enterprise 2.0 technologies. There are too many Enterprise 2.0 tools to enumerate here, so I have carefully selected the tools that might be taken onboard by organisations to connect knowledge workers in order to boost their knowledge and their ability to learn.

2.3.5 Technology Best Adapted for the Corporate Wiki

The discussion below highlights the potential of some Enterprise 2.0 technologies to enable collaborative working and knowledge worker empowerment.

2.3.5.1 Social Networking Sites

Social networking websites are Communities of Interests (COI) (see section 2.1.10) that encourage users to register and write a profile by providing details about themselves via online diaries or journals, images, text, video and audio. Profiles may contain personal information such as photographs and descriptive comments about the member. They can link themselves to the profiles of their friends, their friends' friends, and so on, creating an online network of friends to send messages to or interact with in real life. Social networking sites (SNS) are designed to help people meet friends-of-friends, based on the assumption that it is easier to trust friends-of-friends via introduction in real life than total strangers. They pander to the voyeuristic characteristic of human character akin to peeping over the fence to see what your neighbour is doing. Users can restrict their webpage to friends by invitation only or permit anyone on the Internet to have access. Examples of SNS include MySpace and Facebook.

SNS focus on discovering and building online social networks for communities of people who share interests and activities, or who are interested in exploring the interests and activities of others, and which necessitates the use of software. SNS are popular because they are designed to find connections between people attempting to solve similar problems. By inviting friends and business colleagues to join them on SNS, it is hoped that this will create overlapping search communities based on mutual trust. SNS provide various ways for users to interact, such as chat, messaging, email, video, voice chat, file sharing, blogging, discussion groups, etc.

Many organisations still do not realise how pervasive SNS have become, so much so they have intruded in employees' work lives and employees have started workplace networks on their own accord. By checking on the number of workplace networks that admits employees if they have an employee email address, Wearing (2007) uncovered that the Telstra network on Facebook has 3080 members, the Macquarie Group has 2400, the National Australia Bank network has 1300 members and Westpac has 1080.

IBM's Lotus Connections offers the business equivalent of SNS like MySpace or Facebook, bookmark sharing site del.icio.us and blog search tools like Technorati, stitched together in one package. Lotus Connections combines five components: member profiles, activities, blogs, communities and dogear, IBM's word for how users identify and share Web bookmarks with colleagues. It uses the popular Web navigation technique of tagging to help users track popular discussion topics and figure out who may have expertise on any subject. Lotus Connections is expected to create much competition for Microsoft's market in the collaboration and e-mail messaging market, where five years ago Microsoft Outlook e-mail and its newer SharePoint collaboration software began to surge past rival IBM products (USA Today, 2007).

2.3.5.2 MySpace

MySpace was launched in 2003 to compete with sites like Friendster, Xanga, and Asian Avenue. The growing popularity of MySpace prompted Rupert Murdoch's News Corporation to purchase MySpace for US\$580 million in July 2005 (Freedman, 2007). MySpace is the Web's largest social network and one of the most trafficked sites on the

Internet. About 110 million people actively use MySpace to create pages with personal pictures, blog entries, video clips, and links to the pages of their friends (Stone, 2007). Its size and the passion of its users make it a good way to build interest among consumers, especially younger ones. MySpace's partnership with Google allows placement of ads targeted to specific pages, interests, and searches, thus making membership free to join.

2.3.5.3 FaceBook

Facebook was founded in 2005 as a social networking site for college students in Harvard University and then extended to other universities and colleges. It is based on the paper facebook that is given to college students to familiarise themselves to the faces of the students on campus. Facebook began as a social networking site especially for college students before opening up more broadly and emerging as a serious competitor to MySpace in the U.S. and abroad. Facebook began supporting high school networks and proceeded to support corporate networks in April 2006 the general public by September 2006.

The meteoric rise of Facebook has attracted the attention of Microsoft, Yahoo, Google and News Corporation; however the youthful 23 year old owner, Mark Zuckerberg has turned down US\$ 1.1 billion so far. It is reputed to be worth US\$ 11.25 billion (Freedman, 2007). Status updates incorporates blog-like commentaries that help the user's friends to keep abreast with the changes in daily or life situations. Facebook poking refers to a way of attracting attention to someone online similar to waving at someone in real life.

MySpace and Facebook sites are free and rely on advertising revenue from banner advertisements. According to Freedman (2007), the main difference between MySpace and Facebook is that MySpace is populated by teenagers and Facebook attracts adults. While Facebook was initially college-centric, the site gained popularity amongst older populations by mid-2007. Unlike other social networking sites, Facebook users are not able to make their profiles public beyond their networks. Structure-wise, MySpace appears to be more cluttered while Facebook is clean and simple.

However, social networking sites like MySpace and Facebook are criticised as being very one dimensional, empty experiences of the company. MySpace, in particular, has highly unstructured user generated content which meant that even though millions of pages were being served up, advertising was hit and miss and returned low yields (Coates, Suzor & Fitzgerald, 2007).

Nevertheless, SNS are of interest to companies in particular because of their business focus. For example, managers of recruitment agencies and Human Resource Departments use SNS because need input from exactly the right people, and those people are extremely hard to identify and track down (Freedman, 2007). Besides automating and shortening the in-person networking process, business focused SNS can help users find jobs, hire employees, and gather resources.

2.3.5.4 MyCyberTwin

An Australian company called RelevanceNow has developed a chatterbot or chat bot which are conversational agents engaging a natural language-based interaction with web site users (L'Abbate & Thiel, 2002). The company has also developed associated tools to evaluate a person's psychographics, which classify attitudes and values, likes and dislikes. Although chatterbots have been around for a couple of decades now, MyCyberTwin²⁴ is one of the first programs to allow users to actively educate their online personas to best suit their own by training the software with basic question-and-answer routines. MyCyberTwin is an intelligent software clone of real people with the ability to conduct life-like and intelligent conversations using artificial intelligence technology while their human twins are offline. The clone humans are able to talk like its owner, knows what they know and functions on their behalf on the internet, their artificial intelligence enable them to work out what people want to know and respond with the most relevant information (Howarth, 2007). MyCyberTwin lets users create and customise a virtual personality that can chat with others while they are offline. Subscribers can use the chat bot on blogs, dating sites or in social networks like MySpace by cutting and pasting code from the site onto the third-party page. The more information that MyCyberTwin has, the more personality the chat bot will have. The

²⁴ <http://www.mycybertwin.com/>

software allows users to pick one of five basic personalities, such as warm-hearted, intellectual or cheeky, down to earth, and then have that choice act as a chat proxy to friends or strangers. A user can also tailor their persona further by answering a set of psychological questions, like "Is success a motivator for you?" giving the chat bot more complexity. Users can review their friend's answers by looking in the log that MyCyberTwin keeps of all conversations (Olsen, 2007).

MyCyberTwin²⁵ has created a niche for itself by capitalising on the fact that companies need new systems to handle and benefit from the increased level of communication. It can potentially be an effective solution to managing information gathering and dissemination for visitors to corporate websites and blogs. For example, companies can use MyCyberTwin as virtual sales assistants which are always online to answer questions about their products in a lifelike conversation with customers. At the same time they gather information, such as why people visit a website, what they really think about a product, or where their owner's friends are going on the weekend. This information is used by the companies to target relevant advertising to their valued customers. The outstanding feature of MyCyberTwin is that its features are hard to copy unlike the features on existing social networks which easily can be copied by competitors. Another feature is its 'plug and play' functionality which makes it easy and popular with its users and advertisers.

2.3.5.5 Social Bookmarking Services

Social bookmarking services enable users to collect and tag their favourite Web links. It relies on folksonomy which is a collection of tags created by an individual for their own personal use (Andrews, 2007). Social bookmarking services include Del.icio.us²⁶ which is a social bookmarking and link-sharing application, Digg.com²⁷ is a popularity-driven site where users can submit, describe, review, and rank each other's websites in terms of preferences (Lake, 2008). CiteULike²⁸ is a social bookmarking site for academic papers.

²⁵ <http://www.mycybertwin.com/>

²⁶ <http://del.icio.us/>

²⁷ <http://digg.com/>

²⁸ <http://www.citeulike.org/>

Users register and then personalise their page, usually minimally designed, just annotated URLs to Web pages. Each URL is accompanied by a line of text describing it, followed by one or more words for tags. Tagging the link is similar to placing it in a specific Favourites folder of a Web browser, except social bookmarks are more specific and available on the Internet. Other users are free to read and use these bookmarks which are stored in a central server location accessible from any machine (Barsky & Purdon, 2006). Users can also subscribe to tags and receive a list of URLs tagged with a certain word on their del.icio.us page. Each annotated tag is dated, editable, and organised in reverse chronological order, blog-style (Alexander, 2006)

The most popular social bookmarking service to-date is del.icio.us, which was purchased by Yahoo in December 2005 (Markoff, 2005). The corporate Wiki can receive RSS updates from social bookmarking sites such as del.icio.us, which lets Web surfers tag and categorise Web content. Knowledge workers can share their favourite Web links and see what other people are bookmarking. The site can be searched using keywords. Each link is tagged with descriptors both general and specific which allow the user to create his/her own list of favourites to share with everybody else, or add to an existing collection. For example, if knowledge workers read a story which they think is relevant to the group, they can use del.icio.us to tag it user generated content (usg), use the keywords 'knowledge management' or 'bpr' short for business process re-engineering, the particular story will automatically appear on the corporate Wiki's RSS page.

Digg²⁹ is another social bookmarking site that encourages active human intervention. Digg is considered a leader in social news, where users determine what is important and interesting by submitting it, digging it and posting a comment. It is devoted primarily to technology topics, accepts submissions of stories that users consider worthy of public attention. The site has expanded beyond technology news, adding separate sections for Science, World & Business, Sports, Entertainment and Gaming. Users can then vote for, or "dig" stories they like, and the site promotes the results accordingly. IBM uses an enterprise level social bookmarking tool called Dogear. It is reported that IBM employees created 17,000 links within two to three months (Yarmosh, 2006).

²⁹ <http://digg.com/>

Information, data, and content which generally are referred to as knowledge are purposefully made more accessible and community based via social bookmarks.

Social bookmarking has been said to represent the shared discoveries, consensus and judgements of a community of users (Boulos & Wheelert, 2007). When users bookmark a site, the service reports how many others have bookmarked the same site. If users click on that number, they can determine who else has bookmarked the site and the date it was found. A further click shows them the bookmark collections of other users interested in 'their' site. Finally, if they choose a common tag, they can see all of the other sites that have been described with that particular tag. Thus users who share a common research interest are able to develop communities of interest and expertise (Barsky & Purdon, 2006). Tagging makes it possible for groups of independently acting computer users to create improvised classification systems. Tag clouds are groups of tags, also known as tag sets, from a number of different users of a tagging service. Information about the frequency with which particular tags are used can be collected. This frequency information is often displayed graphically as a cloud in which tags with higher frequency of use are displayed in larger text (Anderson, 2007).

Alexander (2006) describes three ways in which social bookmarking services enable collaborative information discovery. First, social bookmarking acts as an outboard memory for storing and organising in a central repository scattered links that is lost with time or too difficult to find again due to different browser bookmark settings, or in e-mails, documents, and web pages. Second, social bookmarking applications are expedient for users to exploit the insights of other users to locate information related to their research topic. They assist users in locating people with related interests, where learning from others or by leading to new collaborations can improve the quality of work. Third, social bookmarking reveals areas that are not obviously connected to the primary topic which is beneficial in opening new directions. User-created tagging can offer new perspectives for research. Clusters of tags reveal patterns or gaps not immediately visible. The ability to create multi-authored bookmark pages is useful for team projects. Tagging reveals individual perspectives within the project team.

2.3.5.6 YouTube

YouTube³⁰ is a web site that specialises in short, typically two-minute, user-created videos created by users. It allows users to upload video clips, which are made available to other users, who can view, rate, and comment on them. According to Nielsen (2006) the site was receiving 12.8 million unique visitors and holds the leading position for the most popular media repository.

Tagging is not only used for social bookmarking services but for other Enterprise 2.0 applications as well. For example, applications like YouTube (video) and Odeo (podcasts) allow a variety of digital artefacts to be socially tagged. Any source that includes RSS feeds will want to have as many people add them as possible. Just having RSS feeds alone implies an invitation to run headlines like a news reader. It can be a powerful medium if this is used in conjunction with YouTube.

YouTube makes it easy to send out e-mail links of videos they found interesting, creating a powerful viral marketing environment. It is used by companies who want to take advantage of free advertising and publicity by promoting new products and services. For example, Listerine Pocketpaks® have put up commercials advertising Freshburst® on YouTube. TV networks have shown promotional shows and clips from Better Homes and Gardens, and Gardening Australia. In Australia, in the run up before the federal elections in November 2007, both the Prime Minister John Howard, and the incumbent leader of the opposition, Kevin Rudd have launched YouTube videos in a bid to garner more votes (Howarth, 2007)

2.3.5.7 Podcasting

Podcasting is the technology that allows for distributing audio or audio/video programs automatically over the Internet through the publish and subscribe model. Podcasts are not a downloadable audio or video file. They are audio programs which are time and location independent digital files (Boulos & Wheelert, 2007). Its uniqueness lies in its subscription model which uses feeds (like RSS or Atom) to deliver the enclosed file. Software like iTunes for an Apple iPod and Juice which is suitable for iPods, portable

³⁰ <http://www.youtube.com/>

digital media players, or computers enables computer users to subscribe to regular podcast feeds. Computer users can download podcasts automatically to be stored and played at the user's convenience. It uses an aggregator or feed reader capable of reading audio/video feed formats such as RSS or Atom. Podcasts can be played on any laptop or desktop computer equipped with speakers and supported by media software such as Windows Media Player or Quicktime Pro.

Podcasting is gaining respect among educators. For example, universities around the world such as Drexel, Duke, Cambridge, Bath, Sydney and Wollongong are using podcasting to reach out to their students. Organisations such as Britain's national tourism agency, Visit Britain³¹ use podcasting to showcase some of Britain's best cities and to generate publicity for British music artists. Digital media has been taken up another notch with the introduction of video podcasts also known as vidcast or vodcast. Online delivery of video-on-demand clips can be played on a PC, or MP3 player equipped with video playing function.

Podcasting can provide insights, intelligence and business advice to other organisations in a similar industry, as well as offer a wide range of successful partnership opportunities. Examples include a weekly or monthly podcast featuring a discussion about the company's product and or industry insights such as an ongoing update on news from its industry. Subaru implemented Enterprise 2.0 technologies into its training program so that a single trainer can reach 600 dealers within six months at a cost of US\$0.075 per person. Besides monetary cost savings, the company was able to reduce the travel time for trainers and provide a way for employees to revisit the key program information whenever they need it (Griffiths, 2007). Distributing podcasts is a simple process. Subscribers to RSS feeds will receive information about new podcasts as they become available. The difficulty is producing a good quality audio file.

2.3.5.8 RSS

RSS is an acronym for Really Simple Syndication and represents the family of formats which allow users to find out about updates to the content of RSS-enabled websites, blogs or podcasts without actually having to go and visit the site. Instead, information

³¹ <http://www.visitbritain.co.uk/about-britain/image-and-sound-gallery/videos/cities.aspx>

from the website such as the story's title and synopsis and URL link, is collected within a feed (which uses the RSS format) and piped to the user in a process known as syndication (Anderson, 2007). In essence, the feeds themselves are just web pages, designed to be read by computers rather than people.

A user needs to install software such as amphetadDesk or NetNewWire, usually described as news readers or news aggregators onto their computer desktop to use the feed. The newsreader checks the feeds and lets the user read any new articles that have been added. RSS supplies rich meta-data about Web-based resources, which can then be automatically retrieved and catalogued by RSS software. RSS feeds can also be read with the sidebar of Netscape 7. Subscribing to RSS feeds enables the client software will then periodically check for updates to the RSS feed and keep the user informed of any changes.

RSS files are most commonly created with a text editor, but can also be written in an XML or HTML editor. RSS allows users to define their own information feeds from data stored in corporate applications and can used to publish frequently updated content such as blog entries, news headlines or podcasts. Yahoo has integrated RSS feeds into its personalised offering, My Yahoo. Content is added to My Yahoo page by topic or by 'Editor's Picks'. Efficient use of RSS will essentially redefine how information is located and consumed in the enterprise.

To ensure that the corporate Wiki is always updated with the latest news items about what interests the corporate Wiki community such as news, sports, entertainment, online publications and blogs, the benefits of implementing an RSS feed is obvious: deliver information to visitors even when they are not actively surfing your site, and they will come back when an item piques their interest. For other types of businesses, an RSS feed can keep an organisation in constant contact with its past customers. New product information, sale announcements, and coupon offers are good examples of what may resonate with customers. Also, customers may be more likely to click on an RSS subscription than they are to subscribe to a newsletter, because they do not have to share any personal information (namely their e-mail address) to opt in. And perhaps the

biggest advantage of RSS over e-mail is that the organisation avoids getting caught in the recipients' spam filters.

2.3.5.9 Mashups

Mashups which are named after hip-hop mixes of two or more songs are another interesting phenomenon. A mashup is the result of an Internet application that blends or mashes together two or more sources of content or data known as Web services, available on the Internet. Mashups are also known as situational applications because they are seldom developed from scratch; rather, they are assembled from existing building blocks. The rise of situational applications is not attributed to technological changes alone. Increased computer literacy and current Web development enables casual programmers to create composite applications out of components, even if they have little technical knowledge of the underlying capabilities.

Mashups have the facility to mix map data, photos, video, news feeds, and blog entries, provide rich user interfaces that address the need for increased worker productivity by making it easier to find and use the information that a worker needs for a particular task or role. Mashups are targeted at people who want to make Web applications without the aid of professional programmers. Mashups are facilitated by what are known as open APIs – Application Programming Interfaces. An API that does not require the programmer to license or pay royalties is often described as open (Anderson, 2007).

Examples of platforms include QEDWiki (quick and easily done Wiki), ADIEU (Ad Hoc Development and Integration Tool for End Users), and more informally, Wiki platforms such as SnipSnap, permit a high degree of extension and customisation (Cherbakov et al., 2007). IBM, for instance, helped the U.S. Chamber of Commerce Center for Corporate Citizenship mash together a one-stop shop for people displaced by Hurricane Katrina to find jobs. People type into one box the kind of job they're seeking, and the site searches more than 1,000 job boards, then shows their location on a Google Map (Hof, 2006). In spite of the increased competition by linking the company with potential rivals, Amazon and other Web giants such as Yahoo, Google, Ebay and Technorati are now embracing the mashup movement by offering developers easier access to their data and services (BusinessWeek, 2005a).

2.3.6 Ecosystem Analysis

In keeping with the Australian Standard's (AS5037, 2005) approach of using the concept of a knowledge eco-system to assist organisations to understand the environment best suited for enabling their KM activities (see section 2.1.3), perhaps, it is more useful to employ visual representation and reasoning to explain how organisations can use Enterprise 2.0 technologies.

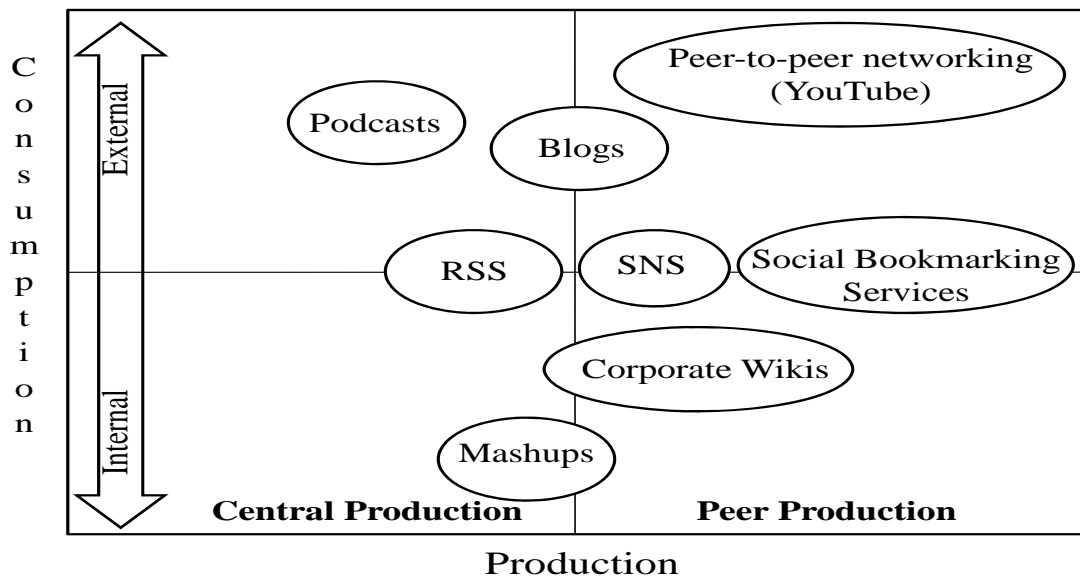


Figure 2.3 Emergent Enterprise 2.0 Technologies Ecosystem
Source: Adapted from Hinchcliffe (2007)

The diagram shows how to employ collective efficiency in terms of central or peer production and how organisational knowledge is consumed. Corporate Wikis complement KM processes embedded in other Enterprise 2.0 technologies, such as blogs, social networking sites (SNS) e.g. Facebook and MySpace, social bookmarking services e.g. del.icio.us and Digg.com, peer-to-peer networking e.g. YouTube, podcasts, Really Simple Syndication (RSS) feeds, and mashups. It presents a comprehensive map of the emergent Enterprise 2.0 technologies ecosystem that positions the organisation in the web of value creation and assesses the interdependencies that determines the flow of benefits and the organisation's ability to capture a significant share of them.

This ecosystem analysis illustrates how knowledge workers can create organisational knowledge pertinent to the organisation's existing and future business. The vertical axis depicts the general tendency towards internal and external consumption of Enterprise

2.0 technologies. The horizontal axis reflects central production methods that encapsulate a more traditional way of production based on hierarchy and control where resources are allocated to tasks directed by managerial instructions as opposed to peer production approaches which embrace the collective efficiency of the crowd to contribute knowledge that was always latent and uncaptured; and/or build tools that democratises organisational knowledge. The corporate Wiki (with its membership restrictions to employees only and hosting on the organisation's intranet) straddles over the central and peer production sectors. However, because the Wiki encourages knowledge workers to generate content for organisational knowledge mobilisation and diffusion; it is seen as actively engaging in peer production modes and incremental innovation.

The next section considers literature review with regard to the challenges of delivering a corporate Wiki assisted by other Enterprise 2.0 tools to organisations which can support knowledge work and the possible strategies to overcome barriers to effective Wiki implementation.

2.3.7 Challenges Facing Enterprise 2.0 Technologies

Adopting emerging Enterprise 2.0 technologies must be effective at addressing broader challenges such as accessibility, affordability, accountability, and improved knowledge discovery, creation and learning. The organisation needs to determine how these applications can serve the organisation, rather than adopting merely because it is the latest trend. As most of the Enterprise 2.0 technologies are available publicly on the Internet as opposed to the corporate Wiki which is used only within the organisation, there will be more pressing issues to consider.

2.3.7.1 Social Issues

New technologies such as those predominantly associated with Enterprise 2.0 (see section 2.3.3) and social technologies (section 2.2) were specifically designed to alter the way we connect with one another. This segment brings some thoughtful insights on the social impact of emerging technologies and trends.

2.3.7.1.1 Motivation

Studying the human characteristics that motivates corporate Wiki contributors will give an insight to the corporate Wiki's success. The motivation to contribute to online communities can spring from a variety of sources. Contributors are motivated by their enthusiasm, altruism, obsessive compulsiveness, and egotism.

Some contributors are enthusiastic because there is an expectation of reciprocity from the community in the future. There are some who are genuinely motivated by the greater good, citing a sense of value to contribute to a worthwhile project. A number of commentators cite the increasing propensity for individuals to engage in the creation and manipulation of information and digital artefacts as a major positive benefit (Anderson, 2007). Some people find it satisfying to apply their professional knowledge to a broader audience, pro-bono style so that they can fulfil a need to sustain their reputation. Although some people are driven by monetary motives at the head, at the lower end of the tail is reputation. Living in an exposure culture means that getting noticed is everything (Anderson, 2006, p. 74).

Contributing to the corporate Wiki can be an addictive experience because it lets users have a hand not just in shaping the debate, but also in designing the product. Then again, on the other side of the spectrum are contributors who are motivated by embarking on an ego-trip just to prove how clever they are. A corporate Wiki is constantly stimulating users through the prospect of having an ego-satisfying piece of the action. It is rewarding users by allowing them to see the instant improvement in their work.

Change management aims at overcoming barriers from a lack of motivation and competence that can hinder employees from attaining successful KM in an organisation. Change management is required in organisations who want to make decisions about cultural transformation in order to succeed in KM initiatives (Mertins et al. 2003). It becomes a tool for the transfer of technology innovation into action. There are two approaches to change employees' thinking and acting that emphasis (short term) behavioural change and (long term) change of attitude. Behavioural change can be brought about by motivational approaches for knowledge behaviours incentives such as

incentives tied in with work evaluation and compensation structure (Davenport & Prusak, 1988). A change of attitude requires direct and personal experience; and a socially transmitted experience (Mertins et al. 2003).

2.3.7.1.2 Incentivisation

Incentives intrinsically and extrinsically motivate employees to carry out activities encouraged by the organisation (Hertzberg, 1968). There is a distinction between material and immaterial incentives but both exhibit characteristics of extrinsic motivation. For example, monetary gratification to reward employees for sharing their knowledge is considered to be a material incentive. Along with competitive salaries, other rewards such as a bonus program needs to be aimed at anyone who goes above and beyond the call of duty e.g. paid overtime to someone who comes up with something extremely creative. It might be \$500 or \$1,000 or a shopping gift certificate. This may be an essential means of reinforcing desired behaviour for sharing and disseminating knowledge. Responsibilities, structure of decision and career prospects belong to immaterial incentives (Mertins et al. 2003). Intrinsic motivation emerges from the task itself because the activity in itself is satisfying (Hertzberg, 1968).

Incentives have a short term effect and do not change attitude, but cause a behavioural change in the first place. A change of attitude may come about through participation via social transmission (Frey & Osterloh, 2002). For example, interactions within the Wiki community while conducting knowledge work in their daily routine instil confidence in the new technology. No template, however, exists for making these changes, because it ultimately requires complex interrelated changes in organisational culture and systems (Kirrane, 1999). As a result, each organisation chooses the characteristics that best fit its culture and business needs (ibid.).

2.3.7.1.3 Lack of Time and Poor Knowledge Perception

A lack of time is a cultural factor that can inhibit knowledge transfer and unfortunately, time, is the resource most likely to be begrudged to knowledge workers (Davenport & Prusak, 1988). Poor knowledge perception may be due to the belief that knowledge is

prerogative of particular groups, not-invented-here syndrome or having a narrow idea of productive work, or that knowledge creation and acquisition requires time (ibid.). The common denominator for these two challenges is that managers must understand that knowledge generation contributes to organisational performance and business success, and is an important part of knowledge work and must be considered a part of the business process that needs to be nurtured.

2.3.7.1.4 Low Work Morale

Traditional hierarchies take for granted that work goals are agreed upon and demand that employees work within the domains delimited by higher level management (Clement, 1996). This often results in low work morale because employees taking on additional responsibilities without the corresponding authority and resources at their disposal (ibid.) For knowledge workers whose autonomy are controlled by traditional hierarchies, the spread of Enterprise 2.0 technologies holds the promise of gaining personal control over knowledge creation and acquisition. The pursuit of greater control is to challenge management but for knowledge workers to do their jobs more efficiently, improve their working conditions and enjoy greater respect.

2.3.7.1.5 Fear of Technology

Enterprise 2.0 tools provide a myriad of different ways to access information and knowledge e.g Wikis, blogs, social bookmarking services etc. This fear may be due to a general misunderstanding or apprehension of technology (Taipale, 2004). For example, some knowledge workers may worry that they do not understand or that they will be unable to cope in learning how to use these tools. A sense of anxiety may even develop as to whether they are as fully connected as they should be.

2.3.7.1.6 Building Trust

Trust levels are lowest in work settings where diversity (gender, race and culture) is the highest (Kipnis, 1996). When people have to trust, they are faced with dilemma. When we trust we give the trustee power over us. Management uses legal and coercive power such as threats, demotion, sacking and legal action, to control their employees they must

trust (Kipnis, 1996), resulting in distrust and suspicion from their employees (Kramer, 1990). Kramer (1990) states that there is accumulating evidence that trust has a number of important benefits for organisations and their members.

Since the content in corporate Wiki environments is never permanent but always open to changes, updates, remixing and reuse, managers fear that an individual or interest group can create articles coloured with prejudice or editing articles that were damaging to work unit/department/organisation's interest. Even authority figures are prone to a lack of neutrality. Recently, it was discovered that both the Federal Government of Australia and NSW State Government have allegedly made a number of surreptitious edits to their Wikipedia's entries. For example, it is alleged that staff from the Department of Prime Minister and Cabinet have been editing Wikipedia entries ranging from the children overboard affair to the ex-Federal Government Treasurer, Peter Costello, so as to remove details that might be damaging to the Government (Moses, 2007a). The Wikipedia's entry on Morris Iemma, ex-NSW State Premier, includes details of profanity-laden remarks directed at the then chief executive of Sydney's Cross City Tunnel. However, it is alleged that an employee from the NSW Premier's Department - which include Mr Iemma's office and those of his cabinet ministers - removed all traces of the outburst from Wikipedia (Moses, 2007b).

The recent availability of a free online tool called the WikiScanner, can trace the IP addresses i.e. digital fingerprints of those who make entry changes to Wikipedia. It may not be able to identify individuals, but it can pinpoint the organisation whose computer network is used to make an edit. For instance, computers in the Department of Prime Minister and Cabinet use a network with IP addresses in the range of 210.193.176.0 - 159 (Moses, 2007a). It is already accomplishing its goal of uncovering covert edits and making Wikipedia editors more accountable.

The 2007 Edelman Trust Barometer³², an annual survey initiated by Edelman, the world's largest independent public relations firm, measured the public's confidence in corporations, government, media and other major institutions; found that people tend to trust their peers more than authority figures. In this study, a peer is defined as a person

³² <http://www.edelman.com/trust/2008/>

like me. Conversations with friends and peers are considered a trusted source of information as articles in newspapers or television news coverage. Rank-and-file employees are more trusted than CEOs in both the United States and Europe. In every region e.g. European Union, Asia, North America, Latin America, respondents most often named shares a common interest with you as one of the top three characteristics that would increase their trust in a person sharing information about a company (Creevy, 2007). The growing trust in 'people like me' which includes peers and the average employee, means that companies must learn to design their communications from the horizontal or the peer-to-peer axis instead of the top-down axis (ibid.). These findings imply that Wiki users may be willing to accept information they find published online, even if it is inaccurate. People are increasingly relying on their peers for information because they are perceived as being less biased.

The 2008 Edelman Trust Barometer³³ revealed that corporate communications must incorporate social media: The findings showed that social media matters most to the 25 to 34 age group which Edelman dubs as 'info-entials'. For instance, Wikipedia is listed as the number 2 most credible source of information about companies in the US, after business magazines. Google, which aggregates news, is cited as one of the three global media sources. The other two are CNN and BBC. 'Info-entials' gather information in a profoundly different manner than their older peers. They rely on multiple sources of information throughout the day which they obtain from message boards or forums, blogs, Wikipedia, and social networks, as well as by checking more traditional forms of media, including newspapers (usually read online), television, and business magazines.

A new social and cultural environment characterised by trust, cooperation, and shared understanding of evolving operational needs is needed. To build trust, organisations need to localise knowledge, be transparent, and engage knowledge workers continuously, respecting and rewarding their views. If done correctly, an organisation's corporate Wiki will allow knowledge workers to participate in knowledge collaboration while at the same time, increase its credibility.

³³ http://www.edelman.com/TRUST/2008/TrustBarometer08_FINAL.pdf

2.3.7.2 Management Challenges

The value proposition of adopting Enterprise 2.0 technologies is strong but there are a number of obstacles that need to be overcome. Questions managers are asking include how they can:

- protect the integrity of company information/knowledge from disgruntled/careless employees, malicious competitors and members of the public,
- give up their ability to control information/knowledge within the organisation,
- encourage employee participation,
- increase productivity through the investment of these technologies,
- manage the creation and sharing of a huge amount of unstructured information/knowledge; and
- secure company knowledge assets, intellectual property and trademarks that are acquired and disseminated so freely, to remain behind the firewalls.

2.3.7.2.1 Potential for Vandalism and Misinformation

According to Wikipedia³⁴, “any addition, removal, or change of content made in a deliberate attempt to compromise the integrity of the Wiki” is considered as vandalism. The most common types of vandalism include the addition of obscenities or crude humour, page blanking, or the insertion of nonsense into articles. There is a growing awareness that as the open nature and speed of disseminating the volume of information available from the Web grows, the ability to determine what is accurate and from a trusted source becomes ever more difficult. For example, it is impossible to control the unmediated voices of the public at blog sites via the user comments. Disgruntled, ex-employees, customers and even unethical competitors might insert comments on the blog to say that the information on the blog is not credible.

Part of the problem stems from an abuse of anonymity privileges that may cause misinformation for a public Wiki. Just as encyclopaedias such as Britannica and Encarta employ professional editors with academic backgrounds, Wikipedia editors known as ‘Admins’ (administrators) are granted special powers. They can protect, delete and

³⁴ <http://en.wikipedia.org/wiki/Wikipedia:Vandalism>

undeleter pages, block specific IP addresses from editing, or quickly revert pages in the event of vandalism. Admins do not have to be subject specialists or experts in their chosen field. Wikipedia is proud to be an encyclopaedia that anybody can edit and the stress is on anybody. It is difficult to determine no way of knowing who the Admins are. Some user pages give personal details, but others give little more than a username and a vague list of interests. This means that Admins can pretend to be someone else entirely. The famous example is Ryan Jordan. Under the username of Essay, Jordan is an Admin and influential Bureaucrat, claiming to be a tenured professor of religion with a PhD in theology and a degree in canon law. In fact, he is a 24-year-old college drop-out, a fact that embarrassingly comes to light in an interview with *The New Yorker* (Andrews, 2007).

The potential for misinformation for a public Wiki, discussion forum or blog is substantial, although collective efficiency (see section 2.3.2.3) can significantly compensate for this and ensure acceptable quality.

2.3.7.2.2 Challenging the Status Quo

The rise of Information and Communication Technologies (ICT) brings with it a fear that the creation and accumulation of information and knowledge by employees would shift the balance of power away from management (Taipale, 2004). More so for Enterprise 2.0 technologies, because if knowledge is indeed power, the amount of information/knowledge available to employees who will be given the liberty to create organisational knowledge in the corporate Wiki will for a large part determine to what extent power can be exercised over management. The issue at stake thus seems to be the restriction of democracy and the preservation of power.

Organisations might reject Enterprise 2.0 tools because they personify peer power that presents difficult challenges for anyone invested in the status quo. Organisations will have to contend with ad hoc groups from the public who have the power to join forces online to get what they want. People are creating what they want themselves e.g. designing their own software with colleagues, and declaring their opinions via blogs instead of waiting for newspapers to print their letters.

Needless to say, companies ignore the lessons contained in this corporate graffiti at their own peril. The term ‘prophetic minorities’ was coined by journalist Jack Newfield, to describe the radicals of the 1960s (Newfield, 1966). Today these prophetic minorities are making themselves heard on the Internet. They were successful in stating their claims about the McDonalds’s lack of nutritional meals, highlighting Nike’s child-labour issues, and championed open source software at the expense of Microsoft. “The value of corporate graffiti reaches beyond what it says about your business, to what it says about your competitors and the consumer psyche in general” (Hanft, 2003).

More importantly, how will knowledge workers handle challenges to established ideas about hierarchy and the production and authentication of knowledge in the organisations they work for? Especially if they have been raised in a more socially networked Web, perhaps firmly entrenched in their peer and mentoring communities through SNS like MySpace and Facebook.

2.3.7.2.3 Encouraging Participation

Managers want to know how to encourage participation and what kind of training employees need before they can effectively use Enterprise 2.0 technologies. Enterprise technologies have a better rate of participation than other KM initiatives in the past 15 years because they were not a good fit for knowledge workers and the way they actually work (Sinclair, 2007). He adds that Enterprise 2.0 technologies are a much better fit for KM practitioners and the organisations in which they work because they bring changes to their social and working lives. Organisations can boost user participation by adopting Enterprise 2.0 tools that can achieve business benefits from increased user participation in a number of ways: user reviews, user ratings, blog comments, social networking tools, content sharing tools, and so on (Lake, 2008). Another way to encourage participation and train employees is to leverage the principles of the Open Source Movement (see section 2.3.4.5.1).

2.3.7.2.4 Social Networking or Social Not-working

Some organisations discourage technology innovation because innovation is seen by some as dangerous and faddish. One of the reasons raised for not encouraging technology innovation are that employees will use company time to ‘play with’ or learn new technologies. Employers fear that SNS are having a detrimental impact on staff productivity. It is easy to develop a bad blog or Facebook page. It takes time to maintain a good one, time that could be spent on the organisation’s main website which raises issues about what is productive. There was extensive coverage in the Australian media releasing a statement from an Internet filtering company SurfControl, where it claimed that the use of Facebook on company time is costing business up to A\$5 billion a year (West, 2007). The social networking site has become so popular worldwide and in Australia. At last count there were 479,500 members signed up to its Australia network and more than 41 million Facebook users worldwide.

Some organisations were so concerned that they blocked staff from accessing it altogether, including Australian media and telecommunication giants Channel 7 and ACP Magazines and Telstra (Wearing, 2007). Critics scorn this spurious figure saying that is based on 800,000 employees spending an hour a day on Facebook, numbers which no existing Australian organisation has. In addition, critics claim SurfControl has other vested interests to paint an alarmist view, because it sells software to block employees using sites such as Facebook (West, 2007).

This scare-mongering is very similar to the ones that have been recorded in history. Plato criticised “the use of writing as a medium of carrying thought and values, and feared that man would rely on writing... and would cease to use memory” (Rijlaarsdam et al. 2005). The telephone was seen as invasive and unnecessary and not so longer in the mid-1990s many companies banned email because it was perceived to be a waste of time. It is interesting to see how those very companies who banned email still do so today, and how far they would be lagging behind their competitors in terms of productivity.

The risk of banning Enterprise 2.0 technologies in work environments can prevent people from learning about the modern world, everything from corporate Wikis to social networking tools they increasingly need. A Galaxy survey found many young workers saw banning access to social networking sites such as Facebook, at work as a betrayal of trust (The Age, 2008). The survey found that banning sites could hamper efforts to recruit young workers in a tight labour market. It found almost half those who used the sites at work would choose an obliging employer over one who blocked access. Organisations that have resorted to banning these applications are avoiding the real source of the problem. This is a management issue and such organisations need to learn how to manage their employees better. Individuals who are spending huge amounts of time at these sites at the expense of work productivity need to be punished, instead of banning everyone in the organisation. Organisations are encouraged to consider the important role Enterprise 2.0 technologies play in people's daily lives. These technologies are an incredibly efficient way for people with real-world connections to share and communicate information and knowledge, including among people who work together. Employers need to explore the site to understand the advantages Enterprise 2.0 technologies are able to bring to communication amongst employees.

There are some social networking saavy companies that are bucking the trend. Siemens already has 6000 employees using Facebook. Facebook is so effective as a social network that Siemens developed their own applications called Scholar Network for employee use and to replace the Siemen's corporate intranet (Rana, 2007). The British Broadcasting Corporation (BBC) is so enamoured by Facebook that its network as of August 3, 2007 has 14,726 members. Richard Sambrook, the Director of BBC World Service and Global News, wrote on his personal blog SacredFacts that "(t) here are over 10,000 members of the BBC group (for which you have to have a BBC email) alone. That's about half the entire organsiation."

Deloitte Australia, for example, uses Facebook inside its organisation. Staff members are encouraged to use the application to connect and keep in touch. There are 14,000 active members on the Deloitte's Facebook network and the numbers keep rising (Fleming, 2007). 233 employees have signed up for Facebook from travel agency Flight Centre. The company thinks that it is a good way for employees and clients to interact

with each other. It has released a new staff policy endorsing the use of Facebook. Flight Centre requests responsible behaviour from staff, respecting the Flight Centre brand and reputation when using the company's name or logo online. While IBM's Facebook network may consist of a huge number of employees, 17,800 internationally, IBM Australia's internet policy does not specifically mention Facebook. Nevertheless, it encourages its employees to be responsible when exploring new spaces of relationship-building, learning and collaboration such as blogs, podcasts (Wearing, 2007).

Another reason for not encouraging technology innovation is that new technologies are too expensive and time-consuming to purchase, implement and maintain (Sinclair, 2007). Creating and acquiring knowledge and making them accessible to employees are not trivial matters. It is seen by organisations as a time consuming and expensive process, in terms of purchasing new technologies, hours expended actually conducting knowledge work and later maintenance expenditures. As technology evolves, expensive and time consuming upgrades eventually become necessary, requiring knowledgeable personnel to implement and maintain them, as well as instructing users in the proper use of these new resources. As most Enterprise 2.0 technologies are free, for example, MediaWiki, it can help alleviate the expense of purchasing such technologies (see section 2.3.4.5).

The final reason for discouraging technology innovation wants to see evidence that these new technologies will increase productivity. Castells (2000) provides this evidence. Reflecting on the empirical findings of several European, Latin American and Asia Pacific countries, and the U.S., he says that technological change improves productivity i.e. reduces the working time per unit of output. He adds that, technology innovation reduces the level of employment for any given demand because the quality and the quantity of jobs change, in the nature of work performed and who works where and how. Individuals or groups who cannot acquire informational skills will be excluded from work or downgraded as workers.

2.3.7.2.5 Trading Quantity for Quality

Managers are concerned about how to ‘control’ the gathering and disseminating of so much unstructured information/knowledge. For example, most of the Social Networking sites (SNS) offer more quantity than quality (Feizy, 2007). If a user were to join MySpace or Facebook, it will be easy to establish a network of thousands of contacts. The problem is that managers of sophisticated, fast-growing companies do not need the world’s opinion when they have a question. They obtain input from the knowledge worker(s) who are already working in their organisation, again proving how valuable the corporate Wiki can be in collecting and preserving tacit knowledge. Furthermore, managers want assurances that information/knowledge is being ‘tagged’ properly through the use of Wikis and social bookmarks for efficient retrieval in the future.

2.3.7.3 Technical Issues

Although technical issues are obviously central to any IT infrastructure, Enterprise 2.0 technologies present similar challenges as compared to a company’s website, intranet or extranet. Immediate concerns include excessive bandwidth, server outages and design issues. The more pressing concerns are security risks.

2.3.7.3.1 Security

The freedom of sharing and collaborating knowledge might introduce security risks. The vast majority of people who participate on SNS are at risk due to the privacy and variety of disclosed information and possible connection to their real identity (Feizy, 2007). Social engineering attacks using SNS are a growing but often underrated risk to corporate IT infrastructure (Hasib, 2008). The main risk here is the loss of corporate intellectual property, but other crimes, such as hacking corporate networks to cause damage, blackmailing of employees to reveal sensitive customer information and even to access physical assets (ibid.)

Enterprise 2.0 technologies can be susceptible to corruption and collusion. Since Enterprise 2.0 platforms enable anyone to upload content, these sites are easily susceptible to hackers uploading malicious content to these sites and so infecting the

community at large. For example, the German edition of Wikipedia's entry on BlasterWorm had a link to malicious code and it was used to distribute malware to unsuspecting users who thought they were getting information on a security patch. Although the link was removed quickly, it did cause some disruption (Sydney Morning Herald, 2006).

The Samy worm involved an online banner advertisement that ran on MySpace which exploited a Windows vulnerability to infect more than a million users with spyware. Internet Explorer users who visited a web page containing this advertisement and whose Internet Explorer was not equipped with the latest Windows Media File patch was most likely infected. Their machines would silently download a Trojan program that installs adware bombarding the user with pop-up ads and tracking their web usage (Ben-Itzhak, 2007).

Asynchronous JavaScript and XML (AJAX) comprises a set of web technologies that are combined to enable web browsers to refresh content (e.g. RSS feeds of stock quotes) in real time allowing a web page to request an update on the content, or part of the content, and to alter that section of the users' remote web browser, all without having to refresh the whole page. This poses a problem, since URL filters and anti-virus applications are looking for signatures, which are impossible to spot when the content is effectively being loaded in parts. Some of the notable early adopters of AJAX are Google Maps, Yahoo and MySpace.

The major drawback for SSN and blogs is network spam. A popular spamming tool named Trackback Submitter³⁵ submits the spammer's website links to related websites automatically. It can also automatically create new accounts and promote the spammer's websites by tagging the URLs multiple times under different usernames. A member's profile in SNS may get people who are not kindred spirits asking to connect with the member. Spammers may list their advertisements in the blog's comments section. Spammers have started bookmarking multiple times the same web page and/or each page of their web site using a lot of popular tags, forcing developers to constantly adjust their security system to overcome abuses (Emerson, 2007). Due to its popularity some

³⁵ <http://www.submit-trackback.com/>

users have started considering it as a tool to use along with Search Engine Optimisation (SEO) to make their website visible. The more a web page is submitted and tagged, the more chances it has of being found.

The use of Enterprise 2.0 tools does not introduce new security vulnerabilities in the realm of web applications because they are a combination of existing technologies used together to develop highly interactive web applications. It is my contention that the applications face the same security issues as other web applications. According to Twynham (2006), common AJAX best practices such as proper authentication, authorisation, access control and input validation, have not been developed. This leaves security professionals to tread the path of trial and error.

Any attempt to incorporate new tools must come with a clear solution for data access, leakage, and mishandling. Furthermore, as mobile access to enterprise data and applications becomes more prevalent, there must be a way of reducing the threat of unauthorised access to the data travelling between locations, while still being able to provide the knowledge worker with easy access (Nass & Levitt, 2007). The issue of data and network security is no longer just a technology problem but also a criminal, legal and most of all, a management problem.

2.3.7.3.2 Implementing and Maintaining Enterprise 2.0 Technologies

A report, entitled *Serious Business: Web 2.0 Goes Corporate*, conducted by the Economist Intelligence Unit (EIU) asked 406 senior executives for their views on Web 2.0. Over a quarter of respondents said their IT departments lacked the competence level to implement Web 2.0 applications effectively (Ryan, 2007). If organisations are keen to adopt these technologies, then it is a matter of hiring new IT staff or outsourcing to external resources. White (2007) says that Enterprise 2.0 technologies offer new ways of building, deploying and using IT applications - the focus being on simplicity and user self-sufficiency, because it provides powerful but easy-to-use tools for publishing, sharing, finding and collaborating about corporate information/knowledge.

2.3.7.3.3 Excessive Bandwidth and Server Outages

Bandwidth management is a major issue in Enterprise 2.0 environments, particularly with the increasing popularity of the use of graphics, pictures and video clips. This popularity is in some respects a natural response to technological change because bandwidth, server and storage space have all become much cheaper. For systems not designed to handle large volumes of data, it may not take much to disrupt the network through excessive bandwidth use. The organisation may issue three warnings to the user. After the third strike, the user's network port will be significantly slowed so as to prevent further excessive use of network resources. It is important to differentiate between prohibiting and discouraging the monopolisation of a valuable system resource such as bandwidth.

A server outage may be caused by hardware or software problems or power failure where the server does not respond to the requests for service. However, this problem pertains to all websites and is not exclusive to Enterprise 2.0 applications.

2.3.7.3.4 Design Issues

There are drawbacks to such tag-based systems as well. For example, there are no standard set of keywords known as controlled vocabulary, no standard for the structure of such tags (e.g. singular vs. plural, capitalisation, etc.), mistagging due to spelling errors, tags that can have more than one meaning, unclear tags due to synonym or antonym confusion, highly unorthodox and personalised tag schemas from some users, and no mechanism for users to indicate hierarchical relationships between tags. For instance, a site might be labelled as both cheese and cheddar, with no means of identifying that cheddar is a type of cheese (Emerson, 2007).

2.3.7.4 Legal Issues

This section identifies the principal legal risks arising from the use of Enterprise 2.0 technologies in organisations and how to mitigate these legal risks concerning intellectual property. The benefits of Enterprise 2.0 technologies can be swamped by concerns over the increasing level of regulation under which companies find them

working, and the risk-averse legal perspective this engenders. Hence, companies stick with traditional methods of reaching consumers, even though consumer audiences are fragmenting, thanks in part to Wikis, blogs and podcasts. Similar to the legal concerns raised by the corporate Wiki, the four main legal risks are copyright infringement, trademarks, defamation, publicity and failure to protect the privacy of personal information. Failure to comply may result in lawsuits and damages. As Enterprise 2.0 security litigation is still relatively new, it hardly covers the deluge of international security issues that are now commonplace in all areas of business and government.

2.3.7.4.1 Copyright Infringement

Intellectual property (IP) represents intangible property such as the property of a person's mind or intellect. It can be an invention, trade mark, original design or the practical application of a good idea; or confidential information (IP Australia, 2008a). In essence, an organisation's proprietary knowledge is a key component of success in business today. Organisations may choose to protect intellectual property through a range of laws such as the Copyright Act 1968 (Commonwealth)³⁶, Trade Marks Act 1995³⁷, and the Australian States Defamation Acts³⁸.

Under the Copyright Act 1968 (Commonwealth), the copyright owner has a number of exclusive rights, including the rights to reproduce and to communicate the work to the public (broadcast or place on the Internet). There are also a number of fair dealing exceptions to copyright infringement, including fair dealing for the purpose of criticism and review, parody and satire, research and study, and reporting the news.

Copyright law is relevant to blogs and podcasts because it applies to creative and expressive works, which are most of the things that are included in a podcast. This includes, for example, performances, scripts, interviews, musical works, video clips and

³⁶<http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/frame1odgmentattachments/62632B5B1514AEB0CA2570DC000DF45C>

³⁷<http://www.comlaw.gov.au/comlaw/management.nsf/lookupindexpagesbyid/IP200401292?OpenDocument>

³⁸Defamation Act 2005 (Qld) s 6; Defamation Act 2005 (NSW) s 6; Defamation Act 2005 (Vic) s 6;; Defamation Act 2005 (Tas) s 6; Defamation Act 2005 (SA) s 6; Defamation Act 2005 (WA) s 6; and Defamation Act 2006 (NT) s 5.

sound recordings. Permission must be obtained from the copyright owner to copyright protected work on blogs and podcasts. It is relatively easy if all of the material that is included in the blog or podcast is a new composition but can become progressively more complex if materials created by other people are included. Providing a link on the organisation's blog must not infringe another blogger's or website owner's copyright. However, the organisation needs to ensure that the blog or website that it is linking to does not infringe copyright. The organisation is liable for copyright infringement if third party material is incorporated into the blog or podcast; and for also authorising others to use that material as part of its blog or podcast. Video sharing sites such as YouTube have increased exposure for copyright infringement when they post or permit the posting of content that is owned by someone other than the person submitting the material. SNS are usually provided by corporate entities such as MySpace and FaceBook which create their own archives. This leads to logical questions such as "Who owns the content in an individual's space?" "Is it the individual, the organisation or the SNS provider?" these questions still do not have logical answers.

Mashups are created by sourcing an application programming interface (API) from each Web service to call each source of content or data and a program is written that combines the Web services into a new mashed together presentation or compilation. Mashups can also be created using Web feeds, such as RSS and JavaScript (Gerber, 2006). Using proprietary APIs requires paying a fee and signing a licence agreement. Using open source APIs means that they are available to anyone to use for free. However, there are limits on how a user can use open source APIs. The APIs' owner may specify terms and conditions of use or a specific license such as GNU General Public Licence³⁹ or a Creative Commons Licence⁴⁰ that allows only non-commercial use (Gerber, 2006).

Copyright law does not protect raw data, but it does protect compilations of data. If the compilation contains a minimal amount of creativity, it becomes an original work of authorship e.g. in selection, coordination, and/or arrangement of the data (Gerber, 2006). Under the new reforms in Australian Copyright law (Australian Government

³⁹ <http://www.gnu.org/licenses/gpl.html>.

⁴⁰ <http://creativecommons.org/license/>

Attorney-General Department, 2006), most mashups made by unauthorised use of copyright material will remain illegal because it can be argued to be a hybrid product of one or more of the underlying Web sites or databases. For instance, Google was sued by Agence France Presse (AFP) for listing its content in Google News without licensing it. Yahoo News avoided similar legal entanglements by signing agreements with AFP so that it has the liberty to add RSS feeds to their site (Glaser, 2005).

SNS such as MySpace and FaceBook are also a source of concern among organisation because of the potential risk to their company's confidential information. Organisations may be held liable for social networking site postings and third party content if a person visits the organisation's webspace in a platform and infringes copyright, defames another person or misuses another person's personal information (Coates et al. 2007).

Confidential information also known as trade secrets can be protected by copyright. This can provide effective protection for some technologies, proprietary knowledge (know-how) and confidential information. The information in the trade secret must be valuable to both the company and its competitor. For example, the value of the Coca-Cola formula is to PepsiCo (BBC News, 2006). To protect valuable information and knowledge from escaping the company and into the hands of its competitors, organisations can also implement some employee centred controls, such as non-disclosure agreements and non-compete clauses. Non-disclosure agreements specify who the employee may or may not discuss trade secrets with (Bishop et al. 2001). The non-compete agreement limits with whom and within what time frame the employee can work after employment with the company (ibid.). Restrictions often include competitors in the same industry where the employee would have the opportunity to utilise trade secrets and other insider information acquired during the time with the employer. The employee is considerably limited by the non-compete agreement in regards to their immediate career moves after employment with the company.

2.3.7.4.2 Trade Marks

Trade mark law is designed to prevent other companies with similar merchandise from free-riding on the association of quality with the trademarked item. According to the

Trade Marks Act 1995(Australia), a trade mark can be a word, phrase, letter, number, sound, smell, shape, logo, picture, aspect of packaging or a combination of these (IP Australia, 2008b). Trade mark rights are acquired through use or through registration with IP Australia (ibid.). A trade mark owner may prevent others from using any mark that creates a likelihood of confusion as to the source or sponsorship of the associated goods or services. The United States Court of Appeals for the Eleventh Circuit ruled that the use of a competitor's trade mark in a website's meta tags may be actionable as trademark infringement (Keenan, 2008). Meta tags are code in websites that ensure search engines catalogue the website as relevant to terms contained in the meta tags. In *North American Medical Corp. v. Axiom Worldwide, Inc.*, NAM's complaint alleged that Axiom had used two of NAM's trademarks, 'Accu-Spina' and 'IDD Therapy', in the meta tags of Axiom's website. Both companies are competing manufacturers of physiotherapeutic devices for providing traction to treat back pain. The court ruled that Axiom's use of these trademarks in Axiom's meta tags resulted in the listing of Axiom's site in Google as the second-most-relevant result in a search for either of those trademarks.

2.3.7.4.3 Defamation

Defamation law exists to protect reputation. However in an attempt to protect reputation, it may come into conflict with a wider goal of the legal system, namely, the promotion of freedom of speech. The conflict is between two public interests: on the one hand, the interest in the public protection of individual reputation and the provision of an orderly means of achieving it by process of law; and on the other hand, the public's right to know and the discovery of truth (Lawlink, 1995). To determine liability for defamatory matter in a blog, a court will likely start with the general tenor, setting, and format of the blog, as well as the context of the links through which the user accesses the particular entry. Next the court will look at the specific context and content of the blog entry, analysing the extent of figurative or hyperbolic language used and the reasonable expectations of the blog's audience. However if the blog writer expresses a personal opinion, this may not be considered defamatory. Courts look at whether a reasonable reader or listener can understand if the statement constitutes a verifiable fact (EFF, 2007).

Under the Australian States Defamation Acts⁴¹ a person can have an action for defamation if he/she can establish that material posted to a social networking or YouTube website are likely to injure his/her reputation. Such material includes material that exposes them to ridicule, contempt or hatred, make people shun or avoid them or the tendency to lower their reputation in the estimation of others. However it is noted that an organisation is not liable for defamation if it has the ability to remove defamatory material posted by third parties to its webspace, or to limit access to the webspace, or acts to remove the defamatory material quickly.

For podcasts, organisations may be liable for slander if a defamatory statement is expressed in a transitory medium, such as verbal speech. However it is considered to be a civil injury, as opposed to a criminal offence. Actual damages must be proven for someone to be held liable for slander.

2.3.7.4.4 Publicity/ Privacy Issues

There is no right of publicity in Australia. Injured parties may resort to the law of defamation; the Federal Trade Practices Act and State Fair Trading Acts to seek redress (ArtsLaw, 2007). In law, privacy refers to a situation in which the private sphere of the individual is respected. The Australian Commonwealth Privacy Act of 1968 governs how personal information is collected, stored, accessed, updated, used and disclosed by the public sector. The definition of personal information pertains to any information that enables an individual to be identified.

Personal privacy is endangered in three ways including:

- The inappropriate use of user's personal information by corporations or government agencies to create user 'profiles' to then be sold to third parties against the user's consent;
- Online activity can be traced via the 'electronic trail' of user's consumption and information-gathering patterns, thus being inundated with unwanted mail or spam; and lastly,

⁴¹ Defamation Act 2005 (Qld) s 6; Defamation Act 2005 (NSW) s 6; Defamation Act 2005 (Vic) s 6;; Defamation Act 2005 (Tas) s 6; Defamation Act 2005 (SA) s 6; Defamation Act 2005 (WA) s 6; and Defamation Act 2006 (NT) s 5.

- That movement throughout websites is monitored by ‘cookies’ stored on a user’s computer that records the internet history, thus leaving a trail of their information for other users on the same server to access (Flew, 2005).

Although the Commonwealth Privacy Act 1988 does not apply to private sector organisations, state governments or agencies, cases such as *Australian Broadcasting Corporation v Lenah Game Meats Pty Ltd* (2001) and *Grosse v Purvis* (2003) raise the possibility that the right to personal privacy may become increasingly important under Australian law.

Under U.S. law, the right to publicity allows individuals to control how their voice, image or likeness is used for commercial purposes in public. If the organisation chooses to use another’s image, likeness or voice as a way of advertising or soliciting its blog or podcast, the organisation will need to get permission from those individuals if it is using their voice or images for commercial purposes. These rights are relevant to blogging and podcasting because audio or video interviews may be conducted, perform plays, sing songs, and produce all sorts of other spoken or visual content.

2.4 Chapter Summary

The literature review in Chapter 2 discusses four main areas: knowledge work and KM, social technologies focusing on the corporate Wiki and technology innovation. It explores what constitutes as knowledge work and KM. It indicates that knowledge work is characterised by a high degree of variety and exceptions, strong communication needs, weakly structured processes, networks and communities and requiring a high level of skill and expertise as well as a number of specific practices. The review of literature also points out the causes that contribute to the failure of current KMS (section 2.1.4.1). Since the corporate Wiki is a social software and given the social nature of knowledge and learning (section 2.1.5), this means that the corporate Wiki as a KMS needs to be viewed as a socio-technical system (section 2.2). A discussion on technology innovation shifts the dialogue on Web 2.0 and Enterprise 2.0 (sections 2.3.2 - 2.3.3). It sets the stage for a greater understanding of emerging Enterprise 2.0

technologies to provide practitioners and academics alike articulating the role that these technologies play in civil society, which in turn can only help us to incorporate them in our work environment in the most productive and effective way.

Chapter 3 Research Approach & Design

This chapter clearly outlines the theory options that were considered, the selections made and a well-argued reasoning for selecting of qualitative case research methodology, participative action research and Activity Theory. The research background highlights the difficulties of discovering whether a corporate Wiki is able to support knowledge work because it involves often hidden interactions between knowledge workers and the corporate Wiki involved in knowledge work. The final section begins by describing the background context for the choice of a theoretical basis for the research, namely Activity Theory. Activity Theory is used as a basis for this research to underpin case study and participative action research methodologies. It then moves on to critically review Activity Theory, particularly as it relates to knowledge workers who are central to any attempt to improve knowledge creation and dissemination. Activity Theory's 'tool-based' perspective posits that all human activity is a relationship between subject and object, mediated by tools and community. This makes it relevant in the study of emerging Enterprise 2.0 technologies such as the corporate Wiki to be used as Knowledge Management Systems (KMS) which can help to support knowledge work in the work environment.

3.1 Research Background

Initial research (Pfaff & Hasan, 2006a, b; Hasan & Pfaff, 2006a, b.) that was published reported corporate Wiki projects that were unsuccessful. It also identified management, social and legal issues that justify against the easy uptake of Wikis in corporations. The research was not only interested in understanding about the use of KMS in organisations, but more about engaging knowledge workers in the democratic process of creating organisational knowledge which constitutes as knowledge work. It discovered that the knowledge worker that uses the corporate Wiki becomes almost completely immersed in a computing environment. The notion of the 'knowledge worker' (Drucker, 1959) was re-defined to whom the management of their collective knowledge about their work is an integral part of the work itself and integral to the performance of the

organisation. This new reality dramatically alters the methods by which organisations must manage, learn, represent knowledge, interact, solve problems, and act. Hence, the learning organisation (Senge, 1990) emphasises on the internalisation of knowledge, through experience and action and generation of new knowledge through social networking.

This thesis becomes a logical argument that addresses several research questions that are shown to be important and not well understood. Tentative research findings in the literature review showed that the primary research question “Does a corporate Wiki support knowledge work” has not been answered because little is known in academic research about the implementation of a corporate Wiki in a work environment. It takes into account the nature of knowledge in a corporate Wiki, organisational culture, and suitability of corporate Wikis to all types of organisations; Wiki failure and steps to reduce Wiki rejection.

3.2 Review of Research Methodologies and Theories

This section examines key methodologies and theories that might be relevant and explains how the research design is constructed after consideration of key influences on research design.

Researchers have long debated the relative value of qualitative and quantitative inquiry (Patton, 1990). Quantitative researchers in seeking for statistical significance have been criticised for aiming for large numbers of cases which are context-stripped (Nelson et al. 2000). There is a growing tradition of using qualitative research approaches to study information technology phenomena (Nelson et al. 2000; Trauth & Jessup, 2000) because of it lends insight into the soft, cultural and political issues involved in the introduction of technology (Baskerville et al. 2000) such as the implementation of corporate Wikis. Given that knowledge work occurs within social contexts (Avison et al. 1999) (see section 2.1.1.2), this suggests that the implementation of a corporate Wiki is better suited to a socio-technical approach (see section 2.1.5) where the social and organisational aspects of knowledge creation, storage and sharing need to be considered

alongside the technical (Mumford, 1978), and taking a qualitative approach is more appropriate.

Quantitative research supporters view random sampling as the key to facilitate generalisation. Random sampling is criticised as neither necessary nor even preferable for qualitative inquiry (especially in case studies) because their strength comes from the description of the context (Eisenhardt, 1989). Given the goals of this research, purposive sampling is employed. Purposive sampling strategies are designed to enhance understandings of selected individuals or groups' experiences or for developing theories and concepts (Devers & Frankel, 2000). Information rich cases are selected where individuals, groups, organisations, or behaviours will provide the greatest insight into the research questions. Miles & Huberman (1994, p. 34) and others (Devers & Frankel, 2000) note that three types of cases will give the most insightful data in purposive samples: typical cases (i.e. those which are normal or average for those being studied); deviant or extreme cases (i.e. those who represent unusual manifestations of the phenomenon of interest); and negative or disconfirming cases (i.e. those which are exceptions to the rule).

3.2.1 Case Study Research

Case study research is gaining increasing acceptance over the past decades in the IS field (Klein & Myers, 1999; Orlikowski & Baroudi, 1991) and is the most common qualitative method used in IS (Alavi & Carlson, 1992; Orlikowski & Baroudi, 1991). Myers (1997) argues that case study research method is particularly well-suited to IS research, since the object in the discipline of IS is organisations, so "interest has shifted to organisational rather than technical issues" (Benbasat et al. 1987). Orum et al. (1991) assert that since we do not live in a world of simplicity and uniformity, those who adopt the qualitative approach of case studies generally picture a world of complexity and plurality. Since a number of organisational issues contribute to our knowledge of individual, organisational and social phenomena, a case can be made that various major organisational issues cannot be addressed like in-depth case studies can.

3.2.1.1 Precision, Objectivity and Rigor

Many equate precision, objectivity and rigor with quantitative measures (Patton & Applebaum, 2003). Hoepfl (1997) explains that quantitative researchers seek precision through causal determination, prediction, and generalisation of findings; while qualitative researchers seek instead illumination, understanding, and extrapolation to similar situations. Case studies typically combine data collection methods such as archival searches, interviews, questionnaires, and observation (Eisenhardt, 1989). While quantitative data often appears in case studies, qualitative data usually predominates.

Case studies are accused of being subjective and lacking rigor (Hamel, 1995). Proponents of quantitative studies criticise case studies for being subjective and strongly influenced by the researcher. To limit the role of personal interpretation from the development of the research design, through the data collection and analysis, emails and telephone interviews are used in this research so as not to affect the validity of the study.

Yet it has been shown that quantitative research can also be affected by the bias of the researcher and of participants, samples can be manipulated, data can be tampered with or purposely excluded, surveys can be poorly constructed and respondents can answer dishonestly (Gould, 1981). In terms of lacking in rigour, case studies are criticised to lack standard methodological procedures (Kennedy & Lazar, 1999). Miles and Huberman (1994) refutes this notion, and cite that data collection is labour intensive, can last months or even years, and data overload seems almost inevitable.

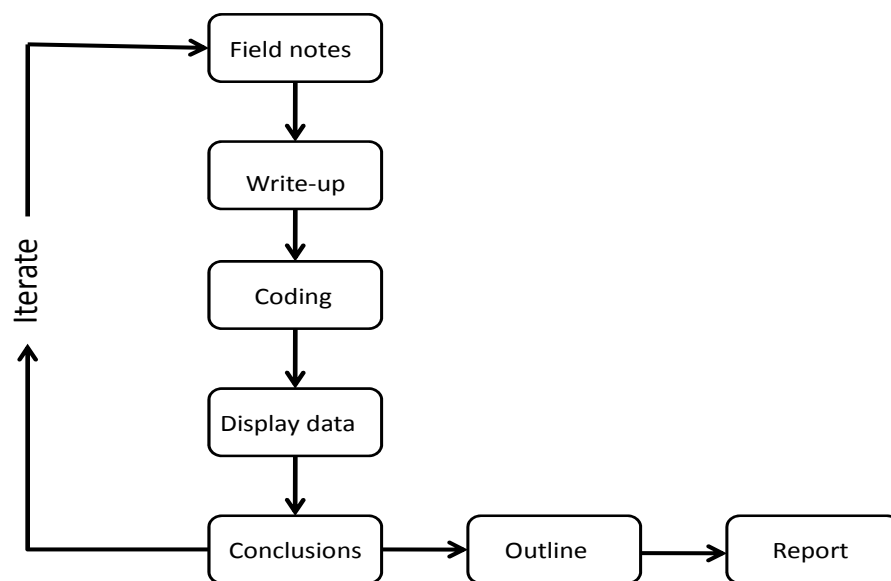
3.2.1.2 Pre-Structured Method

To analyse case study evidence, Miles and Huberman (1994) have developed formal methodologies for qualitative data collection and analysis for observing events and conducting unstructured interviews. One notable challenge to case study research is the element of time and many longitudinal case studies are executed over years (Yin, 2003). To expedite the process for this research, the pre-structured case analysis is adopted. This technique described by Miles and Huberman recommends that the researcher establishes “the outline is, in effect, a shell for the data to come” (Miles & Huberman, 1994, p. 84).

This method consists of compiling a case study outline and preparing the framework before data collection begins. Collected information from each case is filled into the prepared framework. The information is continually edited and refined while the information is collected. This enables the report writing to be finished as soon as the data collection is completed. Insufficient information is quickly identified and this shortfall easily rectified and more information can be collected.

Figure 3.1 illustrates the difference between this approach and the more traditional and lengthy method. The pre-structured method is useful to streamline data collection and to provide a foundation to compare data sets from different cases by collapsing the processes of data collection, analysis and report writing into one evolving procedure (Walliman, 2005). The pre-structured method is based on the precise set of research questions (Section 1.1.1) set forth in this thesis.

Usual Method



Pre-Structured Method

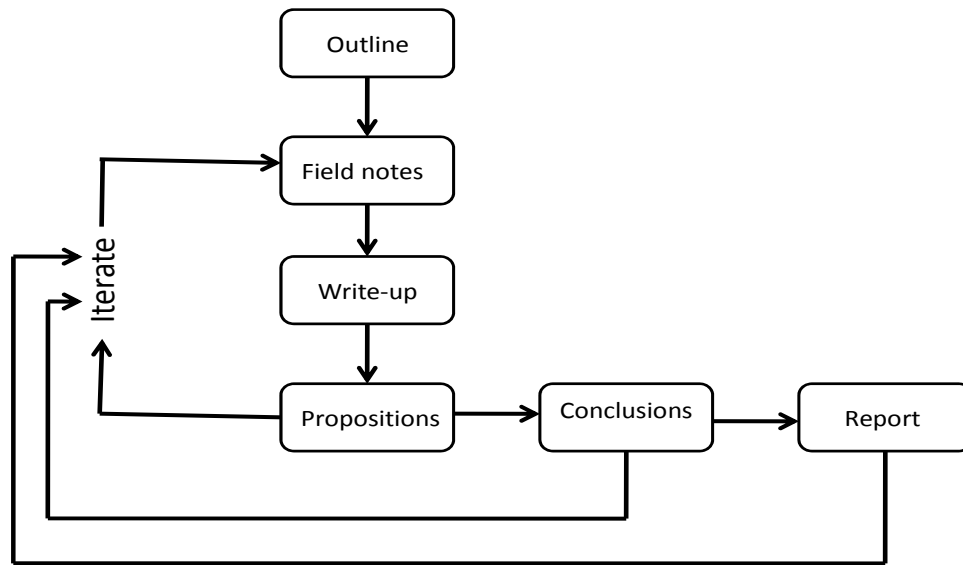


Figure 3.1 Usual Method vs Pre-Structured Method
Source: Adapted from Miles and Huberman (1994)

3.2.1.3 Increasing Validity

The major weaknesses of the pre-structured case approach are that conclusions can be drawn too early in the research process and data direct from the field is difficult to analyse. However, this is combated by triangulating with other data sources. The triangulation method is also referred to a combination of methodologies in the study of the same phenomenon (Miles & Huberman, 1994). Conventional empirical methods, such as email questionnaires and telephone interviews, are inappropriate for many of the issues researchers need to address in the study of Information Systems (IS) in organisations and that a multi-method approach is more effective. In this research, a triangulated approach to data collection includes using questionnaires, the interview method, and observation. Stake (1995) notes that triangulation methods used in case studies increase validity by verifying the results obtained. Analysing data in different spaces, at different times and in different contexts; having other researchers, review procedures and conclusions; and using different data sources to study the same object all serve to attain triangulation and increase confidence in conclusions (Patton & Applebaum, 2003).

Multiple case studies not only strengthen the conceptual validity of the study, but also help determine the conditions where the findings hold (Miles & Huberman, 1994). Understanding the world requires experience and constructing conscious models of how it functions. The implication is that the more experiences a person has, the more he/she learns. Related cases support learning by scaffolding learning and representing complexity by examining prior experiences and relating them to the current problem (Jonassen & Rohrer-Murphy, 1999). The unifying methodological theme of this research is the use of qualitative case studies and the comparisons between them. There is an increasing interest in analysing what is common and/or different across cases that share some key criteria (Yin, 2003). Multiple cases strengthen the results by replicating the pattern-matching, thus increasing confidence in the robustness of the findings.

To counteract the frequent criticism that case studies are dependent on a single case which renders it incapable of providing a generalising conclusion (Yin, 2003), six case organisations are chosen to propose and ramify claims and to establish their analytic generality. These cases share similar and contrasting characteristics which are discussed in Chapter 4.

Another method to increase validity is to consult with colleagues (Miles and Huberman, 1994). Open communication and critique by my PhD supervisor and papers submitted in peer reviewed conferences are used to address this concern. The six cases are compared, and differences and patterns observed are explored to develop a better understanding of the interplay between organisational culture, leadership styles and knowledge workers (See section 2.1.4.2.5).

Using case study research as the basis for this research is the preferred strategy because knowing what you want to find out leads to the question of how to find the information (Miles & Huberman, 1994). Case study research strongly emphasises the importance of understanding the phenomenon under study in the context of the culture, sub-culture, organisation or setting and this is considered central to qualitative research (Miles & Huberman, 1994). The knowledge generated will serve the discipline of KM, shape management and knowledge workers' understanding of a complex topic such as knowledge work, through interpreting and re-interpreting the meaning of events.

The process of comparing and merging different organisational viewpoints leads to a deeper understanding of the problem domain. It collects rich information including history, opinions, analysis and recommendations (Yin, 2003). It draws attention to missing elements in the organisation's KM strategies. This does not mean that the research begins and ends with case study methodology. There are other issues where researchers need to delve into and that are where PAR and Activity Theory comes into play.

3.2.2 Participatory Action Research

Action research became popular in the use of scholarly investigations of IS towards the end of the 1990s, (Checkland & Holwell, 1998; Baskerville & Wood-Harper, 1998). According to O'Brien (2001), action research is known by many other names, including participatory action research (PAR), collaborative inquiry, emancipatory research, action learning, and contextual action research, but all are variations on a theme. Other action researchers disagree (Baskerville, 1999; Whyte et al. 1991).

However, action research is also criticised (Kock, 2003) for:

- lacking methodological precision;
- lacking controllability, due to the complexity and fuzziness of real environments;
- being subjective or biased, due to the researchers' deep personal involvement; and
- delivering results that are difficult to generalise.

To alleviate the potential barriers of action research, PAR evolved from action research to include social research methodology, participation in decision-making by low-ranking people in organisations, and socio-technical thinking regarding organisational behaviour (Whyte et al. 1991). To put it simply, PAR is 'learning by doing' - a group of people identify a problem, do something to resolve it, see how successful their efforts were, and if not satisfied, try again (O'Brien, 2001). This research method is able to develop an understanding of the interaction of complex social organisations and their information systems (Baskerville, 1999). Complex social processes can be studied best

by introducing changes into these processes and observing the effects of these changes because real change is effected by real actions in real organisations.

The distinction between action research and PAR is increased client participation which means that the responsibility of theorising is shared between researchers and client participants (Baskerville, 1999). It accepts intervention from the researcher to become part of the study and qualitative data as a medium to the empirical work such as the observer's values and prior knowledge, to bring 'meaning' to the observation, making them part of the experimental data (Baskerville, 1999).

Whyte and the others (1991) argue that PAR requires a higher standard of participation than action research because it is assumed that the action researcher cannot acquire the depth of understanding that client professionals will have already achieved through years of living within the social context under study. In PAR the researcher is not a disconnected observer and reporter but a facilitator and teacher, while participants are viewed as researchers and not the objects of research (Miller & Brown, 1986). Management of group dynamics in its many aspects plays a central role in PAR processes, which makes it a good methodology to study the various aspects of organisational culture (Ragsdell, 1998).

A simple model of the cyclical nature of the typical action research process is presented in the figure above. Each cycle has four stages: plan, act, observe, and reflect. The planning stage signals what the participants intend to do. For example, planning on how to implement a corporate Wiki to manage knowledge and thinking about how knowledge work activities on the Wiki will be monitored and reviewed. During the action phase, participants examine whether if the project went according to plan or what actions were missed out? The observation phase signals a critical analysis on what happened and confirmation of findings. For example, seeking input from participants and documenting & sharing observations. The reflection stage consists of interpreting the implications for changed practice in KM. This includes, seeking understanding from different sources, being creative with problem solving solutions and building reflections into the next plan, to design work practices that are enriching and lead to the development of skills and knowledge.

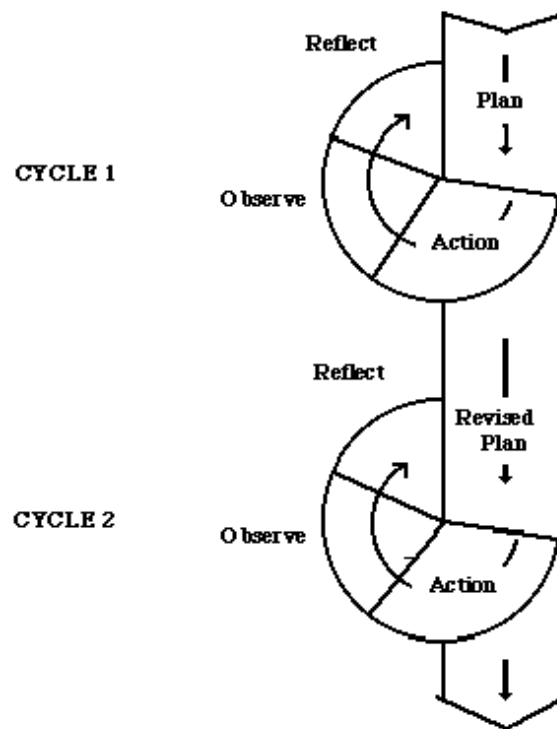


Figure 3.2 Action Research Process

Source: Stephen Kemmis in Hopkins, 1985

3.2.3 Comparison of Theoretical Perspectives

Several researchers have commented on the similarities between Activity Theory and other theories that expound collective knowledge and practice (Jonassen, 2004; Schwen & Hara, 2003; Wenger, 1998; Engeström, 1987). Theories that share similar theoretical perspectives include Structuration Theory (Giddens, 1984), Actor Network Theory (Latour, 1987) and Technology Acceptance Model (TAM) (Davis, 1989). Although an in-depth comparison has already been done by many researchers (Widjaja & Balbo, 2005; Hasan, 2000; Nardi, 1996a), nevertheless it is important that a thoughtful and informed discussion of a crucial decision explains the decision to use Activity Theory in this research.

Activity Theory provides a framework to analyse the phenomena as people engage in a socially related activity. In the same vein, Giddens' Structuration Theory (ST), is intended to reconcile the tension between the force of social structure and subjective

individual action and provides a model for stratification of consciousness and action which is similar to the Activity Theory activity levels (Widjaja & Balbo, 2005).

Adapting ST to the IS context has been done by Orlikowski (1992b) who treated technology as a structure in its own right. Adopting a practice lens perspective, Orlikowski (2000) argues that technology structures are emergent and enacted, not embodied and appropriated. Instead of starting with the technology and examining how actors appropriate its embodied structures, this view starts with human practice and examines how it enacts emergent structures through recurrent interaction with the technology at hand (Jones & Karsten, 2003).

Other IS researchers have used ST for sense-making of the various forms of technological and social shaping of human behaviour that occur in the IS context, particularly focusing on the requirements, design and use stages (Walsham & Han, 1990). ST makes a valuable contribution to IS researchers to help them study the ways in which social activities are said to be recursive where the rules, resources, and social relationships that are produced and reproduced in social interaction to create social structures. ST proposes a dualism of human agency and social structure. Human agency and social structure are not two separate concepts, but are two ways of considering social action. Agents have knowledge of their society and it is this mutual knowledge that produces structures.

ST has been criticised as being too generalised and does not pay much attention to work practices because it is considered to be a research methodology and not easily transformed to into a practical IS development methodology (Kaplan, 2004). According to Activity Theory, an activity is considered the basic unit of analysis to analyse both individual and group behaviour. These activity systems are mutually constructed by subjects (participants) using certain tools using tool(s) to mediate the object (the motive of the activity) of behaviour and changes in it.

Actor Network Theory (ANT) and Activity Theory attempt to analyse multiple activity systems while focusing on the cross-cultural dimension of learning and work (Engeström, 2001). ANT argues that the adoption of new technologies can be

influenced by the actors of society and are chosen among a set of different possibilities created by network of social actors, all of them technically viable and with different attributes (Ueno & Otero, 2006). This network of social actors, the actor-network, is compounded by social and cultural elements that include the inventors, engineers, researchers, consumers, managers, and also workers, government agencies, and end users of the innovation (Ueno & Otero, 2006). ANT considers all actors equal within the network.

ANT does not account for pre-existing structures, such as power, but instead sees these structures as emerging from the actions of actors within the network. Power emerges with the ability of an actor to align other actors to its interests. Tensions, interests and power are carried by the agents of the actor network who decide the option for a new technology in spite of other technically viable solutions. Knowledge work targeted at transforming organisational culture requires a schematic framework that the larger community, rules and division of labour of an activity system to provide reference points to understand conflicts and tensions that arise from such work. Both Wenger and Engeström see tension as an opportunity for learning and development for the subject and the community (Jonassen, 2004).

ANT is useful for characterising the system and understanding the way it functions while Activity Theory not only characterises the functioning of the system but also illuminates pervasive tensions (Jonassen, 2004). Designing a next generation KMS has a deeper implication for the organisation and its organisational culture because it is a complex activity balancing many tensions. It is one thing to design a KMS to support knowledge workers to do their work more efficiently and another thing to design a KMS that focuses on bringing about change.

The Technology Acceptance Model (TAM) is an IS theory that states that a number of factors will affect how users accept and use a technology (Davis, 1989). The goal of TAM is to predict IS acceptance and diagnose design problems before users have experience with a system. Prediction of user acceptance is determined by two central factors: 'perceived usefulness' and 'ease of use'. User acceptance is defined as the

demonstrable willingness within a user group to employ information technology for the tasks it is designed to support (Dillon & Morris, 1996). Perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). If a technology is expected to increase their job performance, then the users' intentions to use the technology will be greater than that which can be attributed to their attitude toward the technology alone. 'Ease of use' refers to the easier it is to use a technology, the greater the expected benefits from the technology with regard to performance enhancement.

TAM is a theoretical approach that seeks to understand the social and psychological determinants of user acceptance at an individual level. It has been found to be extremely robust and has been replicated using different tasks (Dillon & Morris, 1996). While TAM focuses on beliefs of technology and the outcomes of using it, it does not explicitly address the social, interpersonal and situational factors that may influence a user's behaviour as Activity Theory does.

PAR is used in conjunction with Activity Theory for the analysis of case organisation B because of the limitations of PAR. PAR promotes 'one best way' task design for user-determined task procedures, to design work practices that are enriching and that lead to development of skills and knowledge (Dillon & Morris, 1996), making it unable to analyse the complex interactions involved. Activity Theory is applied to explain the intricacies of management/knowledge workers' perceptions' knowledge work; and how organisational culture can influence tool adoption by knowledge workers.

In essence, Activity Theory is more practical and work-related than ANT, ST, TAM and PAR. Activity Theory is effective as a general and grounded framework. It is general in that it has implications for the whole range of issues that arise in KM, and in its ability to look at the broader social context of these issues.

3.2.4 Activity Theory

This section consists of a thorough discussion of the theoretical lens that is selected for this research where all concepts of Activity Theory are drawn upon and applied later in

the thesis in Chapter 5. Key aspects of Activity Theory will be reviewed later to refresh the reader, but derived from the discussion here.

3.2.4.1 Background on Activity Theory

Researchers discern three theoretical generations in the evolution of the cultural-historical theory of activity (Engeström, 2007). The first generation is centred on the psychologist, Lev Vygotsky (1978), who introduced the concept of artefact-mediated and object-oriented action (ibid, p. 40). He examined collective mediated behaviour directed towards an outcome, by taking activities as units of analysis rather than individual actions. However there was no recognition of the part played by other human beings and social relations in the triangular model of action.

The second generation of Activity Theory was motivated by A. R. Luria (1976) and A.N. Leont'ev's work (1981). Luria (1976) showed that human psychological functions could be transformed under the influence of changing psychological tools. Leont'ev (1978) developed Vygotsky's ideas of social and cultural mediation by developing a hierarchical model of human activity. He showed the difference between an individual action and a collective activity, and between activity, action and operation. A human individual never reacts directly to the environment. Figure 3.3 shows the relationship between the human and objects of environment is mediated (changed) by cultural means, tools and signs.

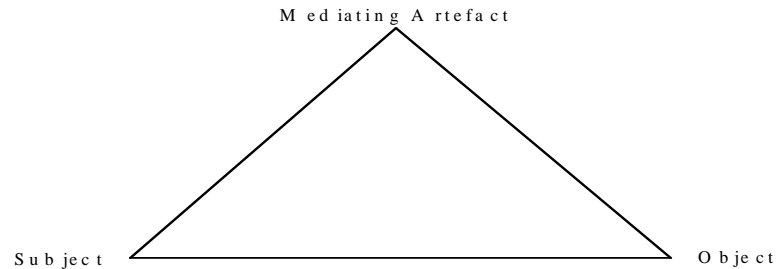


Figure 3.3 Reformulation of Vygotsky's Model of Mediated Action
Source: Center for Activity Theory and Developmental Work Research (2007)

In the last two decades, the scope of Activity Theory has broadened to encompass interaction within a community (Engeström, 1993). Engeström (1987) introduced an expanded version of the mediational model to combine Vygotsky's (1978) original conceptualisation for the mediated relationship between the *Subject* and Leont'ev's social and cultural aspects of human activity.

Activity Theory is often depicted as the activity triangle diagram illustrating Engeström's model (1987) of an activity system (see Figure 3.4). The activity triangle model incorporates the Subjects, Object, and Community components. Engeström (1987) added another three components to this basic triangle that are mediators of human activity, Tools, Rules and Division of Labour that may affect activity.

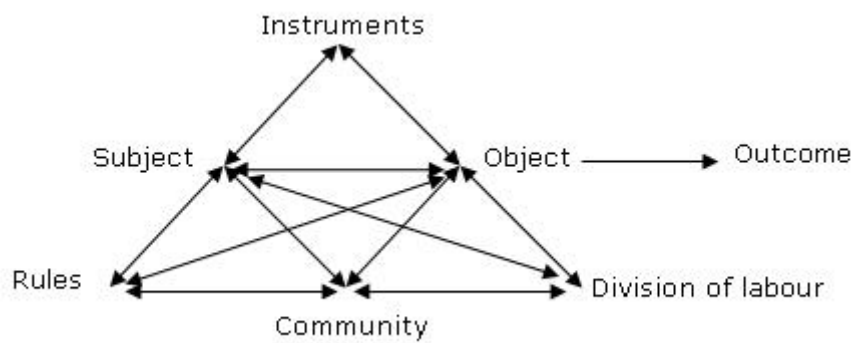


Figure 3.4 Structure of a Human Activity System
Source: Engeström (1987)

The third generation of Activity Theory was inspired by Michael Cole (1996) based on the idea that there was a simultaneous co-existence and interaction of various different cultures and activities and not just the historical evolution of a single culture. The development of conceptual tools would help to understand dialogue, multiple perspectives and traditions, and networks of interacting activity systems. Figure 3.5 depicts the expansion of the basic model to include minimally two interacting activity systems (Engeström, 2007).

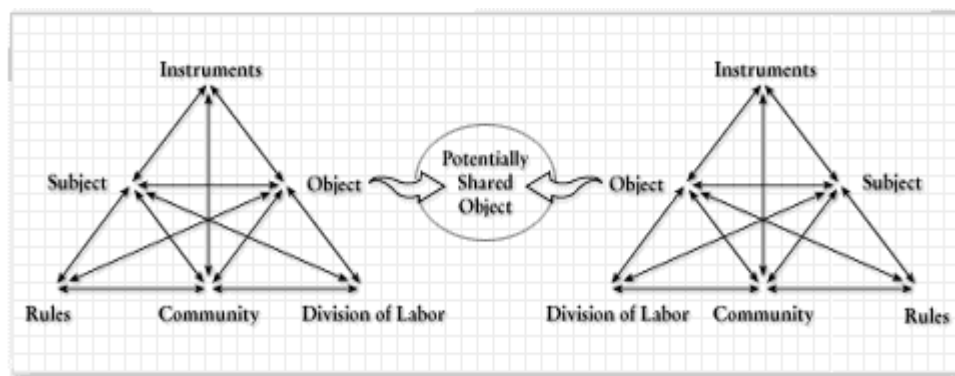


Figure 3.5 Two Interacting Activity Systems as Minimal Model for the Third Generation of Activity Theory
Source: Center for Activity Theory and Developmental Work Research (2007)

3.2.4.2 Criticisms of Activity Theory

Although Activity Theory offers benefits for designing corporate Wiki environments and understanding knowledge work, there are unresolved issues that must be addressed.

Just as the strengths of Activity Theory have been identified, researchers must also understand its limitations so that it can be usefully applied to impact practice. Limitations include the difficulty faced by researchers in unravelling activity systems and distinguishing between the levels of activity, actions and operations (Uden, 2007).

Activity Theory does not agree with constructivist models and methods of learning, and some researchers may not view the Activity Theory method as a suitable approach to assess the corporate Wiki activity system. Hädrich and Priebe (2005) argue that Activity Theory is concerned with activities aimed at the joint creation of knowledge i.e. exploration of knowledge, and does not focus on how knowledge is integrated with the value chain so it is not oriented towards creating customer value through the exploitation of knowledge. Therefore, other methods have to be combined in order to get a more comprehensive picture of knowledge work in a business context.

Activity Theory has been criticised as a loose theory, more valuable for understanding what went wrong than doing predictive work (Rochelle, 1998; Nardi, 1996b). The key limitation of this approach is also its key strength because as a heuristic framework, it is used for asking important questions that other theories may not raise so clearly, and for seeing relationships among those questions that may guide design and evaluation technology based tools. It supplies the researcher with a complete understanding of the activity system under observation, including the dynamic interplay of all the units of the activity system (McMichael, 1999).

3.2.4.3 Justification of the Use of Activity Theory

Activity Theory provides the framework for evaluating case studies and specific questions in the questionnaires and interview process to directly address the elements of Activity Theory. The reasons below justify the use of Activity Theory as a theoretical approach used for this research.

3.2.4.3.1 International Acceptance

Activity Theory has gained international acceptance among researchers who recognise that it provides a rich holistic understanding of how people collaborate with the

assistance of sophisticated tools in the complex dynamic environments of modern organisations (Hasan, 2006, Hädrich & Priebe, 2005; Waycott, Jones & Scanlon, 2005). The principles and components of Activity Theory have been used as analytical tools for many areas of research and practice in Information Systems (IS) and KM (Hart & Warne, 2005; Hasan & Gould, 2003; Clases & Wehner, 2002). For example, Activity Theory has been proposed to guide the analysis of knowledge work (Hasan & Pfaff, 2006b) and human–computer interaction (Hasan, 1999).

Activity Theory is a useful framework to understand the totality of human work and praxis (Bødker, 1991). Praxis allows us to generalise our investigations beyond individual use of technology. By anchoring an analysis in praxis, the historically developed ways and means of groups of people undertaking a particular activity, we are able to balance the analysis between the general and the particular. In the case with new technology, we often need to explore an artefact that is not yet there, and the existing praxis is a valuable starting point for that (Bødker & Grønbaek, 1996).

The application of Activity Theory to the use of social technologies for KM shows a theoretical approach to study knowledge work within the intricate dynamic context of the modern corporate environment. Jonassen (2004) argues that every system has a history and nested actions which are viewed from different perspectives and points of time may be interpreted and represented differently and constitute their own activity systems. It is for this reason that Activity Theory is used to underpin other theoretical perspectives such as case studies and action research.

3.2.4.3.2 ‘Reification’ vs ‘Social Constructionist’ Views of Knowledge

Understanding the ‘reification’ vs the ‘social constructionist’ views of knowledge (section 2.1.3) holds the key to understanding the ‘tool-based’ perspective of Activity Theory which sees people and machines as fundamentally different. KM is not a simple transfer of information, but a complex and often messy network of tool-mediated human relationships that must be explored to understand the social and cultural practices that affect users’ behaviour toward the orientation of the tools that they share.

Activity Theory emphasises tool-mediated action in context (Engeström, 1987). Tools refer to culturally produced means for changing the environment and achieving goals. In other words, human beings not only act on their environment with tools, they also think and learn with tools (Russell, 2001). At a primary level these tools are material and external such as the Wiki as a KMS. Humans also fashion and use tools at a secondary or internal level which include business processes, work practices, and organisational knowledge. Tools are regarded as carriers of cultural knowledge and social experience (Maier, 2005).

Tool mediation espouses that the interaction between subject and object is mediated by an external or internal tool. According to Leffa (2005), tools can be analysed from a synchronic perspective, which maintains that tools are responsible for the transmission of social knowledge; and from a diachronic perspective, which states that tools account for the accumulation of cultural knowledge and social experience. Kaptelinin (1995) argues that tool mediation is on equal footing with formal education when it comes to socialising a person. We learn with the tools we use and use this knowledge to produce new tools, which, in turn, leads to more knowledge, and so on.

The emphasis Activity Theory places on tools, including computer artefacts such as Wikis, are as mediators of activity. This emphasis differentiates between human actions and the mediating role of tools where all human experience is shaped by tools and sign systems that we use (Nardi, 1996a). Attention is on the activity itself rather than the interaction between the knowledge worker and the corporate Wiki. The focus is on the knowledge worker's objectives and activities and the corporate Wiki is the tool through which the knowledge worker achieves his/her objectives. The knowledge worker is seen to be doing other things besides using the corporate Wiki.

Activity Theory aims at explaining the character of human behaviour. This attribute helps researchers move from considering the individual alone, to their relationships with other people in the context in which they attempt to accomplish the organisational level of collaborative knowledge work which is intrinsic in the corporate Wiki. It examines the activities that knowledge workers and managers are engaged in, the tool that they

use in the activities, the goals and intentions of the activities and the intended and unintended outcomes.

3.2.4.3.4 Multifaceted Analysis

Activity Theory provides a dynamic framework that can accommodate a multifaceted analysis of the interrelated activities of knowledge workers, their motives and purpose, their relationships and the tools that mediate their KM activities (Hasan & Pfaff, 2007b). According to Waycott et al. (2005), Activity Theory is a collection of broadly defined concepts that are open to interpretation. This perspective permits a re-analysis of the data collected in a previously conducted analysis using case study and participatory action research. Activity Theory is used to re-interpret key concepts that are particularly relevant to the research and helpful in providing an explanatory framework for the data. Varied data collection methods advocated by case study and action research methodologies such as questionnaires, interviews and observation are utilised to validate the different points of view from the subjects, community and tools.

Activity Theory offers in-depth understanding of an activity from different perspectives. There may be legitimate alternative sets of actions that can enable the successful performance of an activity. For example, it is common practice in IS development to assess the feasibility of different design solutions to an organisational problem and then choose one solution to implement based on a cost benefit analysis. There may be instances where it is feasible to allow concurrent different solutions (i.e. different sets of actions) for an activity under different circumstances (e.g. in different countries where cultures vary or in different divisions of a company). It is important however, to have a common understanding of the object (purpose) of the activity at the top of the hierarchy (Pfaff & Hasan, 2006b).

3.2.4.3.5 Historical and Cultural Context

Understanding the history of innovation in the organisation helps to uncover previous attempts to implement technological change. Expertise is historically developed. It is developed over time through a unique combination of knowledge and skills, which is

difficult to copy because it is embedded in the organisation, instrumentation, work practices, and the culture of the firm (Virkkunen & Kuutti, 1997). This sticky knowledge and its manifestations at the individual, group, organisational, inter-organisational, and geographical levels make it difficult to transfer (Badaracco, 1991).

Context (Nardi, 1996a) plays a crucial role in the understanding and development of emergent Enterprise 2.0 tools such as a corporate Wiki. Too often, the contextual nature of knowledge work is either totally ignored or, if acknowledged at all, poorly understood (Linger et al. 2005). Analysing context is essential for defining the larger activity systems within which activity occurs among the subject, community, object and the dynamics that exist between the subject and the mediators (Nardi, 1996b). Context consists of elements such as involved organisational units, roles, and resources as well as purpose and outcomes of related activities and participating communities. It also includes person-related information such as required skill level and communication relationships between roles (Hädrich & Priebe, 2005). Analysing context enables us to seek information in order to describe how things get done in this context because different contexts impose distinctly different work practices (Uden et al. 2007).

Corporate Wikis are susceptible to contextual change and the knowledge worker's interaction with that context. The emphasis is on the way people undertake an activity that is influenced by the environment around them and their ability to develop an understanding based upon previous experiences in order to make logical actions (Er & Kay, 2005). The context within which knowledge is being shared in an organisation comprises social, management, legal and technical issues which can be analysed at different levels of abstraction (Pfaff & Hasan, 2006a). These issues have important implications when implementing a new KMS with which people will interact. Activity Theory will be used to examine how users' motivations and their perceptions of their roles in the corporate Wiki change as they become more engaged in the community.

Introducing a new technology in an organisation has a cultural context. Advocates of the corporate Wiki need to be aware of tensions in the organisation that may hinder success and the extent to which Wiki users are committed to the Wiki. Activity Theory illuminates why some organisations have problems with implementing a corporate Wiki, while others do not. The Activity Theory framework is useful for identifying and

understanding issues that organisations should consider before adopting a corporate Wiki and during the implementation process so as to increase the possibility of success.

3.2.4.4 Assumptions of Activity Theory

The subsequent section extrapolates the assumptions of Activity Theory that are based on the premise that these assumed relationships within and between activity systems must be resolved to ensure effective KM integration.

3.2.4.4.1 Unity of Consciousness and Activity

A fundamental assumption of Activity Theory is the unity of consciousness and activity (Kaptelinin, 1995). Consciousness refers to any mental functioning including remembering, deciding, classifying, generalising, abstracting and so forth, as a product of our social interactions with other people and of our use of tools (Nardi, 1996a). Activity Theory emphasises the difference between people and things on the basis that humans alone possess motive and consciousness (Nardi, 1996a). Activity theorists argue that consciousness is not a set of discrete disembodied cognitive acts such as decision making, classification and remembering. It is located in everyday practice, you are what you do (Nardi, 1996b) and this characteristic is particularly relevant to knowledge work. There is an obvious dialectic relationship between knowledge and work, i.e. thinking and doing or what knowledge workers do and what they know (Pfaff & Hasan, 2006b). Weiser (1993) argues that users live through their practices and tacit knowledge so that the most powerful things are those that are effectively invisible in use. By invisibility, he means that the tool does not intrude on human consciousness but the focus is on the task and not the tool. The challenge is making the invisibility visible through the study of human factors and the user interface.

Knowledge workers may memorise organisational knowledge such as rules and procedures, but they understand better through the process of doing it. A number of observers (Bryant et al. 2005; Emigh & Herring, 2005; Lih, 2004) argue that the content of Wikipedia is influenced by social norms within the Wikipedia community as well the technological medium upon which the community is built. There are several benefits of using Activity Theory to see if the same holds true for the corporate Wiki, as well as to

increase our observations for the design and understanding of KMS in the work environment.

3.2.4.4.2 Object-orientedness

Object-orientedness (Engeström, 1987) acknowledges the importance of the environment with which human beings are interacting. The objective of the activity lends direction to the activity. The social and cultural properties of the environment are equated to be as objective as physical, chemical, or biological ones. These properties exist regardless of our feelings about them (Kaptelinin, 1995). If knowing and doing are initiated by intentions, then the source of intentions are directed at objects of activity. Just as the wisdom of the crowds (Surowiecki, 2004) of the Open Source Movement (OSM) intended to contribute to creating Linux, the open-source operating system in 1991, so too can this wisdom contribute to building corporate Wikis as the organisational knowledge repositories of learning organisations, enabling knowledge workers to learn while being innovative.

3.2.4.4.3 Hierarchical Structure

Leont'ev (1978) introduced a three-level hierarchical model of activity (Figure 2.5) that translates it into a set of secondary concepts and isolate specific activities.

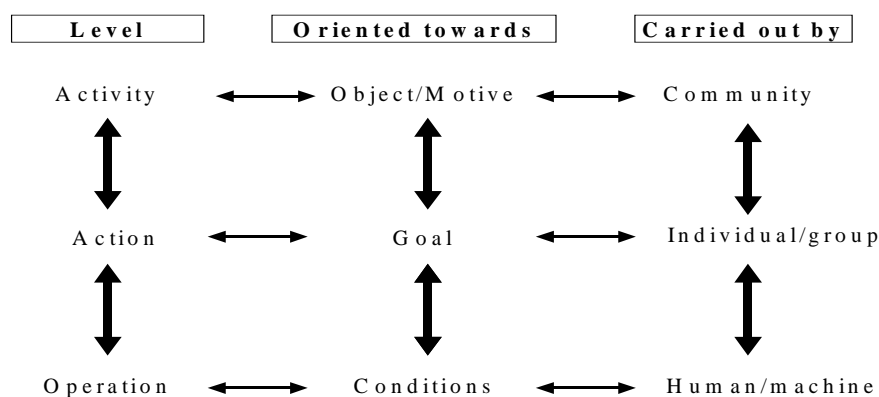


Figure 3.6 Hierarchical Model of Activities
Source: Adapted from Leont'ev (1978)

According to Kuutti (1995) activities which can be performed by individuals or groups, can be considered as having three hierarchical levels: activity, action and operation. Corresponding to these three levels are motive, goal and conditions. Since humans interact with their environments and learn about the world through their interactions in order to fulfil some goal.

On the top level, an activity consists of a goal directed chain of actions such as tasks, actions and operations to transform the object (Jonassen & Rohrer-Murphy, 1999) and is regarded as conscious. A motive (human need) is the object of a whole activity. An activity supports a motive where each motive is an object, material or ideal satisfies a need (Kaptelinin, 1995). When a motive is frustrated, people are upset, and their behaviour is unpredictable.

In the central level, actions can decompose into operations under certain circumstances. Actions are directed to goals so as to accomplish the activity. Usually, goals are subordinated to other goals, which may be subordinated to still other goals, and so on (Tuikka, 2002). When a goal is frustrated, it is necessary to plan what to do next and set a new goal. Great effort and sometimes, negative emotion are displayed.

The next level down sees operations are conscious actions when they are first performed and their objects are transformed into outcomes not at once but through a process that typically consists of several steps (Kuuti, 1995). Repeated exercise and internalisation change activities into actions and then into operations as they become automatic resulting in more successful actions. Operations are then said to be non-conscious or routinised and are carried out automatically by human routines or even by a machine (Nardi, 1996b). The relationship between levels is fluid and subject to continuous changes. Many people do not realise that automatic processes are affected by actual conditions. People often do not have their own goals, and will automatically adapt themselves to the current situation. The bi-directional arrows indicate that a reverse reaction can occur. For example, operations can turn into actions if the activity is disrupted; or an action may become entirely operationalised; or it may become an activity if the entire community focuses on its goal. Equally, an activity might be seen as an action in relation to a higher activity.

Kaptelinin (1995) holds the view that since Activity Theory is used to predict human behaviour, it is critically important to distinguish among motives, goals, and conditions. Therefore, to understand and to predict the changes of people's behaviour in different situations, one has to ask if the behaviours support a motive, a goal, or actual conditions? Engeström (1987) emphasises the clarification of motives and goals of the activity system. For example, what are stakeholders' goals and motives? What are their expectations about the outcome? This stage is considered to be the most important step of the process. Several techniques can be used at this initial stage, including the analysis of formal and informal documentation, user observations and interviewing. Given that the corporate Wiki must meet users' needs, a thorough understanding of the intentional dynamics of the activity system is critical.

3.2.4.4.4 Contradictions

Engeström and Miettinen (1999, p.32) notes that:

“Actions are not fully predictable, rational, and machine-like. The most well-planned and streamlined actions involve failures, disruptions, and unexpected innovations.”

Engeström and Miettinen call these disruptions within activities contradictions. Activity Theory enables the identification of these underlying contradictions that may produce failures, disruptions or innovations. Given the complexity of human activity, inner contradictions are expected to arise in the performance of activity and/or brought about by the diversity of actors and their expectations.

Sometimes a problem may occur in the process of transforming an object into an outcome, due to an inadequacy in some of the components that or some other problem that may have affected the interaction between the components make up the activity. For example, if the selected tool is not appropriate to the object; or the subject is unable to use the tool competently, and so on. We then have a contradiction between the object and the outcome.

Engeström (2001) argues that contradictions are points to reveal how the activity is developing and its purpose is to drive development. Thus, contradictions are where researchers need to look in their analysis in order to locate what needs fixing so as to pave the way for what needs to be changed. This is particularly valuable for researchers who are analysing knowledge work in the corporate Wiki activity system. Identifying these contradictions helps researchers to be more effective at developing ways to mediate the effects of the contradictions or encourage the production of innovations to overcome the contradictions.

Activity theorists may need to analyse the intentions that are transpired from contradictions that individuals perceive about their environment, such as differences they need to know before they can accomplish a goal and what they know at that point of time (Jonassen & Rohrer-Murphy, 1999). Conscious intentions direct meaningful goal-directed activities that will frame the context for both mental processes and external actions. However their intentions can only exist in the context of the activity.

Contradictions are not necessarily to be avoided because they are the driving force of transformation within an activity system (Engeström, 1987). Resolving conflicts may involve using other Enterprise 2.0 technologies: RSS feeds, blogs, social networking sites, social bookmarking and mash-ups. The concept of contradictions is a useful analytical tool, enabling the identification and classification of particular instances of change and development in an activity system. Analysing other Enterprise 2.0 technologies may provide opportunities for the development of a new KMS to support a particular activity system such as the corporate Wiki.

3.2.4.4.5 Internalisation-Externalisation

Another assumption of Activity Theory is that of internalisation-externalisation (Vygotsky, 1978).

“Every activity has both an external and an internal side because the subject and the object of an activity are in a reciprocal relationship with each other:

the subject is transforming the object, while the properties of the object penetrate into the subject and transform him or her” (Kuuti, 1995, p. 22).

Activities can be internal or external but they cannot be understood if they are analysed separately because they transform into each other (Kaptelinin & Nardi, 1997). In short, internalisation is the transformation of external activities into internal ones. Internalisation provides a means for people to try potential interactions with reality without performing actual manipulation with real objects (mental simulations, imaginings, considering alternative plans, etc.).

Vygotsky (1978) posits that internalisation is social by its very nature because it transforms external activities to become internal activities. During socialisation, a knowledge worker internalises by participating in common knowledge activities with other humans through language, theories, technical artefacts as well as norms and modes of acting. Through the course of internalisation, knowledge workers use their explicit knowledge e.g. prior knowledge and experience, values and beliefs, to come to an understanding on how to define a situation or solve a problem that constitutes as tacit knowledge. These are acquired through interaction with the environment and are thus rooted primarily in experience and the tacit knowledge resident in the environment and the way it is distributed and accessed. In order to coordinate individual and group knowledge work activities, this context-specific knowledge has to be externalised, i.e. formalised and communicated.

The mental process is then externalised by performing some actions through the application of his or her knowledge so as to act and verify or correct or improve their memory or understanding to specifically solve the problem. Knowledge workers are only able to internalise knowledge through performing an activity externally, that is, they learn by doing through using the contents of the corporate Wiki.

Nonaka and Takeuchi (1995) state that externalisation aims at articulating tacit knowledge into explicit concepts while internalisation aims at embodying explicit knowledge into tacit knowledge. Externalisation transforms internal activities into external ones and is often necessary when an internalised action needs to be verified and

corrected or improved. Activities are influenced by other activities and other changes in their physical environment, since it is used for the externalisation of thoughts and as external memory. For example, learning may then be externalised in future social activity, leading to further change and perhaps learning. This knowledge is acquired over time, through experience, and cannot easily be learned by others.

Externalisation is important because the corporate Wiki requires a group of people to work collaboratively, thus requiring their activities to be performed externally in order to be coordinated such as creating and maintaining the contents of the corporate Wiki. Knowledge workers can combine the process of knowledge creation with the corporate Wiki, which is a social technology. This enables knowledge workers to socialise around it, and internalise the new knowledge.

3.2.4.4.6 Development

Activity Theory is interested in development and change, which includes historical change, individual development, and moment-to-moment change (Russell, 2001). All three levels of analysis are necessary to understand people learn and share knowledge. Development refers to the life history of an organisation. As organisations mature, it is accompanied by changes. According to Activity Theory, to understand a phenomenon means to know how it has developed into its existing form (Kaptelinin, 1995).

The concept of development equips us to accept and handle change in the activity system. By analysing and understanding how knowledge work has developed over time gives researchers a good foundation in how knowledge work is done in the present state. A corporate Wiki activity system is dynamic. Corporate Wiki entries change continuously, necessitating the requirement that the knowledge activities created for it have to be developed and re-developed. The activity of the subject and each component of the activity system are dynamic so it is constantly evolving as they relate to and interact with each other not only towards stability and consensus but also through conflicts, discontinuities and breakdowns.

Both the process of socialisation (from novice to expert) and the questioning of authority, suggest that criticism and initiation of change have to be taken into account (Engeström & Miettinen, 1999). The corporate Wiki is modified and changed to meet the needs of various divisions of labour. It facilitates the creation of the community. It accelerates the dissemination of rules. It is a powerful tool for knowledge workers to transform their corporate Wiki and then communicate these transformations back to the community.

Activity Theory is strongly predicated by the expanding spiral of learning in the Developmental Work Research (DWR) approach (Engeström, 1987), where the work unit is viewed as an activity system bringing together both practice and learning (Virkkunen & Kuutti, 2000). DWR provides a dynamic framework that can accommodate a multifaceted analysis of the interrelated activities of knowledge workers, their motives and purpose, their relationships and the tools that mediate their KM activities (Pfaff & Hasan, 2006b). Kuutti and Virkkunen's research (1995) use activity systems to represent the object of organisational work where a system as a whole is taken as the unit of analysis and intervention. The concept of an activity system is introduced as a potential candidate for a unit of analysis that makes it possible to analyse the specific historical, local challenges and problems of organisational learning and to direct a collective learning process.

The zone of proximal development (ZPD) comprise of the range of actions that can be performed by a person in cooperation with others (Vygotsky, 1978). ZPD distinguishes the difference between what a person can do alone without any help and what one can do with the help of more experienced people. Engeström (1987) describes activity as systems of collaborative practice. In other words, it is rare that meaningful activity is produced individually but is predicated by groups of people (Jonassen & Rohrer-Murphy, 1999). For instance, a knowledge worker relies on other team members, managers, and creators of the corporate Wiki to perform his/her job. Knowledge is shared and distributed in tools, people, and the community (Jonassen, 1999).

3.3 Research Approach

A multi-method research approach is used to combine Activity Theory, participatory action research (PAR) (Lewin, 1946) with methods used in case studies (self-administered questionnaires, semi-structured interviews and observation) to increase knowledge about whether a corporate Wiki is able support knowledge work. Triangulation (Miles & Huberman, 1994) of different types of data collected from different contexts, across the different cases using different methods will focus on knowledge workers' attitudes to, and what they do with corporate Wikis, or put it succinctly, to discover the purpose of using corporate Wikis.

Based on the results of the review done on research methodologies and theories (section 3.2), it was decided that using only PAR and case study research methods, were insufficient to study the many issues that are hidden in knowledge work activities employed by knowledge workers as they engage the corporate Wiki in the work environment. Activity Theory would compensate for their shortcomings because it affords a simple way to visualise a complex subject. Generally, a Wiki in the public domain is created ad hoc, with not much attention paid to evaluation, maintenance or quality. Activity Theory helps to re-correct this oversight for corporate Wikis by formulating research questions (section 3.3.1), and intimations of this have been made earlier in section 1.1.1).

3.3.1 Using Activity Theory to Formulate Research Questions

Activity notation assisted in developing the technique of generating research questions based on the various components of the main activity system (Mwanza, 2001). This notation method is utilised to decompose the main activity system into smaller manageable units or sub-activity triangles to generate specific questions from the case studies aimed at obtaining meaningful data (Mwanza, 2001) (see section 5.4).

The activity decomposition for the main activity system shows the activity in the first diagram by breaking down into various sub-activities as depicted in the table below.

| Actors | | Mediators | | Objective (Purpose) |
|-----------|---|--------------------|---|------------------------|
| Subjects | - | Tools | - | Object |
| Subjects | - | Rules | - | Object |
| Subjects | - | Division of Labour | - | Object |
| Community | - | Tools | - | Object |
| Community | - | Rules | - | Object |
| Community | - | Division of Labour | - | Object |

Table 3.1 Activity Notation
Source: Mwanza (2001)

Each combination within the activity notation shall consist of:

- an ‘actor’ represented by the **subject** or **community** component of the triangle model,
- a ‘mediator’ represented by the **tools**, **rules** or **division of labour** component of the triangle; and
- the **object** on which activity is focused.

Research questions that are specific to a particular combination within the activity notation and also representing a sub-activity triangle are then generated (Uden et al. 2007). The questions generated can be general or specific to a particular situation. Questions that are specific to a particular combination within the activity notation and also representing a sub-activity triangle are then generated.

An example of general research questions is the primary research question: Does a corporate Wiki support knowledge work? This central research questions is sub-divided into associated research questions:

- What is the nature of knowledge in a corporate Wiki? (See section 2.1.1)

- How does organisational culture impact on corporate Wiki implementations? (See section 2.1.4.2.5)
- Is a corporate Wiki more suitable to a specific type of organisation or industry sector? (See section 2.1.4.2.5)
- Why do corporate Wikis fail in some organisations? (See section 2.1.4.1)
- How can a learning organisation take steps to decrease the possibility of a corporate Wiki rejection? (See section 2.1.6)
- How can Activity Theory be used to analyse the potential of the corporate Wiki and other Enterprise 2.0 technologies to support knowledge work by democratising organisational knowledge? (See section 5.4)

The primary research question aims to uncover the real nature of work practices that reside in a space between the organisation and individual perspectives. Can the corporate Wiki reveal the nature of this hidden space that support knowledge work that is critical to successful organisational outcomes and learning? All the other questions that follow are closely related to the primary research question.

To answer the main question, it is logical to ask the next question, “What is the nature of knowledge in corporate Wikis?” The research findings of whether the nature of knowledge is different in different contexts, for example, across the different cases will be presented later in the thesis in Chapter 4.

The third question attempts to make sense of organisational culture and leadership styles (See section 2.1.4.2.5) by reviewing the perspectives of international experts in the field, both researchers and practitioners, and their impact on KM in organisations in terms of acquiring, access to and dissemination of knowledge. If the goal is to identify if organisational culture has the potential of influence the flow and management of knowledge within an organisation (Knapp & Yu, 1999, p. 16), then an examination of the culture within organisations needs to be conducted. According to Gupta and

Govindarajan (2000), building an effective culture within which people operate in an organisation is a crucial requirement for effective KM. Is it possible to overcome the traditional and conservative organisational culture which may conflict with the way corporate Wikis challenge management authority by engaging the knowledge worker in democratising organisational knowledge? This research will clarify the managerial leadership roles that may assist in the development of a knowledge creating and sharing culture which may have important implications for organisational change and development. This process has been described as attempting to move entrenched bureaucracies and control systems in the direction of human relations and task achievement in order to adapt to the environment (Denison & Spreitzer, 1991).

This research will consider the importance of human relations. Cameron & Quinn (1999) stress the importance of leadership behaviours to develop trust and a sense of belonging in an organisation to facilitate knowledge sharing. Nonaka and Takeuchi (1995) recognise that even in companies with well-developed KM infrastructure, people still turn to others to provide solutions to problems. Task achievement combines innovation, and creativity and the development of external relationships congruent with the externalisation processes involving the conversion of tacit to explicit knowledge (SECI model) (Nonaka & Takeuchi, 1995). It introduces the notion of the corporate Wiki becoming an 'information commons' (see section 2.1.11) which is described as common spaces where people can share experiences and have unanticipated, un-chosen exposures to the ideas of other people to support knowledge work (Benkler, 2006).

The fourth question aims to learn about corporate Wiki usage in several organisations to identify whether it is suited to all types of organisations or just learning organisations. Or are Wikis more suited to a specific organisational culture (see section 2.1.4.2.5) or industry type (see section 2.1.4.2.4.3)? It seeks to uncover the building blocks of the infrastructure that are already in place in learning organisations, to identify gaps in terms of what is required, and to propose how those gaps should be closed for organisations who desire to become learning organisations.

The fifth question examines what really happens to knowledge work, and to knowledge workers, when management does not take an active interest in 'knowledge'. It sheds

light on the reasons as to why the corporate Wiki has been a failure to some of the case organisations.

The sixth question explores how organisations learn from using corporate Wikis as opposed to just learning how to store knowledge in organisational memory. It also looks at the measures taken by successful learning organisations to overcome several KM challenges to utilise the corporate Wiki. If the corporate Wiki brings added value to KM, then some guidelines are needed in terms of its introduction and adoption. It expands on the Wiki infrastructure that is needed to be in place to support knowledge access in the future.

The final research question requires the use of the Activity Theory framework to reveal the activities in knowledge work and whether these activities are supported by the corporate Wiki. It aims at analysing the influence of the growing use of the corporate Wiki has on knowledge work and collaborative behaviours, by examining how the Wiki community from different organisations appropriates the corporate Wiki for their own ends. These appropriations are specific in dealing with the new technology that transforms both the technical system and social group.

Examples of specific research questions include:

- How applicable is the corporate Wiki to knowledge workers and how do knowledge workers utilise the corporate Wiki so as to create, share and disseminate knowledge about work to provide better KM support?
- How the rule of creating, writing and editing corporate Wiki entries as knowledge sources while working affect the way knowledge workers share work knowledge in order to provide KM support?
- How organisation's rules and cultural norms affect the way teams of knowledge workers share work knowledge so as to provide better KM support?

- How incorporating individual knowledge workers in a project team or working with another project team affect the way the team(s) share work knowledge so as to provide better KM support?
- What is the perception of KM needs?
- How the roles of Wiki users affect the way knowledge workers share organisational knowledge?

The results of decomposing the activity system of six case organisations using an activity notation process are discussed in Section 5.4.

3.3.2 Case Order and Setting

The methodology engaged in this study is best described as a longitudinal multiple case study approach (Yin, 2003) which encapsulates this research to study organisations utilising the corporate Wiki over time in terms of an inter-organisational comparison among six organisations. The case studies aim to discover the potential for corporate Wikis to support knowledge work in organisations.

The number and type of cases are selected to address the primary research question; “Does a corporate Wiki support knowledge work?” and other related research questions (see section 1.1.1). Yin (2003) indicates that to achieve literal replication or prediction of similar results usually requires at least six to ten cases. Based on this line of reasoning, the criteria about organisational culture types and leadership styles discussed in section 2.1.4.1.5 will be used to study the fertility of knowledge transfer for each of the organisational culture types and draw conclusions about the likelihood of sustaining the corporate Wiki for each organisation.

This exploratory study was conducted in six organisations consisting of two primary cases and four supporting cases. For the purpose of confidentiality, the six organisations have been designated as case organisation A, case organisation B, case organisation C, case organisation D, case organisation E and case organisation F. These organisations were selected on the basis of generalising the study and representing diverse

organisational cultures, structures, industry sectors and locations (see section 2.1.4.1.5). The comparative study describes six organisations, three each from Australia and the U.K. ranging from those that operate in the private sector to the public sector, are small, medium and large sized; and may have state, national and international operations. The organisations are aware of the need for a KMS but vary in their approach and their level of adoption.

The research study is conducted in two phases because the two primary cases in Phase One were originally planned as pieces of participatory action research (PAR) (Lewin, 1946) (see sections 4.1.1 and 4.1.2). The initial intention is for two different research approaches based on Activity Theory (Engeström, 1987; Vygotsky, 1962) and PAR are to be undertaken during Phase One of the research. Phase One aims at studying the introduction and testing of corporate Wikis in two primary cases in Australia, case organisation A which is a knowledge intensive organisation and case organisation B which is a non-governmental organisation. Furthermore, the research gravitates towards purposive sampling of negative or disconfirming cases because Phase One research case organisations with corporate Wiki implementations received little success, and little is known in IS/IT research about successful Wiki implementations.

Invitations were issued by case organisations A and B, to become a consultant and action researcher, to implement a corporate Wiki and observe its contribution to KM. PAR is particularly chosen because its strength involves all relevant parties to actively examine together current action (which they experience as problematic) in order to change and improve it. They do this by critically reflecting on the historical, political, cultural, economic, geographic and other contexts which make sense of it (Wadsworth, 1998). As I would be actively liaising with other members of the corporate Wiki project while building and testing the corporate Wiki, this enabled me to exploit a PAR feature which considers the "causal inferences about the behaviour of human beings are more likely to be valid and enactable when the human beings in question participate in building and testing them" (Argyris & Schon, 1991, p. 86). It allows a fuller and more meaningful account of the knowledge worker-environment interaction referred to as knowledge work because "knowledge work is ingrained in the day-to-day operations of

the business at the grassroots level and driven by the people who interact with the external environment on the frontlines of the business” (Malhotra, 1998).

Activity Theory used as a basis for this research to underpin case study and participative action research methodologies. Activity Theory is useful in evaluating the corporate Wiki because it was able to visualise the complexity of relationships within an organisation, but also on examining how well the corporate Wiki supports knowledge work. It would be interesting when the data analysis begins to reveal that the activity system of Activity Theory is providing insights concerning the behaviours of knowledge workers and their managers. The activity system contradictions provide rich insights into the corporate Wiki dynamics and opportunities for the evolution of the corporate Wiki to include other Enterprise 2.0 technologies.

I have taken into account of Avison and the others’ (1999) criticism of researchers who claim that they have been using PAR as their principal research method because interviewing and observing people in these situations without the insight associated with intervention is not PAR. The absence of active participation in the actual building and testing of the corporate Wikis in Phase Two case organisations did not recommend them to be set up as PAR projects. Only case study and Activity Theory are used in Phase Two of the research.

Although case organisations A and B are set up as a PAR projects to address the issues of KM, particularly to avoid the former mechanistic approach towards KM which believes that an application of technology and resources will allow knowledge workers to do their jobs better, case organisation A decides to pull out of the PAR project because it decides that the corporate Wiki is not suitable for its organisation. Some of the reasons cited for its discontinuation of the project are vandalism fears, managers not wanting to share power and intellectual property issues (see section 4.1.1). When it becomes apparent that management support will not be forthcoming, the research plan is altered to identify and examine the reasons for the organisation’s reluctance to proceed with the Wiki project. It is decided that an objective look at my experiences with case organisation A’s failed Wiki project is necessary and used as an opportunity to learn about what causes corporate Wiki failure and the steps that can be taken to reduce Wiki rejection by applying the Activity Theory framework.

PAR is used only for one case organisation, forming the methodological basis of the research design for case organisation B. As a result, case organisation B becomes the sole PAR project in this research to study whether a corporate Wiki is able to support knowledge work and to identify key elements of a successful corporate Wiki adoption process. Case organisation B's goal is to develop a corporate Wiki as a KMS within the Business and Management Division to create an information resource site that will give corporate Wiki users access to documents on governance, knowledge management, and risk management directed at small business owners.

The case study for case organisation B is built up over a period of time throughout the research process from the initial design to the final presentation of results and discussion of the project members' action implications. Project members are encouraged to "participate actively with the professional researcher throughout the research process from the initial design to the final presentation of results and discussion of their action implications" (Whyte, 1991, p. 20). Case organisation B's Project Manager is accorded 'co-researcher' status as prescribed by PAR (Elden & Chisholm, 1993). The role of case organisation B's Project Manager is to bring practical understanding of the social setting including existing organisational knowledge and culture to identify the problems that are the underlying causes of the organisation's desire for change to adopt the corporate Wiki as a KMS. My role as an action researcher is to bring knowledge of action research and general IS theories to make interpretive assumptions from observation; and intervene in the problem setting (Baskerville, 1999). Action researchers, together with the "members of the organisation we study are actively engaged in the quest for information and ideas to guide their future actions" (Whyte et al. 1991, p. 20). Work begins with defining the nature of knowledge that is to be placed in the corporate Wiki and studying knowledge workers' attitudes to, and their use, of the corporate Wiki. More details of the PAR project can be found in Section 4.1.2.

Phase Two denotes the research stage where data is collected for the supporting cases. They comprise of four cases of corporate Wiki usage in organisations. The main purpose of these cases is to get supporting data for the primary cases and data of real use of corporate Wikis for business purposes in an organisation. The research gravitates

towards purposive sampling of negative or disconfirming cases because Phase One research case organisations with corporate Wiki implementations received mixed success, and little is known in IS/IT research about successful Wiki implementations.

The four supporting case organisations in Phase Two of the research come from a cross-section of industries, such as public utilities, research and development, government; and marketing and technology. These organisations come from both small-medium enterprises (60-400 employees) and large organisations (more than 5000 employees) and their organisational reach is regional, national, and global.

Organisations which are corporate Wiki users that are participating in Phase Two are:

- Case organisation C – A public utilities company in the U.K.
- Case organisation D – A global research and development company headquartered in the U.K.
- Case organisation E – A government organisation in Australia
- Case organisation F – A marketing and technology consultancy in the U.K.

The four organisations had already implemented corporate Wikis and this was seen as an excellent research opportunity to investigate how and why do learning organisations adopt and use corporate Wikis, and compare these findings with the research findings from case organisations A and B of Wiki failure, so as to investigate if corporate Wikis are suitable to all types of organisations, the causal issues that contribute to corporate Wiki failure; and steps to reduce Wiki rejection.

3.3.3 Data Collection

Evidence for the case studies for both Phase One and Two of the research comes from four sources: email questionnaires, telephone interviews, face-to-face interviews and observation. Bearing in mind the cost and distance as this is a comparative study of organisations in Australia and the U.K., telephone interviews are sometimes used interchangeably in place of face-to-face interviews. Case organisation B is the only case study that was set up as a PAR; face-to-face interviews are also used to substantiate the collected data from the PAR project.

Consistent with a qualitative approach, the sample involves a small number of people deeply nested in the context under investigation (Miles & Huberman, 1994) to focus on the details and quality of individual experiences. Purposive sampling (Kinnear & Taylor, 1991) is chosen to select the employees most likely to provide the answers to the research questions and then deliberately includes them in the sample.

| Phase/Date | Case | Data Collection Method |
|-----------------------------|------------------------|---|
| Phase One Feb – Mar 2006 | Case A Primary Case | 5 Face-to-Face Interviews (2 hr each) with 5 employees Note taking Observation |

Table 3.2 Data Collection Method (A)

| Phase/Date | Case | Data Collection Method |
|------------------------------------|------------------------|---|
| Phase One Sep 2006 – April 2007 | Case B Primary Case | Participatory Action Research Work and Business Documents 1 Face-to-Face Interview (4 hr) with Project Manager Note taking Observation Emails |

Table 3.3 Data Collection Method (B)

| Phase/Date | Case | Data Collection Method |
|------------------------------|--------------------------|---|
| Phase Two May – Sept 2007 | Case C Secondary Case | 5 questionnaires sent and all returned from 5 employees 4 Telephone Interviews (2 hr each) with 4 employees 1 Face-to-Face Interview (2 hr) with 1 employee Note taking *The 5 employees were the same people that participated in the questionnaires and interviews. |

Table 3.4 Data Collection Method (C)

| Phase/Date | Case | Data Collection Method |
|------------------------------|--------------------------|---|
| Phase Two May – Sept 2007 | Case D Secondary Case | 5 questionnaires sent and all returned from 5 employees 4 Telephone Interviews (2 hr each) with 4 employees 1 Face-to-Face Interview (2 hr) with 1 employee Note taking *The 5 employees were the same people that participated in the questionnaires and interviews. |

Table 3.5 Data Collection Method (D)

| Phase/Date | Case | Data Collection Method |
|------------------------------|--------------------------|--|
| Phase Two May – Sept 2007 | Case E Secondary Case | 5 questionnaires sent and all returned from 5 employees 5 Telephone Interviews (2 hr each) with 5 employees Note taking *The 5 employees were the same people that participated in the questionnaires and interviews. |

Table 3.6 Data Collection Method (E)

| Phase/Date | Case | Data Collection Method |
|------------------------------|--------------------------|--|
| Phase Two May – Sept 2007 | Case F Secondary Case | 5 questionnaires sent and all returned from 5 employees 5 Telephone Interviews (2 hr each) with 5 employees Note taking *The 5 employees were the same people that participated in the questionnaires and interviews. |

Table 3.7 Data Collection Method (F)

It is decided to select a sample of five staff members from five organisations (case organisations A, and C - F) making it a total of 25 participants from five organisations: one group of four corporate Wiki champions, one group of four managers and one group of 12 corporate users/contributors comprising of knowledge workers. Case organisation B is the only exception where only one employee participated in the research. The small sample in case organisation B is tempered with document analysis which is included in the data collection process. As requested by the organisations, the confidentiality of the subjects is protected, and sources are not cited.

26 knowledge workers are interviewed individually across organisations to lend some evidential probability to research claims. The knowledge workers represent stakeholders that belong to organisations which like to use or are using corporate Wikis to facilitate KM. According to Drucker's (1959) definition, managers and corporate Wiki users are known as knowledge workers. To differentiate the perceptions held by managers and non-managers with regard to organisational culture and performance, knowledge work and the corporate Wiki, it was decided to sort them into two groups, people holding management positions belonging to the managers group while those with non-managerial positions were collectively known as knowledge workers.

Senior managers and line managers are chosen to become interviewees to understand the need for a more in-depth understanding of naturalistic settings and the complexity of implementing organisational and technological change. It is believed that the managers are in the best position to assess the organisational culture, the extent of the success of corporate Wiki implementation and denote the challenges. Several sources comment that managers will give a good evaluation of the overall organisational culture (Rupel & Harrington, 2001; Brynjolfsson & Hitt, 1998).

Knowledge workers ranging from Wiki champions to Wiki novices are selected to reflect the importance of understanding the context and the complexity of knowledge work. More importantly, the target sample ranges across preferred leadership styles from traditional and conservative to open and innovative management approaches. This discrepancy will provide further insight into the KM dilemma, as it illuminates the relationship between KM; and organisational culture and leadership style (see section 2.1.4.1.5).

3.3.3.1 Data Collection for Case Organisation A

Case organisation A's research takes place between February to March 2006. As the topic of this research is investigating has no original data available, it is decided to collect primary data through the use of collection techniques such as interviews to extract the data from a group of respondents. Data is collected via five face-to-face interviews in two hour interviews. The interview questions can be found in Appendix 2. Extensive notes are also recorded while the interviews are taking place. For case

organisation A, five staff members are interviewed - two are directors, one is a head of department and the other two are rank and file knowledge workers. The framework of factors affecting the uptake of the corporate Wiki for case organisation A becomes the basis to understand why corporate Wikis are rejected.

Table 3.8 presents the characteristics of the interview population of case organisation A:

| CASE A | Definition of Characteristics | Value of Characteristics |
|--------|-------------------------------------|--|
| | No. of participants | 5 |
| | Age of the participants | 31 – 62 years |
| | Gender of the participants | 80% Male, 20% Female |
| | Number of years in the organisation | 2 – 11 years |
| | Job title | Directors, head of department, administrative staff member and technical specialist. |

Table 3.8 Characteristics of Case Organisation A's Interview Participants

3.3.3.2 Data Collection for Case Organisation B

Case organisation B's research takes place from September 2006 to February 2007. Case organisation B's Project Manager is interviewed for four hours to get a balanced perspective of the human experience so that this research can describe the experience of individuals as they encounter specific situations (Barritt, 1986) as they conduct their day to day knowledge work activities. The interview questions can be found in Appendix 2. The interview is supplemented by emails and work-related business documents to further aid understanding of what and how changes in practice occur; and the notion of organisational learning is considered. Argyris and Schön (1996, p.16) suggest that organisational learning occurs when individuals within an organisation experience a problematic situation and inquire into it on the organisation's behalf. The problematic situation in this case is how to support knowledge workers' learning effectively in a non- traditional work space. What people think and feel and are most suitable when the focus of the research is on the process (how) and interactions rather than the outcomes of a particular event or phenomenon. This was in keeping with the corporate Wiki's

democratic process of knowledge creation and dissemination by being a research methodology that tries to be a genuinely democratic or non-coercive process whereby those to be helped, determine the purposes and outcomes of their own inquiry (Wadsworth, 1998). The Project Manager also provides samples of documentation that the organisation will like to put in the corporate Wiki.

As consistent with PAR projects, a great deal of the participation was done through consulting methods. For example, case organisation B's Project Manager would ask for my view on a specific subject matter and I would provide it gladly, indicating and further developing fruitful researcher-practitioner collaboration. These informal interactions proved to be very useful, and resulted in the implementation of the corporate Wiki.

Table 3.9 presents the characteristics of the interview population of case organisation B:

| CASE B | Definition of Characteristics | Value of Characteristics |
|--------|-------------------------------------|--------------------------|
| | No. of participants | 1 |
| | Age of the participants | 38 |
| | Gender of the participants | Male |
| | Number of years in the organisation | 7 |
| | Job title | Project Manager |

Table 3.9 Characteristics of Case Organisation B's Interview Participants

3.3.3.3 Data Collection Procedure - Phase Two

The case studies in Phase Two signals the shift from Wiki rejection to Wiki acceptance. Phase Two is instrumental in re-examining the nature of knowledge and to identify how interventions can be made to turn organisations into learning organisations (Senge, 1990) through the use of the corporate Wiki. This part of the research takes place between May – September 2007.

3.3.3.3.1 Recruitment of Organisations for Phase Two

The first stage of recruitment is to recruit small, medium and large organisations from the private and public sector from two countries so as to do a comparative study of corporate Wiki use and the emerging trends and challenges in KM faced by such organisations. To advertise the study, two approaches are taken to recruit organisations: direct emailing and word-of-mouth. For direct emailing, a number of corporate Wiki users are found through search engines. Emails requesting participation in the corporate Wiki research project were sent to four organisations in different industries. Two organisations which are corporate Wiki users are emailed and agree to take part in the research. The word-of-mouth approach is implemented by asking industry contacts if they can participate in this research. A further two organisations which are actively using corporate Wikis are identified, making it a total of four organisations that are participation in Phase Two of the research. In addition, they indicate the reasons why they implemented the corporate Wiki, the kind of problems they had with their previous KMS and what the corporate Wiki is used for. Furthermore, this seeks information on how these organisations choose and maintain their corporate Wiki on a long term basis.

3.3.3.3.2 Recruitment of Participants for Phase Two

For case organisations C – F, the second stage of recruitment is to define criteria to which potential participants can compare themselves. It is decided that knowledge workers (see section 2.1.2) must:

- identify with the role as a knowledge worker;
- be a user of a corporate Wiki; and
- intend to or have contributed to the corporate Wiki.

3.3.3.3.3 Pre-contact

Pre-contact is established before data collection begins. An email is sent to inform respondents about the questionnaire and to set up an interview. The email explains what data is being collected and the reasons behind the study. This informed subjects how long the form shall take to fill in, states that all responses will be treated confidentially, and provides contact details if they have any questions. The questionnaire itself is

divided into three sections and contains instructions relating to each section: basic demographic data, information on corporate Wiki, and personal and corporate challenges faced using the corporate Wiki. A copy of the email questionnaire can be perused in Appendix 1. Upon completing the questionnaire, the subjects are thanked for their cooperation and details are given for submitting their questionnaire. My e-mail address is made available, and subjects are offered the opportunity of contact if they have any queries. A follow up email is sent to people who have not responded within a certain time. If the subject has not fully completed all required sections of the questionnaire, they are sent an email highlighting which sections are mandatory and asked to complete those sections before sending them back once more.

3.3.3.3.4 Questionnaires

The questionnaire is emailed to a contact person (a corporate Wiki user) in the four organisations that have met the knowledge worker's criteria set in Section 3.3.3.3.2. This contact person is asked to send the questionnaire randomly to five employees, preferably a mix of top-level, middle-level and line management (including IT managers, project managers, and an IS Director) and knowledge workers who are corporate Wiki users and have wide experience and are best positioned to assess their organisation's KM activities, organisational performance, and knowledge work perceptions. This is done to increase response rates and to present a more composite picture, and not introduce other biases. Participants are derived from several departments and teams across the organisation.

This study is part of a research study on corporate Wiki effectiveness. A copy of the questionnaire can be found in Appendix 3. The following are examples of the questions used in the questionnaire:

1. What was the main purpose for implementing a Wiki?
2. What is/are the Wiki(s) used for?
3. What kind of organisational culture and management type does your organisation have?
4. How many people use the Wiki and to what age group do they belong?

5. What are the social, legal, management, and technological challenges/barriers to implementation, and how do you intend to resolve them?
6. How long have you been using the Wiki for?
7. From your experience, what recommendations can you make for Wikis to be more utilised to support user interactivity, collaboration, communication, and knowledge creation in a way that engages and motivates the user?

The rationale for the questions above, are shown through its link to the research questions. A well argued case is made for the inclusion of the seven questions, and their relationship with the seven dimensions that follow. The questionnaire relating to the corporate Wiki user understanding consists of seven dimensions: knowledge of the corporate Wiki, extent of corporate Wiki use, length of time using the corporate Wiki, take up of new technology, organisational culture and leadership type, corporate and personal challenges, and recommendations. Assessments are based on respondents' evaluations of the levels of these seven dimensions that form the basis of the primary research question: Does a corporate Wiki support knowledge work? (See section 1.1.1)

The seven dimensions are listed below:

1. Knowledge of corporate Wiki

This question asks respondents to identify the reason(s) why the corporate Wiki was implemented in the organisation. This criterion is associated with the primary research question. It reveals the managers' understanding of what knowledge work is and its perception of knowledge workers which help us to explore if a corporate Wiki can support knowledge work.

2. Extent of corporate Wiki use

Extent of corporate Wiki use at work is understood by measuring the use of the corporate Wiki for routine work by asking what is/are the Wiki(s) used for. This reveals the nature of knowledge in a Wiki and corresponds with the second research question.

3. Organisational culture and leadership type

This criterion relates to the third research question and is likely to reveal whether organisational culture and management's leadership style have an impact on different adoption/acceptance outcomes. Organisational culture is created from a broad range of internal and external influences, some of which have been argued to lie beyond managerial control (Alvesson, 1991). Demographic factors such as: age, sex, length of service and occupations are key intervening variables in the determination of knowledge workers' values. These sets of correlates may predict levels of knowledge workers and organisational effectiveness the organisation.

4. Take up of new technology

The question, "How many people use the Wiki and to what age group do they belong?" tries to ascertain whether the Wiki is used in small group or large group settings may reveal the suitability of corporate Wikis to a specific type of organisation or industry sector which is the fourth research question. The age of the Wiki user will give an indication of how readily each generation responds to the take up of new technology and if this influences Wiki adoption/acceptance outcomes.

5. Corporate and personal challenges

Determining the challenges and barriers to effective corporate Wiki use corresponds with the fifth research question which will help other organisations avoid the same pitfalls.

6. Length of time using the corporate Wiki

This variable was measured by the following criteria:

- less than six months
- six months to one year
- one to three years
- three to five years

It gives us an indication on how successful the corporate Wiki and the steps taken to decrease the possibility of a corporate Wiki rejection (sixth research question) are effective.

7. Recommendations

Recognising that the knowledge worker is familiar with knowledge work at the grassroots, this question is designed to tap the experiences of the knowledge worker to solve some of the problems of corporate Wiki ineffectiveness. It aims at answering the sixth research question which considers ideas and methods to decrease the possibility of a corporate Wiki rejection.

As response rates are strongly affected by the method of data collection, it is ensured that there is plenty of interaction between the potential respondent and I, so as to achieve a higher response rate. The length and difficulty of the survey is minimised so that it will take less than 20 minutes to complete. The format is simplified so that the questions are not ambiguous and have clear instructions and only ask what is necessary. Questionnaires are sent via email and responses emailed directly to me to protect confidentiality. The assumption is that traditional, expensive, time-consuming marketing survey studies can be carried out via e-mail and can be expected to achieve reasonable results (Tse, 1998).

Email questionnaires have a lower response rate as compared to telephone or face-to-face interviews. A contributory cause may be that for email questionnaires, the respondent is left to return the survey, causing more work for the respondent, as they have to fill in the questionnaire independently and return it to the researcher. This is one of the reasons why telephone or face to face interviews are set up with the participants. However, this problem was not encountered in this research as all 25 participants returned the completed questionnaires.

Although questionnaires provided a broad understanding of surface patterns and a firm foundation for this research project, the findings are difficult to interpret without reference to the interviews. Interviews provide a much richer understanding of how and why people differ in the way they use and respond to corporate Wikis.

3.3.3.3.5 Interviews

The interviews provide in-depth data about how knowledge workers use corporate Wikis and how the new tool changes KM activity. The principal interest is the interviewees' interpretations, understandings, and accounts of how they make sense of the social phenomena of Enterprise 2.0 technologies.

An interview document is constructed to aid in data collection. Additional questions are added to the schedule of questions used in the questionnaire for the individual interviews with selected interviewees. The interviewees are the same five people that have participated in the questionnaires. They are asked at the start of the interview about the use of the induction process to inculcate organisational cultural values, the uniqueness of the organisation and the norms encountered with the introduction of new technology. Managers are asked to respond based on their perceptions of their relationships with their knowledge workers and vice-versa. The interview questions centres on the information that is available on the corporate Wiki for knowledge workers by reviewing the information that is used, how it is used, and the importance of certain types of information. The questions focus on three major areas:

- organisational cultural challenges/barriers to implementation;
- information e.g. type, use and importance; and
- business processes e.g. operation, participation, procedures and suggestions for improvement

Open-ended questions are chosen to probe for information and to give respondents maximum flexibility, in structuring their responses. There are two major considerations in deciding on a mainly open-ended approach rather than one using more close-ended questions. One is the degree of prior research on the subject of concern. This research explores a series of rather abstract and complex issues in a relatively uncharted area at the time, investigating the adoption and use of corporate Wikis and the views of management and knowledge workers. Emphasising close-ended questions will not have served any major purpose, particularly in the exploration of patterns and perceptions. A second consideration is to maximise response validity. Open-ended questions provide a greater opportunity for respondents to organise their answers within their own

frameworks. This increases the validity of the responses and is best for the kind of exploratory and in-depth work this is doing, but it makes analysis more difficult.

In-depth interviews are conducted with five corporate Wiki champions, managers and knowledge workers from a selection of men and women from all levels and in all types of jobs within the organisation. Bearing in mind that the participants live a distance from each other, some from England and others from different Australian states, only two are face-to-face interviews and 18 responses are received through telephone interviews. The interview document is carefully gone over to cover each question in an attempt to increase the accuracy of responses.

Tables 3.5, 3.6, 3.7 and 3.8 present the characteristics of the interview population from case organisations C - F that have participated in the research project in Phase Two:

| CASE C | Definition of Characteristics | Value of Characteristics |
|--------|-------------------------------------|---|
| | No. of participants | 5 |
| | Age of the participants | 20 – 39 years |
| | Gender of the participants | 100% Male |
| | Number of years in the organisation | 2 – 13 years |
| | Job title | Project Manager, Engineer, Project Leader and Members |

Table 3.10 Characteristics of Case Organisation C's Interview Participants

| CASE D | Definition of Characteristics | Value of Characteristics |
|--------|-------------------------------------|---|
| | No. of participants | 5 |
| | Age of the participants | 22 – 36 years |
| | Gender of the participants | 100% Male |
| | Number of years in the organisation | 1 – 10 years |
| | Job title | IS Director, IS Project Manager, Scientists and Engineers |

Table 3.11 Characteristics of Case Organisation D's Interview Participants

| CASE E | Definition of Characteristics | Value of Characteristics |
|--------|-------------------------------------|---|
| | No. of participants | 5 |
| | Age of the participants | 23- 56 years |
| | Gender of the participants | 90% Male, 10 % Female |
| | Number of years in the organisation | 4 years – 20 years |
| | Job title | Technical Project Manager, IT developer, and Research Scientists. |

Table 3.12 Characteristics of Case Organisation E's Interview Participants

| CASE F | Definition of Characteristics | Value of Characteristics |
|---------------|--------------------------------------|---|
| | No. of participants | 5 |
| | Age of the participants | 20 - 40 |
| | Gender of the participants | 90% Male, 10% Female |
| | Number of years in the organisation | 1 – 10 years |
| | Job title | Chief Technology Officer and technology consultants |

Table 3.13 Characteristics of Case Organisation F's Interview Participants

3.3.4 Analysing and Interpreting Case Study Evidence

How data is analysed and interpreted represents another key question in case study research (Paré, 2002). Yin (2003) states that generalisation from a case study can be done by analytical generalisation so as to guide the decision regarding what will be analysed and for what reason. An explanation-building strategy (Yin, 2003) is adopted to understand the how and why associated with each corporate Wiki implementation project and to provide answers to the research questions. This strategy involves developing a case description in Chapter 4 which serves as a framework for organising the case study. The first step is to identify the problems encountered in the current KMS. The second step is to describe the challenges encountered during the corporate Wiki implementation process.

Challenges are identified through an in-depth analysis of the contextual conditions such as the social, management, legal and technical issues surrounding the implementation of the corporate Wiki. For each challenge, a solution is described to overcome the problem. This is done by providing evidence of the effectiveness of each solution, identifying and explaining how certain contextual conditions affect the effectiveness of the solution.

3.4 Chapter Summary

This chapter outlines the research approach and design taken for this thesis. Trying to select from the options considered was a difficult decision. It was decided to take up Kaplan and Duchon's (1988) advice that "no one approach to Information Systems research can provide the richness that Information Systems as a discipline, needs for further advancement." Research methodologies, for example, case study and participatory action research used in this thesis are explained and a comparison of theories such as Structuration Theory, Actor Network Theory and Activity Theory are presented. The selection of Activity Theory to inform KMS design for a corporate Wiki is justified and links between theoretical concepts and design practice are developed.

The concepts, insights, and understanding that are developed from patterns in the data are formulated into case studies which are then analysed using Activity Theory to answer the primary research question, "Does a corporate Wiki support knowledge work?" To answer this question and the other related research questions in Section 1.1.1, one must study the nature of knowledge in corporate Wikis and the essential elements of KM and knowledge workers that relate to the challenges of a more cooperative and democratic KM concept. In order to understand the role of the corporate Wiki as a KMS from a researcher's point of view and to implement it successfully as a practitioner, it is important to learn from organisations which have experienced successful implementation of corporate Wiki projects that is considered an uncommon phenomenon. The empirical work is essential to advancing knowledge on knowledge workers and the corporate Wiki and investigating the notion that the corporate Wiki can assist to alleviate KM challenges and provide learning organisations with ways to share and distribute knowledge throughout their processes, sites and workforces. The case studies considered in the next chapter and will introduce many potential benefits that corporate Wikis can bring to KM; however they will also highlight the fact that new tools inevitably, introduce constraints. Thus, it is important for KM research to focus not only on how newly emergent Enterprise 2.0 technologies enhance knowledge work, but also to assess the potential negative impacts that these new tools may have.

Chapter 4 Case Organisations

Chapter 4 builds upon the preceding chapters and presents corporate Knowledge Management (KM) cases in action. It presents the case narratives and summaries to provide a cross-case comparative analysis to identify similarities and differences among the six cases. Each case description will provide a detailed description of the case. It begins with some background on the organisation such as type, location and size. Prior attempts of KM and its problems with its KMS are discussed. Next, an identification of the organisation's KM needs such as knowledge-sharing and collaboration including determining the kind of knowledge work that is performed by the organisation; and motives to implement a corporate Wiki are presented. The next section within each case will identify the factors that affect corporate Wiki implementation and adoption outcomes such as organisational culture and leadership styles. The end of each case study will draw the various threads together and discuss precautionary measures taken by more successful organisations to overcome social, management, legal and technical challenges/barriers challenges and barriers which will help Wiki implementation and how they can lead to Wiki failure if not addressed.

4.1 Case Studies

The interview questions identified in Section 3.3.3.3.4 aim to answer the primary research question “Does a corporate Wiki support knowledge work?” and associated research questions (see section 1.1.1) to provide the structure for the analysis. A ‘template’ approach is adopted where a number of characteristics from each case organisation can be applied to strengthen the descriptions provided and later used to compare the case organisations (see section 4.2).

4.1.1 Case Organisation A

| CASE A | Definition of Characteristics | Value of Characteristics |
|--------|--|---|
| | Type of organisation | Knowledge services |
| | Location | Australia |
| | Size of organisation | SME (>200 employees) |
| | Current KMS/technology | Intranet |
| | Intranet Uses | Publish information e.g. calendar events Telephone/E-mail Directory HR forms |
| | Number of years KMS/technology was used | 2 years |
| | Failure of current KMS | Information overload Poor quality information Poor search engine Tacit knowledge and business processes not captured |
| | Number/Age of Users | All employees (>200) 18 – 70 years |
| | Purpose of Wiki Implementation | Good search engine Easy access to information Store work-related business processes, policies and documents |
| | Organisational Culture | Bureaucratic |
| | Management Type | Autocratic |
| | Social Challenges/Barriers | Lack of incentives Lack of time Low work morale Mistrust |
| | Management Challenges/Barriers | Vandalism Unreliable information Limits to power sharing Centralised IS control Recruiting and training Wiki users Technology innovation discouraged |
| | Legal Challenges/Barriers | Intellectual Property Legal Liabilities |
| | Technical Challenges/Barriers | Installing Wiki Software Maintenance |
| | Recommendations | Training & Development Courses Store & access policies & business processes Good quality & well organised information Easy to search |

Table 4.1 Characteristics of Case Organisation A

Case organisation A is a small medium enterprise (SME) located in Australia. It provides knowledge services and employs fewer than 200 employees, including casual employees. It can be described as a knowledge intensive firm where most work is said to be of an intellectual nature and where well-educated, qualified employees form the major part of the workforce (Alvesson, 2000). It uses a predominantly paper based management system, with the exception of accounts and an intranet-based information systems that functions as a KMS. The intranet is used to publish information such as calendar events and telephone/email directory internally across the organisation. Web-based Human Resource (HR) Department forms such as time sheets for the collection of payroll and leave forms are implemented to reduce the paper trail. The organisation is confident that all employees (> 200) whose ages range from 18 to 70 years use the intranet because the leave forms are available only on the intranet.

The organisation does not have much resources to address the challenges posed by their current KMS and cannot afford an expensive KMS. After the business case is put forward for a corporate Wiki, management is keen to adopt the corporate Wiki as a better KMS to replace their current intranet. The knowledge workers of case organisation A said that the drawbacks of the current system are “information overload and information of little quality.” The information in the intranet is not well organised and difficult to search. It is time-consuming to read everything that purports to be information. The search engine yields far too many hits or the keywords give unanticipated meanings. Sometimes, a user may not get any hits at all, without the precise keywords. “I have to remember the exact name of the policy or the search engine will not find it,” expresses a knowledge worker. Users spend a lot of time getting the data and analysing it as best as they can with little direction from the management team. This limited management’s ability to control the business. Information has to be requested from different people who, in some cases, carry the information in their heads. Due to the high turnover rate and the fact that “people forget because the business processes are not written down”, “makes our jobs more difficult”, said the knowledge workers.

The current intranet has not fulfilled its objective of allowing employees have access to speedier time-sensitive information and enhancing the decision-making process. Implementing a corporate Wiki will mean that its good search engine will give knowledge workers easy access to information to work-related business processes, policies and documents. Case organisation A initially welcomes the chance to set up a Wiki as part of this study of the adoption of corporate Wikis for KM projects.

When management decided to cancel the project and reject the Wiki concept outright. The interviews with case organisation A's knowledge workers and managers will provide the reasons for the change in management's decision. The research plan is altered to identify and examine the reasons for the organisation's reluctance to proceed with the Wiki project. The lessons and insights learned from this failed corporate Wiki project will serve a guide for further research in the development and implementation of corporate Wikis in a business environment.

Case organisation A is a relatively traditional organisation in many ways that exhibits a bureaucratic organisational culture. Case organisation A has a pyramidal structure where at the bottom; in terms of pay, prestige, and formal autonomy are knowledge workers. Next up are heads of departments, and finally, the directors. If organisations are defined by their lines of flow of power, information, and authority, then case organisation A is described by a knowledge worker as a workplace which is "hierarchical in the extreme." "It is a pyramid of power, privilege, and access to information", said another knowledge worker. Management's views reflect the autocratic leadership style of making extensive use of bureaucratic controls to achieve its desire for control and rigid policies.

Several social challenges and barriers such as low work morale and distrust (see sections 2.3.7.1.4 and 2.3.7.1.6) and a lack of incentives (see section 2.3.7.1.2) are raised. All of the knowledge workers that are interviewed feel they are not rewarded financially. Knowledge workers perceive knowledge work as "doing unnecessary admin work" which increases their workloads, since it is not tied to any incentives. Another statement such as "our workloads are already heavy, but wasting time on intranet makes it even more challenging" indicates that since knowledge work is not included in their

job description, knowledge workers suffer from a lack of time to complete their work. They suffer from low work morale, “I am not paid enough to think.” Many do not feel that there is sufficient job security, “there is a high turnover rate here”. They particularly did not like being told what to do, “I don’t like being ordered around”. Knowledge workers have a low opinion of knowledge sharing. “If I share what I know, they become smarter than me”, says a knowledge worker. “You share, you lose power” and “it’s a lose-lose situation”, says another knowledge worker. The negativism and intolerance for new ideas from Case organisation A’s managers are filtered down the ranks, and this makes this organisational culture inconducive to fertile knowledge transfer.

The social challenge is to communicate to managers that the organisation needs to value their knowledge workers so as to foster the sharing of individual contributions of organisational knowledge. This will create real value for corporate Wiki contributors and how the community benefits from collaborative thinking.

The management challenges and barriers include vandalism, unreliable information, centralised IS control, limits to power sharing and technology innovation. The managers of case organisation A were afraid that the employees may deface the corporate Wiki with misinformation, slander, rude jokes, and pornography. They were also concerned that information on the Wiki will not be considered a credible source and the inconsistency of writing quality. The directors are most concerned about the corporate Wiki’s democratic approach to allow knowledge workers update work documents, policies and procedures that may lead to vandalism. Obviously, an uptake of new technology is permissible, “if it is authorised by the CEO, then it is ok”, says a director. This explains why none of the managers are willing to take the responsibility to make an IT decision. During the interview with the directors, it is quite clear that management are not keen to share power. I am reminded time and time again, that “all documents and changes must be approved and made from the Head Office.” “Even sub-divisions cannot make changes; head office will not allow employees to change things.” Another concern is recruiting, training and educating subjects or potential Wiki administrators and users. The managers are unsure if they will be successful in recruiting volunteers to become administrators who will train and educate users on Wiki use. Administrators will act purely on a voluntary basis because management will not endorse corporate

Wiki work as part of their job descriptions. The interviews with the managers from case organisation A reveal that they do not understand much about technology and as a consequence discourage technology innovation. All of them admit that “I’ve never heard of a Wiki.” The term, *Wikipedia* also drew blank looks. The head of department asked, “What does ‘Wiki’ stand for?” He thought that the term ‘Wiki’ was an acronym of a technical term. Another director claims that, “there must be something wrong with it if it is not mainstream like Microsoft.” Furthermore, IT projects are seen as an added and unwanted burden.

Case organisation A cites intellectual property issues and legal liabilities as their legal challenges and barriers such as how to wean employees away from sophisticated copying and putting up inappropriate information. The technical challenge is how to install the Wiki software and maintain the technical features of the corporate Wiki. The small IT department already has a heavy workload and does not have the necessary expertise to install the freeware ‘MediaWiki’.

Several recommendations have been identified which knowledge workers think are critical to the success of a viable corporate Wiki. Knowledge workers acknowledge that there are plenty of opportunities for training and development, however these opportunities “lacked vision and was boring.” This is because “the training courses are repeated every three months” and causes some of the staff members to “dread going to these courses” because they were “not learning anything new”. Knowledge workers want to “put the training and development on the Wiki” where it can be easily accessed. “It will be a good idea to put the policies and procedures on the Wiki as I am constantly referring to them.” “Make sure it (the corporate Wiki) works not like the one we are using now”, is a constant refrain from case organisation A’s knowledge workers.

4.1.1.1 Case Organisation A Summary

Case organisation A is evidently not a rational actor. Its goal is not to solve a defined problem of alleviating the bottle neck acquisition of work documents, but to relieve the stress on the organisation caused by pressure operating outside of or overwhelming the capacity of normal channels. Case organisation A is less than impressed by the

technologists' promises of greater efficiency or optimised outcomes. The implied criticism contained in those promises and the disruption of routine their implementations foreshadow, even for the most effective and economical innovations, is felt as undesirably disruptive if it means that the culture must change its values and habits in order to become a sensible organisation (see section 2.1.7). Organisation A's natural resistance to organisational change plays an important role in shaping their response to the use of the corporate Wiki.

When the introduction of the new Wiki technology threatens to disrupt the existing corporate structure, it meets with tremendous resistance from case organisation A's management. A technology that reinforces existing lines of power and information is more likely to be adopted. The divergence of interests between managers and knowledge workers, and the potential implementation fissures along those lines, is a source of many implementation failures of widely-touted 'advances' (Prakken, 2000). As there is no Chief Information Officer or senior level IT director, all IT decisions are approved by the Chief Executive Officer (CEO) who does not have technical skills and orders are given to the beleaguered IT manager. IT services are "cobbled together" to provide "the basic IT services at minimum costs", said a knowledge worker who works in the IT department. Key to the reluctance to use the corporate Wiki for knowledge sharing is a perceived incompatibility between the collaborative nature of the technology and the individualistic and competitive nature of the organisation. In such an environment, knowledge sharing via a corporate Wiki is seen to threaten status, distinctive competence, and power.

The command and control oriented leadership style of case organisation A creates a bureaucratic organisational culture and their autocratic leadership style (see section 2.1.4.1.5) creates a degree of fear and resentment in the organisation. In contrast, the democratic style of the corporate Wiki comes across as a shock to the organisation. "How can I trust them (knowledge workers) not to change or vandalise the business documents", said a director. Because of the character of this organisation and the emphasis on command and control, the storing aspect of organisational knowledge seems to be more relevant than the human to human perspective.

Even if the corporate Wiki is implemented in case organisation A, it will be difficult to sustain it for the long term. There is a truism that even the most complacent bureaucracies direct some incentives at their workers (see section 2.3.7.1.2). These may be monetary, in the form of performance bonuses or stock options, career enhancing in the form of promotions, or sanctions like demotion and the consequent loss of authority and responsibility. Case organisation A offers none of these. This pervasive deskilling and condescension towards knowledge workers is central to the organisational culture of case organisation A. Hence, enlisting the cooperation of knowledge workers to contribute to the Wiki will be seen as path of continued resistance and frustration.

4.1.2 Case Organisation B

| CASE B | Definition of Characteristics | Value of Characteristics |
|--------|---|---|
| | Type of organisation | Non-governmental, industry legislation |
| | Location | Australia |
| | Size of organisation | SME (>200 employees) |
| | Current KMS/technology | Website |
| | Website Uses | Catalogues Current news Organisation structure & roles Customer feedback & enquiries |
| | Number of years KMS/technology was used | 10 years |
| | Failure of current KMS/technology | Cannot create personal/dept spaces Webpages created by IT staff |
| | Number/Age of Users | All employees (>200) 18 – 70 years |
| | Purpose of Wiki Implementation | Corporate Wiki with limited public access Create small business space & one stop information resource site |
| | Organisational Culture | Competition/Confrontation |
| | Management Type | Conflict between laissez-faire & consultative |

| CASE B | Definition of Characteristics | Value of Characteristics |
|--------|--------------------------------|---|
| | Recommendations | Store business documents Collective efficiency Attractive features to build up critical mass Link Wiki to other Enterprise 2.0 tools Participate in ARC Linkage Project |
| | Social Challenges/Barriers | Competition Lack of incentives Waste of time Lack of cooperation among employees |
| | Management Challenges/Barriers | Security of confidential and financial information Technology innovation apathy |
| | Legal Challenges/Barriers | Intellectual Property Legal Liabilities |
| | Technical Challenges/Barriers | None |

Table 4.2 Characteristics of Case Organisation B

Case organisation B is a non-governmental organisation (NGO) in Australia which develops industry legislation for public benefit and national interest. This SME which employs fewer than 200 employees (18 – 70 years) and provides extensive facilities and the ability to certify products with industry sector experience and knowledge gained over many years. It is dependent on its website which has been used for about ten years, to reach its targeted audience. The website contains a comprehensive collection of catalogues comprising technical information provide complete information solutions that improve customers' efficiency, competitive position and decision support at every level of the product development life cycle. The current news section showcases its latest projects which it develops owning the projects' intellectual capital in proprietary contexts, either in-house or through licensing and exclusive outsourcing relationships. Other listings on the website include organisation structure and roles; and customer feedback and enquiries. As the organisation does not have a KMS, their employees use the company website to search for work-related information which is supported by manual paper management systems consisting of files and folders. The drawbacks are

that the website does not have the facility to create personal/departmental spaces and Webpages are created by the IT department.

Case organisation B seeks to develop and implement a KMS in the form of a corporate Wiki within the Business and Management Division to create “small business space” so that it can become “a one stop information resource site such as governance, knowledge management, and risk management, for small business owners,” describes the Project Manager when he is interviewed. The corporate Wiki community will not only consist of Case organisation B’s employees but also open to some members of the small business community in Australia. My PhD supervisor and I are invited to act as consultants and action researchers to assist with the design, implementation and use of the Wiki. Case organisation B is set up as a PAR project (see section 4.1.2) based on a simple model of the iterative nature of the typical action research process where each cycle has four stages: plan, act, observe, and reflect. PAR allows multiple opportunities for reflection and re-perception, to help make explicit the concealed and subconscious forces affecting knowledge workers’ perception to KM.

Competition/Confrontation organisational culture is dominant across Case organisation B (see section 2.1.4.1.5). Typical of this culture; the Project Manager takes the perfectionist approach and tries to limit access to the Wiki by securing an invitation only access. There is little executive sponsorship, and the Wiki is not recognised as a key business tool. None of the higher level managers show much interest in actually using the Wiki themselves. The CEO that has given approval to the project adopts a laissez-faire leadership style by expecting people to get on with their jobs. Weak direction from the CEO makes the organisation struggle because the organisation is dependent on the ability and judgement of the central power.

In contrast, the Project Manager as the Wiki champion prefers a consultative leadership style with his subordinates. Perhaps a fear of making mistakes which will not be tolerated by the company, he expects to be told what to do by his superiors. The similarity or differences of the manager’s and the knowledge worker’s view of organisational culture indicates that a high match of organisational culture levels results in a strong organisational culture whereas differences in both groups’ mindsets lead

towards a weak culture (Arnold, 2005). As there is no match between the two groups' mindsets, this only leads to a superficial strong culture where there is weak commitment to sharing the same values and underlying assumptions. Such an organisational culture is considered not very fertile for knowledge transfer.

During the planning stage of the PAR project, a four hour interview was set up with case organisation B's Project Manager to conceptualise, plan, develop and review current KM needs and align them to organisational goals. The "initial focus is on small business management issues", said the Project Manager. A committee for Small Business will be established to produce material to address this problem. "This committee will seed it (the corporate Wiki) with company information summary material from the various business units, such as press releases, company policies, and staff details", adds the Project Manager.

A number of recommendations are made to improve the effectiveness of the corporate Wiki. When asked how the Wiki community will reach critical mass (see section 2.3.2.3) to sustain itself, "new ideas will be conveyed that will lead to new actions by small business owners/operators", replied the Project Manager. Eventually, suitable members of the small business community will be invited to add experiences and advice to this material and harness the power of collective efficiency (see section 2.3.2.3), to build up a body of knowledge on business topics that concentrated on small business issues. The material can be monitored and edited by members of the committee and the result can then be made available at no cost to small business managers. The Project Manager wants the corporate Wiki to be used "to recommend marketing tactics and services to attract small businesses." Other uses will be to "capture feedback from the small business community", and "develop small business-related documents." Eventually, the Project Manager wants to "link it (the corporate Wiki) to other Enterprise 2.0 tools like the Weblog." Often, resources are adopted in large private and public organisations but not by small businesses where they are seen as costly, inappropriate and irrelevant. This project is suggested as a solution which can be implemented at low cost if case organisation B decides to become an industry partner to participate in an Australian Research Council (ARC) Linkage Project that supports collaborative research and development projects between higher education researchers

and other organisations within industry, to enable the application of advanced knowledge to their problems.

4.1.2.1 Choosing a Wiki

During the action phase of the PAR project, a number of Wiki search engines are reviewed to investigate the best one that can be utilised for case organisation B's corporate Wiki. The following tables compare a few features of a number of possible corporate Wiki implementations. Case organisation B wants a hosted solution because they do not want the corporate Wiki to use their own servers and it is decided it will be "too much hassle to involve the IT department." This narrows down the choice to Confluence and Wikispaces. As cost is a primary concern, Confluence is rejected because it is too expensive. It costs US \$49 per month for a hosted solution. The Wikispaces's plan at US \$5 a month proves to be more enticing. Case organisation B opts for the private Wikispaces option where only members of the space can view and edit pages. Nevertheless, compared to the other Wiki search engines, Wikispaces' security and anti-spam features are less advanced because it does not have the following features: host blocking, mail encryption, blacklist and delayed indexing. The corporate Wiki is implemented in the organisation after getting the approval of the CEO.

| | Language | Easy to Install | Version Control | Access Control | File Attachments | Data Storage |
|------------|----------|-----------------|-----------------|----------------|------------------|--------------------------------|
| Media Wiki | PHP | Fair | Yes | Advanced | Yes | Database |
| Twiki | Perl/Cgi | Difficult | Yes | Advanced | Yes | Files, Revision Control System |
| Confluence | Java | Easy | Yes | Advanced | Yes | Database |
| Wikispaces | PHP | Easy | Yes | Advanced | Yes | Database |

Table 4.3 Comparison of Features of Wiki Implementations⁴²

⁴² <http://www.wikimatrix.org/show/>

| | Syndication | Data Export | Search | Security | Suggested Use |
|------------|-------------|-------------|--------|----------|--------------------------|
| MediaWiki | RSS | XML, PDF | Yes | Good | Intranet/internet site |
| Twiki | RSS | XML, PDF | Yes | Advanced | Small-medium scale sites |
| Confluence | RSS | XML, PDF | Yes | Advanced | Intranet/internet site |
| Wikispaces | RSS | HTML | Yes | Adequate | Small-medium scale sites |

Table 4.4 Comparison of External Features of Wiki Implementations⁴³

4.1.2.2 Factors Affecting the Implementation of the Corporate Wiki

During the observation phase, it is noted that the Wiki is used for several months, before a change of top management stalls the use of the Wiki because approval for the continued use of the Wiki has to be obtained from the new senior level manager. The CEO responsible for initially approving the introduction of the Wiki to the organisation left and therefore, the project is not maintained. Interest in the Wiki wanes and the Wiki is no longer being used for its original purpose.

To salvage the Wiki project and increase participation in the corporate Wiki, the Project Manager proposes that, “another department that deals with market research and quality assurance will be invited to work on the corporate Wiki.” However, this department’s role is to maintain the quality of the corporate Wiki contents, while his department will concentrate on creating new knowledge for the Wiki. Case organisation B is advised to: improve visibility by delegating leadership of the KM creation processes to knowledge workers to improve employee trust, reduce ambiguity and error of business processes and documents by entrusting knowledge workers to gather the correct information and edit errors appropriately; and improve communications throughout project and system life cycles. However, case organisation B is unwilling to take the advice of the action

⁴³ <http://www.wikimatrix.org/show/>

researchers of the corporate Wiki project and insists on retaining control over what goes into the corporate Wiki.

During the reflection phase of the PAR project, the analysis indicates that the social challenges/barriers include competition, lack of incentives and cooperation among employees (see Figure 4.2). It appears that each manager or constituency seeks to achieve personal goals within a competitive and perfectionist organisation. There are no incentives for employees to bring good Wiki contributions into the corporate Wiki. The top down approach that is adopted stifles cooperation among employees. Coupled by the lack of strong direction from the Project Manager, members do not have a clear direction or the necessary resources to seed the Wiki and consider it a waste of time. Since there are very few members participating in the Wiki, the information generated is not acted upon.

Security of confidential and financial information and technology innovation apathy are presented as management challenges/barriers. Case organisation B is dedicated to protecting against unauthorised access to or use of such information that could result in substantial harm or inconvenience to the organisation and any customer. It appears that its organisational culture is innovation-averse. For example, it does not have an intranet or any kind of IS and is dependent on a paper trail to support their business processes. The corporate Wiki does not get the level of support that it should from credible, significant and professional knowledge workers who should be participating in the corporate Wiki project, because the top level managers have not 'led by example.'

Case organisation B considers knowledge know-how (see section 2.1.1.1) or information related their business processes, sales and distribution methods, lists of clients and suppliers and patents as intellectual property and marked as proprietary. It is noted that the project manager is nervous about the legal issues surrounding their copyright material. At several times during the interview the project manager said that, "I hope there will not be a problem with the legal side"; and during the course of the project when discussing about the content of the corporate Wiki, he replies, "I will have to speak to the CEO about that." Because the corporate Wiki will be open to invited members of the small business community to add business experiences and advice to

build up the corporate Wiki's knowledge repository consisting of business topics that concentrate on small business issues, this presented the challenge of intellectual property infractions.

Within a few months people start to question the point of maintaining a system that is not being used for anything. Consequently, the usage of the system reduces. This leads to a loss of confidence in the Wiki and the project is suspended.

4.1.2.3 Case Organisation B Summary

Organisations do not necessarily remain stable over time as reflected in case organisation B's experience. This is particularly likely in a bureaucratic organisation, which is a much more dynamic institution than stereotypes would like society to believe. It is obvious that public Wikis are not suitable for all types of information. Case organisation B has confidential or financial information that by law has to be restricted and this information is not suitable to be placed in a corporate Wiki that will be accessible to the public. The implementation of the corporate Wiki suffers delays from administrative red tape due to privacy or regulatory issues.

Nevertheless, case organisation B's Wiki fails for social and management, rather than technical or legal concerns. It lacks the support from nearly all major constituents from the organisation, eventually even from the new top managers. In addition to the major problems of a lack of support and degree of commitment, other factors include the exclusivity of the Wiki to be restricted to certain users, which undermines the Wiki's greatest feature, that of including participatory efforts from knowledge workers to democratise organisational knowledge. The preference for top-down controls means that information flows are restricted.

Furthermore, Case organisation B's emphasis on competition/confrontation in their organisational structure impedes the free flow of information. Case organisation B's experience suggests the more effective and efficient methodology of Wiki design favours a 'bottom-up' rather than a 'top-down' approach. It is evident that a successful

Wiki cannot be designed and mandated by the CEO and top managers, without prior commitment from other constituencies in the organisation.

As a Wiki is produced by many different people, attempting to 'plant' small business information on a Wiki proves to be detrimental. Rather than concentrating on one individual or a 'chosen few' to access the Wiki, there needs to be a series of committees representing diverse elements of the organisation to generate input to the Wiki to broaden online conversation about issues that are important to the stakeholders and give the various constituencies a stake in the Wiki.

To have a viable corporate Wiki, case organisation B does not find the technology daunting but rather, how to get people involved due to the limited resources of attention and time. The study has shown that this will depend on the match between the goal and the technology. For example, case organisation B's corporate Wiki is intended for a small, closed group of users so that the users can post important information on the corporate Wiki to disseminate to the public.

The goal is that the public will be able to find information related to small businesses easier on the Wiki than elsewhere on the Internet and other published sources. However, case organisation B neglects the emotional connection between individual and group. For active participation it seems as if the users must have the feeling to have some impact with their activities.

4.1.3 Case Organisation C

| CASE C | Definition of Characteristics | Value of Characteristics |
|--------|---|--|
| | Type of organisation | Public utilities |
| | Location | U.K. |
| | Size of organisation | Large (< 5000 employees) |
| | Previous KMS/technology | Lotus QuickPlace & Lotus Notes |
| | Number of years KMS/technology was used | 6 years |
| | Previous KMS uses | Email/Calendars Resource Websites White Boards Instant Messaging Polling |
| | Failure of previous KMS | Complicated Poor information quality Information held in different websites Restrictive editing Poor search engine |
| | Number/Age of Users | 50 employees 20 – 55 years |
| | Purpose of Wiki Implementation | Report Writing Discussion Archives Data encyclopaedia Quick document search |
| | Length of time Wiki used | 5 years |
| | Organisational Culture | Task Oriented |
| | Management Type | Consultative |
| | Social Challenges/Barriers | Perception Fear Trust Learning new technology |
| | Legal Challenges/Barriers | None |
| | Management Challenges/Barriers | Bottom up approach tolerated but not encouraged |
| | Technical Challenges/Barriers | None |
| | Recommendations | Publicity & training workshops QuickTime Videos Job descriptions to include Wiki work |

Table 4.5 Characteristics of Case Organisation C

Case organisation C is a large public utilities company based in the U.K. The company is in the private sector owned by a large multinational conglomerate. It is a large employer with a current staff of around 4000 people and their employees range from industrial chemists to engineers to financial analysts. It is committed to the stewardship

of the environment and the principles of sustainable development. Driven by a heavy research focus, the organisation is keen to develop technology effectively, manage and maintain their networked environments, as well as a number of innovative operational models and design tools to assist them in making more informed decisions.

Case organisation C's Wiki champion is a Research and Development (R&D) Project Manager who is motivated to explore how the corporate Wiki is being used and what opportunities exist to extend its usefulness. Their KMS before they adopted the corporate Wiki was IBM Lotus QuickPlace and they used Lotus Notes for their intranet, which were implemented six years ago. Lotus Notes is a powerful tool that can be integrated at the back end of large Information Systems. It has email and calendaring features, host discussion forums, and the collaboration can extend to long-distance reporting. In spite of these attributes, the R&D Project Manager and the knowledge workers equally dislike Lotus Notes. Their sentiments are similar to the one expressed by Arthur (2006) "to the average person, Notes displays all the user-friendliness of a cornered rat." A knowledge worker complains that Lotus Notes is "ridiculously complicated." "Even free email programs allows the user to keep their email in different folders, but Notes makes it to be a complicated process." There is an increasing emphasis on the intranet as an information resource for staff. However, there is a valid criticism that the information is very variable in quality. "Information is unstructured, out of date and duplicated, with content problems affecting most of the site," cited a knowledge worker. The organisation tried to build a number of resource sites that contain categorised information and archive databases that compare favourably with online services. Knowledge workers found themselves members of several website domains that "I can't remember which website to go for which information." One knowledge worker lamented that "I am split in the middle" because involvement in so many domains curtailed their time and efforts to become an active contributor to these websites.

Lotus QuickPlace was adopted to pool knowledge and compare notes with others by sharing ideas, developing resources, discussing a project or preparing work documents. Disparate team members could be connected in real time using instant messaging and web-conferencing tools such as screen sharing, whiteboards and polling. Yet, the R&D

Project Manager remarks that their KMS “was very restrictive on editing and lacked decent search facilities” and “acted more like a Content Management Systems (CMS).” Whilst this is certainly a consideration for organisations, familiarity is the very reason why the Wiki which is similar to case organisation C’s Lotus QuickPlace and intranet was implemented. It is a powerful tool which enables case organisation’s C employees to approach it with ease. The overall goal is to create a KMS that has online services features such as browsers, a search engine and the use of classification schemes and keywords to provide a standard familiar interface to their disparate sources of information. The Wiki’s added value comes in sourcing, classifying and refining information.

It was this impetus that spurred the R&D Project Manager to research the possibility of establishing a corporate Wiki because his department needed a data encyclopaedia. Initially, the R&D Project Manager decides to invoke the maxim that “it is easier to ask for forgiveness after the fact than to ask for permission before beginning” when it comes to corporate Wiki adoption. Although this maxim is not being regarded as an appropriate methodology to begin a KM effort and in reality, an approach like that can end up costing the company dearly. The Wiki is trialled within the R&D Project Manager’s team (Decision Support Projects) and within the R&D department.

The corporate Wiki goes back a few years, about five years ago. “We started using the Wiki to co-author our teams’ monthly report”, said a project team member referring to how the corporate Wiki kick-started with monthly reports. Each project team comprises of six members. 50 people actively use the corporate Wiki whose ages range from 20 to 55. Each team member updates the report with highlights from projects that they are working on for discussion during the meeting. Previously, “it was a rush to get edits in before the meeting”, comments a team member. “It used to be a very clumsy exercise on MS Word”, adds the R&D Project Manager. “The Wiki allows us to edit the report simultaneously” said another team member with a sigh of relief. The corporate Wiki’s page history provides a useful archive of their reports. “We used to have umpteen copies of the report buried in folders as archives”, states the R&D Project Manager.

The R&D department uses data from a variety of sources for modelling purposes. Data has to be collected internally across different departments e.g. internal data such as machine failures, customer contacts or external data such as soil, weather, and census. “With no centrally maintained metadata store it is difficult to track (or even be aware) of data across the organisation”, said the R&D Project Manager. “It is bewildering especially for new employees”, claims a project leader. “It sucked!” exclaims the youngest participant recalling his work experience period with the company. The R&D Project Manager is convinced that that will be a better way to avoid these hassles so “We compiled a data encyclopaedia of all the data we used and were aware of on the Wiki.”

The R&D Project Manager attributes his success to trial the corporate Wiki to “being within R&D (department) helped the implementation process”, “I had access to a server”, and “I wanted to prove that it (technology innovation) should not be CIO (Chief Information Officer) directed”. As commented by the R&D Project Manager, “developing plans on the Wiki with other team members means that the goals and timelines are realistic.” Knowledge workers said that, “no excuses can be made if you are on the Wiki”, “issues and complaints do not drop off the radar”, and “team members are always aware of the mission, tasks, and accountabilities.”

An engineer comments that, “Part of the culture is to look up documents. It is a natural thing to do on the Wiki.” “We now have a simpler, quicker, better and more direct KMS”, acknowledges one knowledge worker. The R&D Project Manager was confident that “if the Wiki was successful the word would spread and other departments would begin to use it.” He was right. Take-up was based on word of mouth which received positive feedback. “It began as a one-off in the sister company, but I saw that it had wider applications”, said the R&D Project Manager. Another knowledge worker agrees, “I found dozens of comparable and similar situations to use the Wiki for my other projects.” When top management sees how well the corporate Wiki is working, it decides that the R&D team will trial the Wiki for other project teams to see how suitable the Wiki will be to case organisation C’s organisational and business goals.

The task-oriented organisational culture means that the organisation is more task-oriented as opposed to people-oriented (Ladd & Herminger, 2003) (see section 2.1.4.1.5). The key aspects of its culture are a commitment to total quality management, a focus on organisational learning and employee empowerment, as well as a long-term time orientation. However, the organisation acknowledges that their organisation culture can be quite bureaucratic, and adopts a more consultative style of management to counteract the flaws of autocratic leadership. Case organisation C's R&D Project Manager says that his organisation frequently organises "knowledge sharing visits" to various sister companies and other departments. It is during such a visit to a sister company that the R&D Project Manager is introduced to a corporate Wiki by another colleague who is a Wiki evangelist. The Wiki evangelist "showed me an implementation of snipsnaps as well as Wikipedia." "This colleague was inspired by Wikipedia", acknowledges the R&D Project Manager. "It seems really useful and so much easier and more productive than our existing "knowledge management" systems", said the R&D Project Manager. These organisational cultural aspects are particularly compatible with the Wiki which is useful for managing ongoing organisational changes. The consultative style of managers encourages openness and communication enabling this culture to be more fertile to knowledge transfer.

The R&D Project Manager names the main social challenges/barriers as "ones of perception, comfort levels with the software, fear and trust" (see Figure 4.5). A project leader explains that "the previous CMS only allows editing to a handful of users in clearly defined roles; the Wiki is a significant departure from this position. Most people don't feel at liberty to jump straight in and edit the page before them. Telling people not to worry too much about structure and letting it emerge as you go is also a foreign concept to most."

The main management challenge/barrier is that the 'bottom-up' approach is tolerated but not encouraged (see Figure 4.5). "I didn't engage IS or the KM department until after implementation as it would have been easy to say no if I had asked permission," explained the Project Manager. "I think most the technological barriers have been overcome (keep it simple)", said the R&D Project Manager. The use of open source

Mediawiki, makes essentially free to implement and relatively easy for the IT savvy Project Manager to install the corporate Wiki for his project team.

The R&D Project Manager admits that, “the Wiki cannot do everything.” The corporate Wiki cannot do away with project meetings completely. There is something to be said for “seeing a person in a face-to-face meeting or walking up to his/her desk and asking him/her why something hasn’t been done yet.” The R&D Project Manager recommends that “face-to-face contact is important”, which explains why the R&D team runs “Wiki Wednesdays” once a month. These are publicity and training workshops to encourage employees to use the corporate Wiki. Detailed instructions are posted on the corporate Wiki explaining how to perform common tasks such as editing pages, uploading images, and formatting sites. Short segments of QuickTime video tutorials help new users to familiarise themselves to the various functions of the Wiki. Re-writing knowledge workers’ job descriptions to include work done on the Wiki helps to overcome the problem of user involvement.

4.1.3.1 Case Organisation C Summary

Case organisation C’s scenario indicates a strong grassroots movement brewing that will hasten the introduction of Enterprise 2.0 tools in the enterprise, with or without corporate blessing. The use of the corporate Wiki for knowledge collaboration without the involvement of the senior executives and in some cases against its wishes is an example of how workers can drive the adoption of Enterprise 2.0 technologies in the workplace. Case organisation C does not secure top management approval for Wiki adoption on the onset. However, case organisation C cultivates an intellectually stimulating and innovative environment where senior managers encourage knowledge workers to think through issues and problems for themselves so that they develop their own abilities. Knowledge workers are also encouraged to research about the latest technology so that they can demonstrate that they are familiar with the latest technology and project management approaches. In such a nurturing innovative environment, the Wiki champion takes the initiative to create and implement a corporate Wiki because the need is there. There is the important relationship between the technology and the organisational context.

4.1.4 Case Organisation D

| CASE D | Definition of Characteristics | Value of Characteristics |
|--------|---|--|
| | Type of organisation | Research and development |
| | Location | U.K. |
| | Size of organisation | Large (< 60 000 employees) |
| | Previous KMS/technology | Enterprise portal |
| | Number of years KMS/technology was used | 7 years |
| | Previous KMS uses | HR information Financial applications Enterprise search engine Employee directory |
| | Failure of previous KMS | Created information silos Non-standard records management practices Difficult to collaborate Cannot create permanent record of emails and conversations |
| | Purpose of Wiki Implementation | Monitor & harvest conversations Help geographically dispersed work teams collaborate on projects Deliver timely and quality data Interactive on-line discussion forum/information commons Develop IP library Build a collaborative spirit |
| | Length of time Wiki used | 2 years |
| | Number/Age of Users | < 3000 employees 20 – 65 years |
| | Organisational Culture | Openness to Change/ Innovation |
| | Management Type | Consultative |
| | Social Challenges/Barriers | User involvement |
| | Legal Challenges/Barriers | None |
| | Management Challenges/Barriers | None |
| | Technical Challenges/Barriers | None |
| | Recommendations | Email notifications of page changes Start small Delegate responsibility Job description to include Wiki work |

Table 4.6 Characteristics of Case Organisation D

Case organisation D is one of the world's largest and successful multinational corporations dealing in research and development. Their products are supplied to more than 100 countries and in 2006, sales total more than \$26 billion and their operating

profit is more than \$8 billion. More than 60 000 people around the world are employed by case organisation D to work in their research and development centres in eight countries. This network organisation with dispersed offices and functions was creating information silos and non-standard records management practices. In addition, case organisation D's geographically dispersed workforces found it difficult to collaborate on projects that span distributed Research and Development (R&D) project teams and different time frames.

Case organisation D has been using an enterprise portal for over seven years. It allows employees to access data from separate enterprise applications such as financial and HR applications in one centralised location. It also includes an enterprise-wide search and employee directory. The enterprise portal is supposed to personalise the data for each work group, in reality, the enterprise portal is managed and 'personalised' by the IS Department and data governed by corporate policies. Consequently, employees find it cumbersome to obtain valuable information. "Arranging and placing portlets on major sites can be a very time consuming effort", complained an engineer. "Portal interfaces are designed for IT staff and not for business users", a scientist agrees.

Any tool that is used for communication is open to misuse, and email is no different. Case organisation D finds that the overuse of the e-mail may have led to information overload. Although emails create a permanent record, case organisation D do not have a team of people to ensure that information is available for re-use by staff and that important pieces of information do not pass into obscurity each day. Often, employees have to delete their emails to prevent their mailboxes from becoming too full.

Case organisation D also uses a wide range of collaboration methods, like the telephone, video-conferencing, instant messaging and e-mail to communicate. The organisation finds that their employees spend a lot of time instant messaging. Knowledge workers spend a lot of valuable time searching through a proliferation of emails to find the required information or finding documents on network drives, databases or in email archives. As such, searching for new and more appropriate tools for collaborative activities became a necessity. The IS Project Manager is the Wiki champion for his company and realises that to solve their KM dilemma it needs a person whose job is to

monitor the conversations that are taking place, harvest the important pieces of information and then transplant them to an intranet or similar resource. Arguably, this job might be overwhelming for one person. Monitoring tools can be used to track conversations on social media to get a feel for the level of discussion on their company, products and competitors as well as the key issues and topics that impact their market. For example, Technorati⁴⁴ and Sphere⁴⁵ are blog search engines. Board Tracker⁴⁶ is a tool for searching discussion boards. “I got the idea from Wikipedia,” explains the IS Project Manager who is an active participant of Wikipedia. Instead of communicating via emails, where the knowledge accumulates and is lost to newcomers, a Wiki page is as easy to update as it is to send an email and has the longevity and centralised accessibility of a webpage disseminated to a wider audience.

Knowledge workers share more information outside the organisation and with people in other countries than they do with each other in the same department. Case organisation D wants to give them an infrastructure or mechanism to talk to each other online and their research leads them to social technologies, in particular the corporate Wiki. The IS Project Manager decides that a corporate Wiki will be the ideal tool for R&D Discovery and Development teams because all R&D project team members can contribute their knowledge to the Wiki. The Project team leaders are expected to lead a small team delivering scientific methods to impact on discovery projects. In addition, project teams are expected to drive the scientific research and deliver projects and publications to support R&D. It is used to create project documents and progress reports with large teams that span multiple departments. In addition, “it is good for developing project options”, explains a scientist who is referring to the online discussion forum on the corporate Wiki.

Much of the Wiki's content is taken from case organisation D's enterprise portal. However, the IS Project Manager champions the qualities of the corporate Wiki as “an information commons” (see section 2.1.11), “managing resource-timeline-quality conflicts, and delivering data with the quality and timeliness to impact on business decisions.” As case organisation D's core business is in R&D, the corporate Wiki is

⁴⁴ www.technorati.com

⁴⁵ www.sphere.com

⁴⁶ www.boardtracker.com

used to catalogue company Intellectual Property (IP) in a manner that is inexpensive and quick to implement. It is an effective way of building up the library of the company's IP as more products are developed. "The corporate Wiki allows me to be involved in all aspects of their performance management, including: coaching, giving feedback, objective setting and development planning", says a team leader.

The IS Project Manager protests that he would have started the corporate Wiki much earlier, had it not been the conservative mentality that was indicative of the company. It was not until two years ago when there was a change in management with a new IS Director who was more open to change and innovative technologies. "He (IS Director) has a commitment on turning good ideas into innovative, effective solutions", remarks the IS Project Manager. Prior to the new change in management, the IS Project Manager criticises, "this company must be one of the slowest companies I know to take advantage of the Wiki approach to knowledge management, and is missing a great opportunity."

The IS Director estimates that there are more than 3000 corporate Wiki users because the R&D Discovery and Development teams comprises of 3500 employees worldwide. The age range is diverse and estimated between 20 – 65 years. At the time of writing, there are 159 projects being developed on the Wiki.

Case organisation D has openness to change/innovation organisational culture which is considered most fertile for knowledge transfer (See section 2.1.4.1.5). Perhaps expressive of its younger aged knowledge workers and consultative leadership style, case organisation D has spent considerable energy and money in team building and worker empowerment. Case organisation D's cooperative and team-oriented culture is compatible with the collaborative nature of Wiki technology. Its strong beliefs in the communicable and social networking aspects of KM seek out and identify those with knowledge to share.

The Wiki champion points out that the main social obstacle is trying to get people use the corporate Wiki instead of email (see Table 4.6). "Email is firmly entrenched in

working patterns and most people resort to sending an email attachment than to create a page on the Wiki and sending a link to notify colleagues”, maintains an engineer.

Case organisation D does not have any management, legal or technical challenges/barriers because the corporate Wiki has the commitment of senior management in terms of funding, standardisation, implementation, and use of the Wiki from the very start.

An IT developer recommends that “incorporating email notification of page changes really helps to pull people back into the Wiki”. The IS Project Manager advises “to start small, because most people already know how the Internet works, the pilot only has to demonstrate the possibilities of this communications medium within the team”. Other R&D teams started their own corporate Wikis to take advantage of the Wiki’s ability to have asynchronous distributed collaboration streamlined their process of sharing knowledge by allowing for one time discovery and dissemination of valuable information. Delegating maintenance of the Wiki to those responsible for publishing information or those who process the paper forms or to project members who are co-writing a report helps to lessen the work. The inclusion of Wiki work on these knowledge workers’ job descriptions helps those who are saving effort by using the Wiki and have a vested interest in getting the information published.

4.1.4.1 Case Organisation D Summary

Case organisation D finds a way to supplant inefficient email distribution and storage by using the corporate Wiki as a core tool that uses and feeds content from emails. Through the adoption of the corporate Wiki, knowledge workers control their own user experience with less guidance from the IS Department. The Wiki implementation process become more successful and streamlined as the IS Department sets up more corporate Wikis. “We have plenty going to learn the lessons and insights”, said the IS Director. Even though the IS Director wants all corporate Wiki projects to be approved by him, “we will really discourage any more pilots unless there is a burning business need. If they want to pursue I will need to see it”, said the IS Director. In reality, many of the corporate Wikis started by the R&D Discovery and Development teams was through the initiative of the project team leaders. Once knowledge workers taste

unrestricted and democratic benefits of the corporate Wiki, they are keen to “work on the Wiki without approval or supervision.” It becomes impossible to control grassroots adoption of the corporate Wiki, in spite of the fact that the IS Director “did not want a proliferation” of Wikis. There are different ways to measure the success of the corporate Wiki. One way is through the use of statistical software. Case organisation D demonstrates a high awareness regarding its Wiki users by using statistical software called WebTrends to track Wiki users. It enables Wiki administrators to gain information such as what are the most visited pages, the averaged time spent on the site, entry and exit pages, and to a certain extent, the mapping of a Wiki user’s journey through the site. Another way of measuring success is through success stories that has directly benefited or contributed to the daily work of knowledge workers. Testimonials of this nature include a knowledge worker praising the corporate Wiki for its ability “to search for, synthesise, and disseminate information” or an engineer who states that “I can categorise, filter, and personalise this collaborative content” on the corporate Wiki. In effect, knowledge workers create for themselves a most intuitive and efficient work environment. The end result is improved worker productivity, morale, and customer satisfaction. Case organisation D considers its corporate Wiki community as an intellectual asset for innovation. Knowledge workers may contribute and edit an idea or comment regarding products, and these ideas are subsequently passed on to project managers and/or team leaders for consideration. KM receives a boost from research and insight from their corporate Wiki users.

Case organisation D’s successful adoption of the corporate Wiki for project management teams have led them to develop corporate Wikis for business units and the whole organisation. These corporate Wikis are used to develop and standardise local operating practices. It is hoped that knowledge workers will use the corporate Wiki to build upon each other’s knowledge of company operations and job functions; and refine business processes so that they will be turned into best practices, shared or reviewed by the entire organisation. Case organisation D is planning to integrate the corporate Wiki with their enterprise portal, “coupled with a larger Web 2.0 project we have in mind”, said the IS Director. “It is still early days, we are only at the development stage”, continued the IS Director. A successful pilot project with the Sales Force Effectiveness team sees the corporate Wiki integrated with the enterprise portal incorporated with

other Web 2.0 features firms their resolve to commit more research in the area of Web 2.0.

4.1.5 Case Organisation E

| CASE E | Definition of Characteristics | Value of Characteristics |
|--------|---|---|
| | Type of organisation | Government |
| | Location | Australia |
| | Size of organisation | Large (< 2 000 employees) |
| | Previous KMS/technology | Intranet |
| | Number of years KMS/technology was used | 8 years |
| | Previous KMS uses | Manuals library FAQ |
| | Failure of previous KMS | Difficult to sift through emails, forum questions and manuals to find solutions to technical problems |
| | Purpose of Wiki Implementation | Create and store 'living knowledge' Improved records and document management system Project writing Lessons learnt and tips store Online discussion forum |
| | Length of time Wiki used | 1 year |
| | Number/Age of Users | < 730 20 - 60 |
| | Organisational Culture | Soft Bureaucracy |
| | Management Type | Consultative |
| | Social Challenges/Barriers | Getting people involved Maintenance and running the Wiki Email use |
| | Legal Challenges/Barriers | None |
| | Management Challenges/Barriers | None |
| | Technical Challenges/Barriers | Limitation to Confluence Wiki software |
| | Recommendations | Job title and Wiki work reflected in job description Recruit Wiki evangelists Link Wiki to internal search engine Customised Wiki software Wiki champion leads by example Switch to MediaWiki software for greater functionality |

Table 4.7 Characteristics of Case Organisation E

Case organisation E is a large government organisation situated in Australia whose domain is primarily in the area of research and development. It employs more than 2000 people. This workforce includes those trained in the social sciences, physical sciences, information technology and engineering. Case organisation E's research provides scientific, technical or analytic support or making decisions that affect all the core processes for national security. It has been using an Intranet for the past eight years. It contains a searchable, accessible library for manuals and Frequently Asked Questions (FAQ). The Technical Project Manager wanted to resolve the perpetual problem of sifting through emails, pages of forum questions and manuals to find solutions to technical problems. This organisation requires a KMS that will maintain the most comprehensive databases of their kind and employ proprietary processes and technology to collect, manage and deliver a vast inventory of information throughout the project life to provide innovative solutions under time pressure. "The success of Wikipedia made me think about how useful it would be for my department", reflects the Technical Project Manager.

The aim of the corporate Wiki is to "have a knowledge of what has been done even if staff leave or are replaced by others" so that it will "create a permanent record" representing "living knowledge" where the cumulative experience of their knowledge workers will be stored in the corporate Wiki, said the Technical Project Manager. Case organisation E wants to implement improved records and document management system to help staff find and access information more effectively. For instance, case organisation E wants to incorporate work manuals, help resources, resources obtained through digital capturing of in-house presentations, best-practice repositories, reports and conference papers relevant to the domain of their work. The first corporate Wiki is implemented "to capture the work being done by staff on technical projects". Soon, a number of corporate Wikis are implemented in the organisation. "I also use Wikis as lessons learnt and tips store...when we solve a problem we record it in the Wiki so that in the future others can learn from this knowledge", explains a research scientist.

Another significant corporate Wiki is developed by an IT developer, "we have established an on-line forum for the organisation's community using a Wiki application at the beginning of this year (2007)". The IT developer admits that, "it remains very

much a learning experience for us.” A research scientist said that the corporate Wiki is useful “to create a community of interest on some broad issues”. Other responses from research scientists includes “exchange ideas, share information and opinions”; “networking people”; “generating ideas and convergence/consensus of views”; and “brain-storming”. A research scientist said that, “the conversations on the Wiki are lively.” Another said that it is “productive.”

The corporate Wiki initially started out slowly with less than 20 members but it grew rapidly till “we have between 20 to 100 users” and has been in existence for over a year. However, “I expect that this will increase dramatically over the next 6 months as other departments start to get involved (>500 users).” “Approximately 30 people have registered for the Wiki, but less than half participated by writing things to the Wiki”, said the IT developer. As the corporate Wiki is quite new to the organisation, the IT developer has not measured the number of people who visit the corporate Wiki regularly, “unknown number of people views the Wiki.” However, checking the visitor statistics, he saw that, “in the last month about 730 "views of the Wiki were made” which confirmed that there was natural curiosity and some interest in the corporate Wiki. The IT developer confirms that the “age group can be diverse.” “A guess of the medium will be around the mid-30s mark, as that is the average age of the employees” in the organisation, said the IT developer.

Like many sections of the public sector, case organisation E’s organisational culture has been established over a long time. Its organisational context is different from most public sector units because they employ multi-disciplinary, specialist teams who are IT competent. Case organisation E can be described as a soft bureaucracy (Courpasson, 2000, p.157) where decentralised responsibilities are combined with centralised decision-making (See section 2.1.4.1.5). Vaast (2007) explains that a soft bureaucratic organisational culture allows the central authority of the Public Administration to acknowledge the knowledge and work of employees while preserving the traditional bureaucratic dimensions of the Public Administration. Supportive managers who are consultative leaders can seal corporate Wiki approval and implementation process.

The social challenges and barriers to corporate Wiki use appear to dominate the picture. “The biggest problem is getting people involved in the Wiki”, said the Technical Project Manager. The other participants agree. “The biggest difficulty is to get greater amount of active participation, especially from stakeholders and those knowledgeable (are often the busiest)”, said the IT developer. “If no one writes regularly to the Wiki, it will just die,” remarks a research scientist. Applications that start out as a blank canvas can confound users instead of inspiring them. Other problems include, “human resources to run and maintain it could be an issue” and “avoiding email use”, adds the IT developer (see Table 4.7).

Case organisation E does not have any management challenges and barriers because it is able to use the consultative and soft bureaucratic processes to motivate knowledge collaboration and innovation. Case organisation E can install the corporate Wikis quickly as the IT developer confirms that, there is “no major problem with implementation”. Consequently, However, “there is some limitation due to the software (Confluence) used”, said a research scientist. For example, there are no personal spaces to host personal profiles.

The Technical Project Manager is officially recognised as the manager of all corporate Wikis running within the organisation and this official role is written in his job description as a “Wiki Developer”. As the corporate Wiki grows to include participation from other employees from different departments, the Wiki champion recruits several Wiki evangelists to act as administrators and to be the point of human contact who can help with technical support for the Wiki. The Wiki even lists their telephone numbers so that employees know who to contact to ask a question. Wiki evangelists will hand out flyers informing other employees about the Wiki and giving presentations on how they can use the Wiki in their work. Linking the Wiki with the internal search engine played a major role to help the Wiki to be ‘discovered’.

To encourage users to sample the waters, case organisation E chooses corporate Wiki tools from Confluence which offers a variety of standard templates as well as the ability to make custom ones. Pre-configured Wiki pages save administrators time and can be

easily customised as users gain experience and familiarity. The Wiki champion intends to produce video tutorials to help new users.

The Wiki champion leads by example and sets clear expectations. As project leader, he insists that all reports have to be produced online on the Wiki. This means that the team has to generate the report collectively and keep each other up to date using the corporate Wiki. He is aware that, “if only one person uses emails, then everyone else will respond via the platform”. He acknowledged that, “personally, it is difficult to master the art of avoiding email.”

Success with case organisation E’s corporate Wikis justifies more time and money to be spent on developing their corporate Wikis further. As part of their research into corporate Wikis, the IT developer said that “we are conducting research into identifying communities of interest based on the content contained in the Wiki and entered by the Wiki user community”. Work has begun to amalgamate the two largest corporate Wikis and has now developed to a stage where my assistance is required fulltime to "maximise its functionality", confided the Technical Project Manager. Case organisation E’s corporate Wiki will change from using Confluence to MediaWiki to upgrade its functionality. Enhancements include additional content and the introduction of a software access control model so that both “a mandatory access control model and access control lists for individuals may be implemented in the corporate Wiki on a Namespace and article basis”, to acknowledge author contributions and measure work performance, continues the Technical Project Manager.

4.1.5.1 Case Organisation E Summary

The study demonstrates the value of having a Wiki champion with extensive systems experience to avoid many of the *traditional* mistakes made with systems implementation. Case organisation E’s management recognise the value of knowledge workers and how knowledge work encompasses their daily work activities. Case organisation E’s management is accommodating to make the organisational changes necessary to reflect the changing role and work activities of their knowledge workers such as changing their job descriptions to include their knowledge activities. “The need

to become a 'lifestyle' at work requires a cultural change”, as the IT developer describes it. Case organisation E’s experience illustrates the extreme importance of constant and creditable advertising, to individuals and constituencies in the organisation on how the Wiki will benefit that the individual and the group. The study indicates that fairly widespread support, or at least neutrality, is required from significant groups for an organisation-wide Wiki to attain its objectives. The Wiki embedded the collaborative sharing of policies, standards, tools, and best practices amongst the project team members who together will help one another and all knowledge workers manage information as a valuable asset throughout its lifecycle.

4.1.6 Case Organisation F

| CASE F | Definition of Characteristics | Value of Characteristics |
|--------|---|---|
| | Type of organisation | Marketing and Technology consultancy |
| | Location | U.K. |
| | Size of organisation | SME (< 60) |
| | Previous KMS/technology | Lotus Notes/Domino |
| | Number of years KMS/technology was used | 10 years |
| | Previous KMS uses | Create and maintain documents |
| | Failure of previous KMS | Clunky Insufficient text tools to create web pages Lacks functionality |
| | Purpose of Wiki Implementation | Retain staff knowledge Good information management practice Product documentation |
| | Length of time Wiki used | 3 years |
| | Number/Age of Users | 18 - 45 |
| | Organisational Culture | Openness to Change/ Innovation |
| | Management Type | Consultative |
| | Social Challenges/Barriers | Previous bad experiences with IS |
| | Legal Challenges/Barriers | Privacy |
| | Management Challenges/Barriers | Resistance to new systems |
| | Technical Challenges/Barriers | None |
| | Recommendations | Privacy Policy Owner/Administrator issues invitations Other Enterprise 2.0 tools |

Table 4.8 Characteristics of Case Organisation F

Case organisation F is a small marketing and technology consultancy SME in the U.K. employing around 60 people whose ages range between 18 – 45 years. It focuses on usages of open source and social tools in business. Strong customer focus on bespoke services and solutions is the basis of case organisation F's product development process. Their previous intranet was Lotus Notes/Domino which was in use for ten years. Responses about their intranet include: "It is clunky", "Insufficient text tools to create and maintain documents", and "Web interface offers less functionality."

Being a smaller company in the consultancy industry, case organisation F needs to establish their market position through the development of innovative products so that they stand out among their major competitors. "We want to take the lead in ICT (information and communications technology)," said their Chief Technology Officer (CTO). "An effective KM is essential for our future growth" and the key to this is organisational learning, "it is critical to company innovation and competitiveness," said their CTO.

Case organisation F is engaged by a number of small and medium enterprises to assist them in developing and implementing knowledge strategies capable of supporting their business goals. The CTO said that his clients faces, "an increasingly competitive marketplace with a rising rate of innovation." A most important objective is to "improve customer service and create customer value" by enabling client organisations to keep a public record of the adverse impacts they experience from the company, which are considerable.

Many of their clients face the prospect of losing key members of their staff due to retirement or resignation and want to harvest the knowledge of leaving staff and make it available in an effective way. For example, their clients try to provide better customer support by encouraging knowledge workers to share their knowledge and experiences about resolving customer problems. Case organisation F is retained as consultants to head knowledge harvesting projects to meet the immediate challenges and "to pilot an approach to knowledge harvesting which will provide ongoing capture and dissemination", explains a technology consultant. "My staff and I are keen users of Wikipedia," says the CTO. By introducing a corporate Wiki to act as a KMS within

their client organisations, a technology consultant said that the corporate Wiki “will reduce the amount of time employees are given to acquire new knowledge.” Key knowledge is identified and recommendations are made to ensure that the staff record or transfer knowledge into the corporate Wiki when the corporate Wiki project is successfully completed.

Client management also recognises the important role that a corporate Wiki can play in the administration and co-ordination of knowledge sharing activities and to support work practices in their organisation. A corporate Wiki is useful because “it is important to catalyse good information management practice by instilling a culture of infotopia (see section 2.3.2.2)”; “bring in, target and filter published information”; and to “accelerate knowledge transfer.” For example, case organisation F accumulates much documentation because the development of product models or prototypes needs to be tested, trialled and refined to become the final product. “It (the corporate Wiki) will reduce cycle times and shortened product development times,” said an IT developer.

Case organisation F has openness to change/innovation organisational culture and retains a much more informal, family atmosphere than the other five organisations due to its small size (see section 2.1.4.2.5). Yeldon and Albers (2004) suggest that smaller firms have an advantage in that they often have a culture and organisational structure in place that is much more conducive to implementing KM efforts. The consultative management style reflects a more spontaneous approach, predisposed to informal interpersonal relationships and ill-defined roles. Managers often circumvent the chain of command and personally delegate tasks to subordinates or do the tasks themselves. KM has an important management component, but case organisation F does not see it as an exclusive managerial activity or discipline.

The social challenges/barriers case organisation F encounters in their clients’ organisations are “a previous bad experience with IS”, and the management challenges/barriers include “the imposition of extensive data collection procedures causing increased resistance to new systems,” adds a technology consultant (see Table 4.8).

A key legal challenge is privacy issues which may include concerns about autonomy, individuality, personal space, and anonymity. Disclosure of personal information may expose one to censure or punishment; it may threaten one's reputation, social status, or self-esteem; it may give others some advantage or power over oneself, or lessen one's advantage over others in competitive situations (see Table 4.8).

The CTO says that there are no technical challenges/barriers. When asked about why the CTO chose to adopt the corporate Wiki as a KMS, "I am inspired by Euan Semple," comes the reply. The CTO sees potential gains of using a corporate Wiki because he is inspired by BBC Head of KM Solutions Euan Semple's foray into emergent low cost Enterprise 2.0 technologies to turn it into proven technology.

The development of a comprehensive privacy policy will allay privacy concerns. Users will have to accept this privacy policy before registering. It details exactly what subscriber information would be collected, which information would be known to the organisation, as well as why this information was necessary and how it would be used. To increase Wiki usage, it is recommended that the corporate Wiki is enhanced with other Enterprise 2.0 tools such as blogs, podcasts, social networking and social bookmarks. The main characteristic of such tools is to encourage users from becoming spectators and turning them into participants. RSS feeds can be set up so that users only receive a summary of the content. If they want to view the complete document, a link within the RSS message will send them directly to the corporate Wiki.

4.1.6.1 Case Organisation F Summary

Case organisation F tries to emulate Euan Semple's success at embedding Enterprise 2.0 new tools in a KMS and encouraging more collaborative behaviours in their own organisation and that of their clients. Semple's informal approach to working with intangible, fluid and personal material that he considers as knowledge may be in stark contrast with more rigid methods based on 2x2 matrices and formulae, but it works, as Semple has shown during his 20 years at the BBC (Higgison, 2005). Even though case organisation F is a small enterprise, it realises that knowledge is more important especially to a smaller company trying to compete in the rapidly changing global

marketplace. “Smaller companies must capture, assimilate, and capitalise on every advantage they can find, including knowledge”, said the CTO.

Case organisation F and its clients see the importance of human conversations as fundamental to knowledge building and want to attract contextualised conversations on critical topics and archive these conversations so as to build *bottom-up* KMS within its limited budget and IT personnel. Case organisation F’s experience illustrates the importance of knowledge workers being responsible for their own growth and learning. Given the right processes and tools by which they can evaluate what they know in a given situation, and they are then able to seek out ways to fill the gaps when needed. “Internal clients are able to track our progress online instead of being emailed reports which soon become outdated”, said a technology consultant.

4.2 Comparative Analysis

The choice of criteria for comparative analysis has been selected in the hope of identifying characteristics. Although this research has a small number of participants from a small number of organisations, common themes emerge from the analysis of the participants’ perceptions and observations from the case organisations which serve as useful lessons about failed attempts or successful implementations to use Wikis as KMS.

First, there is high dissatisfaction with the current KMS which is not meeting organisational needs (see section 2.1.4.1.1). Second, there is a common search among private and public organisations for more flexible, responsive ways of organising and accessing organisational knowledge, while maintaining a capacity for formalisation and central control. The organisations in the study want to avoid past mistakes caused by a mechanical implementation of doctrines and knowledge and opt for a distributed ability to act flexibly in a dynamic environment. Third, there is a strong emphasis upon knowledge sharing and skill development within all organisations. All the organisations in the study have acknowledged that without remedial action to replenish the knowledge

stock, an organisation can lose its ability to do certain things, and the cost of re-learning may be high or even prohibitive. Finally, there is a prerequisite for knowledge workers to communicate with other colleagues and the necessity of a tool that supported the constant sharing of information. It is this need which motivates the initial or attempted introduction of a corporate Wiki in case organisations B – F.

The research findings presented in the tables below compare the common themes and differences encountered in the six case studies in answer to the research questions (see section 1.1.1)

Several factors are identified to understand what contributes to the successful use of a corporate Wiki to assist learning organisations take steps to decrease the possibility of a corporate Wiki rejection. They include research, consultancy partners, technology-focused mission and vision, organisational culture, implementation approach of social technologies, individual/organisational needs, and management's understanding of knowledge workers.

4.2.1 Nature of Knowledge in a Corporate Wiki

The complexity of knowledge workers' tasks often calls upon organisational knowledge that novice knowledge workers do not possess. Although new staff members may have to undergo induction programs and professional development seminars before they start work, there is a huge amount of information that must be assimilated in order to work efficiently. Pressing issues faced by all the case organisations are how to resource new employees appropriately and retain organisational knowledge when employees leave the organisation. If we take a closer look at the nature of knowledge in a corporate Wiki, it can reveal whether the corporate Wiki can support knowledge work activities.

| | Case A | Case B | Case C | Case D | Case E | Case F |
|----------|--|--|--|---|---|---------------------------------------|
| Explicit | Work documents Policies Procedures | Technical, confidential & financial information | Work documents Project plans Project teams' monthly report Archived project reports | Scientific research papers Publications Project documents Progress reports | Work manuals Help resources Reports | Project documents Progress reports |
| | Training materials | Company information Press releases Company policies Staff details | Data e.g. machine failures, customer contacts, soil, weather & census. | Archived Intellectual property | Conference / journal articles | Models Prototypes |

Table 4.9 Examination of the Nature of Explicit Knowledge in a Wiki

| | Case A | Case B | Case C | Case D | Case E | Case F |
|-------|--|---|--|---|--|---|
| Tacit | "Information carried in people's heads" e.g. business processes | Business advice and experiences from small business community e.g. governance, KM, risk management | Video conferences Instant messages E-mails Ideas Discussions | Emails Videos Forum pages Ideas Conversations Interactions with collaborators | Ideas Conversations Opinions Views Brainstorming Networking | Conversations |
| | | Business processes, sales and distribution methods, lists of clients and suppliers & patents | Company operations Job functions Best practices e.g. refined business processes | "Living knowledge" Cumulative experiences of present & ex-employees Best practices e.g. policies, standards & tools | Lessons learnt & tips Experiences Values Beliefs | Captured knowledge and experiences of employees |

Table 4.10 Examination of the Nature of Tacit Knowledge in a Wiki

Empirical studies in this research show that the corporate Wiki can potentially support both forms of knowledge, tacit and explicit (see Tables 4.9 and 4.10). Explicit

knowledge for all the case organisations appears to be similar. They take the form of work documents pertaining to policy and procedural work and/or are project related.

In all these cases it is discovered that longer serving staff members build up work knowledge and business processes, and the organisational culture of ‘the way things are done around here’. Tacit knowledge such as intellectual capital from employees such as business processes, sales and distribution methods, lists of clients and suppliers and patents required by case organisations A – F; or in project management, and research and development processes, required by case organisations B - F, is difficult to capture because they tend to be more idiosyncratic. Unlike the corporate Wiki, case organisations A – F’s current KMS e.g. Lotus Notes/Domino, Enterprise portal and/or intranets are good for disseminating information but cannot support individual and collaborative knowledge work activity, flowing between individual efforts, coordination tasks, conversations, and collaborative work.

4.2.2 Impact of Organisational Culture

| | Case A | Case B | Case C | Case D | Case E | Case F |
|------------------------|---|---|---------------|-------------------------------|------------------|-------------------------------|
| Organisational culture | Bureaucratic Traditional Negative | Competition/Confrontation | Task Oriented | Openness to Change/Innovation | Soft bureaucracy | Openness to Change/Innovation |
| Leadership Styles | Autocratic Command & control | Conflict between laissez-faire & consultative | Consultative | Consultative | Consultative | Consultative |

Table 4.11 Organisational Culture and Leadership Styles

The findings from the case studies suggest that there is interplay between organisational culture affecting organisational performance (see section 2.1.4.1.5). The CEO and senior managers as leaders of the organisation set the tone for the adoption of a certain leadership style (see Table 4.11). This is indicative of case organisations A - F.

Case organisation A’s CEO displays an autocratic leadership style where he retains all the power and decision-making authority. The CEO does not consult other managers or

employees, nor are they allowed to give any input. His command and control tactics include issuing orders without giving any explanations and expect employees to obey these orders without question.

Case organisation B exhibits a Competition/Confrontation culture. Different departments/work units need to understand that competition is a form of learning; and not a hostile act. The different leadership styles adopted by the CEO (*laissez-faire* style) and the Project Manager (consultative style) cause confusion and uncertainty within the organisation and is one of the contributory causes that the corporate Wiki is unable to be sustained for the long term. Adopting a *laissez-faire* leadership style works for teams in which the knowledge workers are very experienced and skilled self-starters. Implementing a new IT project such as a corporate Wiki can be daunting because knowledge workers are treading in unfamiliar waters. It is noted that the Project Manager in case organisation B cannot implement the corporate Wiki without management support. Case organisation B's leadership style proves to be ineffective because of the CEO's frequent absence and lack of involvement during critical junctures. The Competition/Confrontation culture together with a combination of *laissez-faire* and consultative leadership styles does not create the right environment to stimulate constructive use of the corporate Wiki. In this case there are no external stimuli to force the CEO to adopt a more consultative leadership style. This lack of drive, and possibly commitment, are compounded by the change in top management, which leads to loss of confidence and consequent suspension of the corporate Wiki.

To avoid conflicts as experienced by case organisation B, it is important that there is alignment between leadership style and the organisational culture. Bititci et al. (2006) note that managers do not readily change their leadership styles so external stimuli, thus action researchers, play an important role in leading managers to change their leadership styles.

A consultative leadership style (undertaken by case organisations C – F) with a team of knowledge workers who know their jobs can contribute valuably to KM. The research findings demonstrate that managers in case organisations C - F who deploy a consultative style know what the problem is but acknowledge that they do not have all

the information and rely on the specialised skills/knowledge of their knowledge workers. The managers in case organisations C – F encourage both individual and organisational learning (see section 2.1.8) by asking knowledge workers to share their job/industry experiences on the Wiki. The managers identify the sharing aspect as a key to fostering innovative and creative ideas, turning the corporate Wiki into an information commons (see section 2.1.11). “I want to build a site (Wiki) that stimulates innovation,” says case organisation C’s Project Manager. “A space is necessary for experts to come together to share their innovative ideas”, says case organisation D’s IS Manager. They also see that it is the manager's responsibility to help restructure the individual views of team members to cultivate knowledge creating and sharing culture. Case organisation E’s Technical Project Manager frequently reminds his team members, “Have you put it (information/knowledge) on the Wiki?”

4.2.3 Challenges/Barriers That May Cause Corporate Wiki Failure

| | Case A | Case B |
|---------------|--------------------|-------------------------------------|
| Social Issues | Lack of incentives | Lack of incentives |
| | Lack of time | Waste of time |
| | Low work morale | Competition |
| | Distrust | Lack of cooperation among employees |

Table 4.12 Social Challenges/Barriers Causing Wiki Failure

A lack of incentives represents a large part of Wiki failure (see section 2.3.7.1.2). Case organisation A provides no material or immaterial incentives for knowledge work (see Table 4.12). There are no established strategies to include knowledge work as a knowledge worker from case organisation A said, “I am not paid to think”. In case organisation B, top management did not change the incentivisation system since the implementation of the Wiki.

The knowledge workers from case organisation A indicate that they suffer from a lack of time to complete their work because time spent on their current KMS was not perceived by management as knowledge work and thus, not included as part of their daily work (see Table 4.12). Knowledge workers from case organisation B perceive work on the Wiki as a waste of time measured by the low participatory rate on the Wiki. Case organisation A’s knowledge workers suffer from low work morale and case

organisation B's knowledge workers from over-competitiveness because these organisations are not known to tolerate mistakes.

As knowledge workers' jobs are not routine and unskilled, most knowledge workers in case organisation A tend to resent the autocratic leadership style. They see it as a lack of trust and respect for their abilities (see Table 4.12). This accounts for the high turnover rate because knowledge workers "do not like to be ordered around." A combination of fear and resentment resulting in mistrust caused by an autocratic leadership style means knowledge workers are less inclined to transmit more truthful data up the hierarchy as evidenced by case organisation A's experience. This is important because many decisions made by a manager are based on the information supplied by their subordinates and if such information has the unpleasant data filtered out, the decisions made can be wrong.

Case organisations C - F make a conscious effort to change their reward system with the implementation of the Wiki (see Table 4.13). In case organisation E, for example, this takes the form of a change in job title for the Project Manager. Case organisations C, D and E include work done on the Wiki as part of the knowledge worker's job description and performance appraisal. Knowledge workers feel that it is necessary to receive an acknowledgement from management that knowledge work activities on the corporate Wiki amounted to a few minutes/hours, and intruding on work/personal time.

In case organisation C, the Project Manager is not afraid to experiment with the implementation with a Wiki because his organisation regards success as experiments that are thought through, planned and executed. Rather than punishing failed experiments, case organisations C - F encourage and reward collaboration on the corporate Wiki.

| | Case C | Case D | Case E | Case F |
|-----------------|---|--|---|--|
| Social Issues | Perception, fear, trust & learning new technology | User involvement | Getting people involved Maintenance and running the Wiki Email use | Previous bad experiences with IS |
| Recommendations | Publicity & training workshops | Email notifications of page changes | Job title and Wiki work reflected in job description Recruit Wiki evangelists Link Wiki to internal search engine Customised Wiki software Wiki champion leads by example | Analysis of organisational/individual needs & expectations |
| | QuickTime Videos | Start small | | |
| | Job descriptions to include Wiki work | Delegate responsibility | | |
| | | Wiki work reflected in job description | | |

Table 4.13 Social Challenges/Barriers To Wiki Implementation and Success That Have Been Overcome

Case organisations C - F try to overcome distrust and a lack of cooperation through education and publicity (see Table 4.13). This is done through training, in-house presentations, newsletters, forming communities of interest through Wikis, knowledge sharing visits to others members of the organisation. Other research has found that the consultative style encourage workers to communicate information most accurately followed by the democratic style of management (Savery, 1994).

Social attitudes i.e. perception, fear of, and learning new technology; and resistance to change such as limiting the use of email are challenges knowledge workers have to confront. The influence of such attitudes can be derived from the adequacy of the knowledge workers' training on Wiki use. Training delivered via workshops and QuickTime videos can alleviate these negative attitudes. Case organisation F claims that their clients had previous bad experiences with IS such as delivering a system that

supports only some of the requirements and/or is never actually used. It recommends that a careful analysis of organisational/ individual needs and expectations is required. The analysis determines that their clients wanted a KMS that can retain organisational knowledge that is frequently lost when their employees leave the company and the solution appears to be to implement a corporate Wiki as a KMS.

| | Case A | Case B |
|-------------------|---|--|
| Management Issues | Vandalism | Security of confidential and financial information |
| | Unreliable information | Technology innovation apathy |
| | Limits to power sharing | |
| | Centralised IS control | |
| | Recruiting, training and educating Wiki administrators and users. | |
| | Technology innovation discouraged | |

Table 4.14 Management Challenges/Barriers Causing Wiki Failure

Case organisation A cites management issues such as the Wiki being open to vandalism and unreliable information. Case organisation A's director admits that he cannot trust his knowledge workers to change or vandalise the business documents (see Table 4.14). Other issues with unreliable information include problems with inaccurate information, the consistency of entries' writing quality and content. The entries may have basic, factual information, but fear that the articles will have little depth. More so, the managers fear that the Wiki articles can give a distorted view (which is not management-approved) of why a particular issue is significant. Another concern is recruiting, training and educating potential Wiki administrators and users. As case organisation A will rely on volunteers to create a knowledge repository in the corporate Wiki, they are unsure if they can attract enough volunteers to become administrators and train users to fulfil the task. Case organisation A is not keen to release Wiki volunteers to take time off from their daily work schedules to become familiar with the Wiki system and prepare training materials or include knowledge work done on the Wiki as part of their job description. Management expects all employees to become users; however, users will not necessarily recognise the Wiki's value unless they can sufficiently use it. A negative stance on technology innovation is identified as having to change before the corporate Wiki will be accepted as an improvement to the

organisation's KM. In addition, management raises fears that there needs to be limit to power sharing and favours a centralised IS control.

Case organisation B has raised legitimate concerns over the security of its confidential and financial information because of its intention to make its corporate Wiki available to public use (see Table 4.14). Although Wiki content is posted immediately, eliminating the need for distribution with the associated risk of virus transmission, it is not foolproof (see section 2.3.7.3.1).

To address the problem of technology apathy (see Table 4.14), I believe that it is a widely held belief is that one needs a senior executive champion to succeed with a new business initiative (Kim, 2005; Davenport et al. 2002). This notion is based on deeply embedded hierarchical thinking. Although it is important to be realistic about what you can achieve without it, this does not mean that KM initiatives cannot begin before the dialogue is underway.

| | Case C | Case D | Case E | Case F |
|-------------------|---|--------|--------|---------------------------|
| Management Issues | Bottom up approach tolerated but not encouraged | None | None | Resistance to new systems |
| | | | | |
| Recommendations | Perseverance from KW to take initiative and show that they can be trusted | | | |

Table 4.15 Management Challenges/Barriers to Wiki Implementation And Success That Have Been Overcome

Case organisations C – F provide documented evidence that a favourable Wiki adoption/implementation is more prone to bottom up approach (see Table 4.15). Case organisations C – E demonstrates that anyone can become a corporate Wiki champion because most of the champions are line managers. Only case organisation F has a senior executive champion. The case studies reveal that successful corporate Wiki champions' primary role is linking people and not giving answers. If organisations want a large, vibrant corporate Wiki community, case organisation E recognises that this role is often full time and creates a new position for their Technical Project Manager. It needs to be

at least a substantial part of the corporate Wiki champion's job and his/her workload needs be adjusted accordingly to recognise this effort. In a spontaneous corporate Wiki environment, where there is no organisational attempt to support them, an individual or small group spontaneously takes on the job of holding the community together. They keep people informed of what each other is doing and create opportunities for people to get together to share ideas. This role is also critical to the corporate Wiki's survival.

| | Case A | Case B |
|--------------|-----------------------|-----------------------|
| Legal Issues | Intellectual Property | Intellectual Property |
| | Legal Liabilities | Legal Liabilities |

Table 4.16 Legal Challenges/Barriers Causing Wiki Failure

| | Case C | Case D | Case E | Case F |
|--------------|--------|--------|--------|----------------|
| Legal Issues | None | None | None | Privacy issues |

Table 4.17 Legal Challenges/Barriers To Wiki Implementation And Success That Have Been Overcome

Case organisations A and B's legal concerns emphasise the need to protect intellectual property and deter legal liability (see Table 4.16). Case organisations C - E do not cite any legal challenges/barriers because they use a private corporate Wiki which means that it can only be seen by those who have been invited by the owner/administrator with one of three things: a password, 'a secret URL', or an invitation through the Wiki identity system. Case organisation F uses a mix of private and public Wikis which results in privacy concerns (see Table 4.17).

| | Case A | Case B |
|------------------|--------------------------|--------|
| Technical Issues | Installing Wiki Software | None |
| | Maintenance | |

Table 4.18 Technical Challenges/Barriers Causing Wiki Failure

| | Case C | Case D | Case E | Case F |
|------------------|--------|--------|--|--------|
| Technical Issues | None | None | Limitation to Confluence Wiki software | None |
| Recommendations | | | Switch to MediaWiki software for greater functionality | |

Table 4.19 Technical Challenges/Barriers to Wiki Implementation and Success That Have Been Overcome

Case organisation A's technical concerns include installing the Wiki software and maintaining the corporate Wiki because their IT staff do not have the expertise to implement the Wiki nor the time to maintain it. Case organisation B does not have any technical concerns because it has engaged IT consultants to implement the corporate Wiki (see Table 4.18). Case organisation E intends to discontinue use of *Confluence* Wiki software and switch to MediaWiki to improve functionality. Case C, D and F have technologically savvy employees to be able to implement their own corporate Wiki and they are already using MediaWiki software (see Table 4.19).

4.2.4 Suitability of Corporate Wikis to All Types of Organisations

| | Case A | Case B | Case C | Case D | Case E | Case F |
|--------------------------|--------------|-------------------|------------------|--------|------------|-------------|
| Organisational Structure | Hierarchical | Hierarchical | Flat | Flat | Flat | Flat |
| Size | >200 | <200 | <5000 | >60000 | <2000 | >60 |
| Industry Sector | Service | NGO ⁴⁷ | Public Utilities | R&D | Government | Consultancy |
| Location | Australia | Australia | U.K. | U.K. | Australia | U.K. |

Table 4.20 Suitability of Wikis to All Types of Organisations

Research is conducted in two countries, namely Australia and England, to see if different organisational structure (see section 2.1.4.1.5.1), organisation size (see section 2.1.4.1.5.2), industry sector (see section 2.1.4.1.5.3), and location (see section 2.1.4.1.5.4) will affect the suitability of the Wiki to a certain type organisation or industry sector.

⁴⁷ NGO – Non Governmental Organisation

Table 4.20 show how organisational structure, organisation size, industry sector and location revealed by the literature as different variables, were measured.

After taking into account that differences can exist between organisations within a particular industry, there is no evidence to suggest that industry sector affects Wiki success as KM has a useful role to play in all industry sectors. It is also unwise to define a particular industry as a suitable candidate for successful Wiki use. The unique criteria presented here need to be applied to individual organisations and its willingness to become a learning organisation (see Table 4.20). This fact is confirmed by the case organisation E's IS Director as he shares his vision of a learning organisation, "I want to attract managers who are advocates in their workplaces. I want them to question higher management, gain the support of other participants and arouse interest in innovation." The research findings indicate that learning organisations are more successful of corporate Wiki adoption than others as evidenced by case organisations C - F.

At first glance, smaller firms like case organisation F are more likely to innovate and take greater risks because they stand to lose less and more to gain. At a closer inspection, the link between organisation size and technology innovation appear to be hazy. However, case organisations A and B are also small organisations yet they stubbornly cling to traditional methods of doing business. It is evident that case organisations A and B are quick to initiate competitive challenge (they heard about corporate Wikis and wanted to investigate their potential as a KMS) but are slow to respond to competitive challenges. The findings reveal that organisation size does not hinder the success of the corporate Wiki to support knowledge work. It is individual/organisational needs that are major factors influencing different adoption/acceptance outcomes (see section 2.1.4.11).

When it comes to organisational structures (see section 2.1.4.2.5.1), the research findings indicate that the use of a Wiki may flatten the organisational hierarchy, changing traditional and hierarchical communication channels. Flatter structures such as case organisations C - F which adopt the network-centric approach, enable them to respond quickly to speedier demands of information and knowledge required for decision-making (see section 2.1.7). Case organisations C to F are dedicated to

developing knowledge workers who can leverage the corporate Wiki for strategic advantage, which qualifies them as adaptive sensible organisations (see section 2.1.7). Each of these organisations is transforming into a sense-and-respond organisation (Haeckel, 1999), to become increasingly network-centric and agile, essential qualities for survival in a dynamic competitive environment defined by ubiquitous information and social technologies. The corporate Wiki is adopted by their project teams because they realise that it supports the knowledge work of fluid decentralised teams that form and dissolve as workflow demands.

Collective efficiency is able to tap individual contributions of organisational knowledge which is part of everyday work, to unleash the power which is in the lateral and viral nature of the corporate Wiki community, as corporate Wiki users recommend and distribute content that they have created (see section 2.3.2.3). Collective efficiency provides a competitive advantage over their competitors which may have the same information and knowledge but cannot react effectively and quickly due to the relative inexperience of their new knowledge workers. In a competitive environment that exists in case organisations A and B, there appears to have little incentive to share knowledge for fear that their peers may take credit for their ideas and/or become “smarter than me” says a knowledge worker from case organisation A. Knowledge workers in case organisations A and B struggle to differentiate themselves from their peers and knowledge sharing is perceived as a “lose and lose situation”. More so for the knowledge workers in case organisation A because there is little promotion prospects and their livelihoods are at stake (see section 2.1.4.1.4).

While there are no differences between regions in the level of technological sophistication of staff, there are clear differences in the kind of knowledge workers that they employed. More successful are the organisations which hire knowledgeable staff. In case organisations C - F, knowledge workers learn about the Wiki software on their own time. While case organisation A struggles with basic tasks such as setting up Web mail and updating its website, in dramatic contrast, successful organisations take advantage of diverse resources to improve existing applications. Wiki champions in more successful organisations have the ability to install and get technology to work. Case organisations C, D, and F use MediaWiki, an open source Wiki software; so that

they can use a package of applications and take advantage of some advanced features at zero cost (see section 2.3.4.5). Although case organisation E is keen to use MediaWiki to install their corporate Wiki, they lack the necessary time to fully implement it. Case organisation E does not allow the time factor to become an obstacle in implementing a corporate Wiki, so they decided to use Confluence, a commercial firm that specialises in setting up corporate Wikis, to install their Wiki (see section 2.3.4.2).

Although this study involved a small representative sample of users of corporate Wiki in six organisations based in Australia and the U.K., it has revealed some lessons from their experiences. This research began with the assumption that organisations in Australia will be more technologically adventurous because of the slow uptake of technology in England during the early to mid 1990s based on my personal experience and observations having lived there during that time (see section 2.1.4.1.5.4). This prediction was dispelled. Some insights can be gleaned from the research findings. Australian managers appear to be less able to absorb the lessons of best practice and are generally less open to innovation when compared to their British counterparts, in terms of their adaptability, entrepreneurial skills and on the ability to look to the future.

It appears that in the case of the UK, Government regulations coupled with EU policies; and a natural force that has led to technology leapfrogging (see section 2.1.4.2.5.4). Attributing to this leapfrogging effect is due to traditional companies like the BBC discarding their traditional and conservative organisational culture and leadership style to experiment with Enterprise 2.0 technologies. This enables the users there to be immediately exposed to the technology and then be able to innovate using those products as a launching pad. These innovations include new ideas or new uses for existing products. This in turn stimulates their major competitors and other companies in other industry sectors to change their business models, including traditionally conservative media and telecommunications; and financial companies. All three British case organisations in this study (C, D and F) attest to the fact that they are inspired by the leadership of BBC's Euan Semple to create a corporate Wiki as a KMS that captures the human dimension of KM. This proves that imitation is another aspect of entrepreneurial activity.

4.2.5 Reducing Wiki Rejection

| | Case A | Case B | Case C | Case D | Case E | Case F |
|-------------------------|---|---------------------------|--|--|--|---|
| Research | No | No | Networking Internet e.g. Wikipedia Influenced by Euan Semple | Online tracking tools e.g. Technorati.com | Academic research papers Conferences Internet | Blog Discussion Forums Conferences Influenced by Euan Semple |
| Mission & vision | Lack of resources-budget & labour IT projects seen as burden | Limited: Dependent on CEO | IT savvy staff Budget for technology innovation & infrastructure Technology innovative e.g. encourages experiments with new technologies | IT savvy staff Budget for technology innovation & infrastructure Technology innovative e.g. strong leadership from IS Director & IT managers | IT savvy staff Technology innovative e.g. adapt existing technology or adopt low cost technology to existing infrastructure | IT savvy staff Technology innovative e.g. experiments with open source software applications to overcome budget limits |
| Organisational Culture | Mechanistic KM perception | Mechanistic KM perception | Leadership & management programs Peer sharing e.g. knowledge sharing visits Encourages experimentation | Leadership & management programs Tolerant on innovations with approval from IS Director | Fosters initiative & leadership Encourages technology innovation e.g. younger workers adapting social tech(s) for work | Fosters initiative & leadership Technologically adventurous e.g. Think outside of the box |
| Consultancy Partners | No | University researchers | Peers act as Wiki consultants | Peers act as Wiki consultants | Wiki developers/ Consultants University researchers | IT consultants |
| Implementation Approach | Top-up Centralised IS control | Top-up CEO dependent | Bottom-up Peer information commons Generate publicity e.g. Wiki Wednesdays | Bottom-up User-centred innovation processes Word of mouth One success spawned other Wikis | Bottom-up Co-creation of knowledge Quick time video tutorials In-house presentations | Bottom-up Collective efficiency Blog entries |

| | Case A | Case B | Case C | Case D | Case E | Case F |
|--------------------------------|---|---|---|---|--|---|
| Individual Needs | No interest & will to learn | Lack of time & interest for Wiki | Reduce learning curve for new staff | KW learn as they do | Project reports done online, saves time & reduces errors | Acquire & disseminate knowledge |
| Organisational Needs | Immediate concerns, learning not a priority | Immediate concerns, learning not a priority | Develop data encyclopedia, sees Wiki as a tool to learn | Allow geographically dispersed staff to work on projects & documents, fosters collaborative spirit necessary for research | Liberate “living knowledge” to improve learning outcomes | Capture organisational knowledge of leaving staff, project ‘know-how’, inculcate independent thinking |
| Understanding KW ⁴⁸ | No attempts made | Self-interest prevails | Interest in IT Motivated to upgrade skills | Interest in IT Motivated to upgrade skills | Interest in IT Motivated to upgrade skills | Interest in IT Motivated to upgrade skills |

Table 4.21 Steps Taken to Reduce Wiki Rejection

Resistance to change is normal human behaviour, so is innovative behaviour. The driving force behind the popularity of Wikis is an insatiable appetite for creating, distributing and collaborating organisational knowledge. However, case organisations C – F have taken several steps to overcome Wiki rejection (see Table 4.21).

4.2.5.1 Research

It will be poor judgement to underestimate the difficulty of shifting from a traditional and hierarchical organisational structure (see section 2.1.4.2.5.1) to “the open networks of trusted communities and individuals that the knowledge economy requires” (Willmott & Snowden, 1997). Knowledge of or ability to research Wiki software and how it may assist the organisation is the first component of success. Learning organisations such as case organisations C - F spend a lot of time researching Enterprise 2.0 tools to decide which is the best tool that will meet their needs is and how they will reach their audience (see Table 4.21). For example, case organisation D uses online

⁴⁸ KW – Knowledge Workers

tracking tools such as Technorati⁴⁹ to identify influential developers of social media and analysing what makes them influential enabling it to make informed decisions.

4.2.5.2 Mission and Vision

Case organisations A and B do not regard technology as part of their strategic goal for their mission. Their constrained budgets lack the financial resources; staff time, knowledge and willingness to implement a successful technology strategy (see Table 4.21). Case organisations C - F think about what they need to do to accomplish their mission and search for ways that technology can help them. They hire technologically savvy staff, employ a budget that includes the necessary resources to support the technology, and displays a strong understanding of how to adapt existing technology to meet their needs. According to Senge (1990, p. 227), “as people talk, the vision grows clearer. As it gets clearer, enthusiasm for its benefits grow.” The Wiki as a conversational technology leverages the communicative aspect of KM.

4.2.5.3 Organisational Culture

Another important factor in successful corporate Wiki use and knowledge transfer is organisational culture (see section 2.1.4.1.5). The research findings show that the organisational form the organisation takes has consequences for the communication and dissemination of information and its ability to engage in organisational learning (see Table 4.21). Organisational learning develops new knowledge and insights and has the position to influence organisational culture (see section 2.1.8). Case organisation F’s CTO recognises that “it is critical to company innovation and competitiveness” and “to our future growth”. If organisational culture has an effect on corporate Wikis, then the same will hold true, vice-versa, with the passage of time. Case organisation D’s scientist notes that research teams working on the corporate Wiki “foster a collaborative spirit previously not there before”. This “collaborative spirit” is introduced into the organisational culture as an important part of KM practice.

Case organisation A does not fully realise that the corporate Wiki as a KMS can change interactions which defines its organisational structure (see section 2.1.4.2.5.1), sense

⁴⁹ <http://technorati.com/>

making processes or power structures (see Table 4.21). Its perspective of knowledge work consists of memorising a body of knowledge and finding the correct answers. Its reticence towards the Wiki is cultural of traditional and hierarchical organisations. Case organisation B may agree in principle about the importance of technology and feels comfortable with commonly used technology but there is not much motivation on how to learn and use more advanced technology (see section 2.3.7.1.1). The younger generation of knowledge workers are naturally predisposed to being conversational, individualistic and reasonably web-savvy (see section 2.1.4.1.5.5). Case organisations C – F are quick to leverage these characteristics to their advantage.

4.2.5.4 Consultancy Partners

A lack of knowledgeable staff needs not be a problem if the organisation chooses the right partners as consultants to assist them in their KM strategies (see Table 4.21). For example, the Australian government has a programme called the Australian Research Council Linkage Project that supports collaborative research and development projects between higher education researchers and other organisations within industry, to enable the application of advanced knowledge to problems. The cost of the project will be shared between the government and the partner organisation. This government initiative enables external organisations to draw from a wider and deeper pool of expertise and benefit from an independent view of its KM challenges and develop a cost effective solution to its KM problem. A partnership between researchers and enterprises is a major step towards building learning organisations. Creevey (2007) suggests that CEOs should continue to talk with elites, such as investors and regulators, but also engage employees and enthusiastic consumers to be involved in the peer-to-peer discussion. Discussion with third parties with credentials, like academics, is also critical. Case organisation A chooses to spurn this offer. Case organisation B starts on the right track to engage academics to act as KM consultants but lack the will and commitment to sustain the corporate Wiki.

4.2.5.5 Implementation Approach

It is important to understand the ramifications of encouraging the adoption of social technologies such as Groupware, Computer-supported Cooperative Work (CSCW) and Human Computer Interaction, tend to favour a bottom-up, rather than a top-down

implementation approach (see section 2.3.4.5.1). There is a shift in emphasis from the top-down control approach taken by case organisations A and B, as opposed to case organisations C – F (see Table 4.21) . In terms of control, case organisation A and B favour a Wiki as a kind of mechanistic systems so as to constrain and direct cooperation. Top-down instruction may seem more appropriate in some environments, but may not be effective in the long-term if the team leader stops actively making subordinates use the corporate Wiki, as seen in case organisation B. Subordinates and peers may naturally give up if they have not become convinced of its usefulness as seen in case organisation B. If there is a grassroots appreciation of how the corporate Wiki can work and benefit others, it will encourage a new set of helpers and enthusiasts to fill the gap left by the original Wiki evangelists.

Case organisations C - F choose to use a bottom-up approach to enlist in the direct, informal user to user cooperation (von Hippel, 2005). In the initial stages a personal approach is used, where a relationship is built with the people who are interested in the corporate Wiki. This is often the case when the Wiki evangelists ‘sell’ the technology to other employees. So it becomes a case of ‘sowing seeds’. Traditional advocacy methods such as flooding employees with posters and general meetings are also used. Quicktime videos offering instructions and questions answered by peers are examples of such cooperation. They also employ organised cooperation where users are encouraged to join the Wiki community to provide structures and tools to interact and accomplish work. If something is imposed, then it is received differently from something that is chosen.

Case organisations C - F choose to foster grassroots behaviour which will take more time but this will develop organically from the bottom-up as it will become self-sustaining over time. Bottom-up adoption taps into intrinsic and extrinsic motivation for contribution (see section 2.3.7.1.1) and fosters a culture of working openly that has greater strategic benefits.

4.2.5.6 Individual/Organisational Needs

Case organisations C - F realised the potential of adopting the Wiki to meet individual/organisational needs (see section 2.1.4.11) of allowing knowledge and

expertise to be shared among globally dispersed groups and also accelerating the acquisition and diffusion of knowledge throughout the organisation (see Table 4.21). The more successful organisations understand the interests and technological capacity of the communities they serve. Case organisation B fails to recognise that the corporate Wiki is only effective if people have the time and interest to become involved in the first place. Its corporate Wiki is largely unused. While the organisation's staff members recognise that they need to do greater outreach to the small business in community, they fail to consider whether their constituents want this technology. Wiki champions in case organisations C – F are convinced of the Wiki's usefulness, demonstrate that to colleagues, and help develop usage in an ad hoc and informal way in line with their actual needs.

4.2.5.7 Understanding Knowledge Workers

Managers in case organisations C – F recognise that not all staff members are equally receptive to technology and want to leave the corporate Wiki entirely up to knowledge workers to decide what use they will make of such KMS to meet a requirement for flexibility in working (see Table 4.21). This does not mean that by just putting a group of knowledge workers in front of a Wiki will necessarily achieve the goals of knowledge creation and learning. Knowledge workers need to be immersed in a context of participatory learning if an organisation desires a community of knowledge workers to engage in constructing knowledge.

Larger organisations (C – E) have the other advantage of employing a more skilled workforce in aggregate, which may be necessary for the utilisation of new technologies at a certain level of efficiency and efficacy. A strong factor for successful uptake of the corporate Wikis is an affinity for technology. Most of the knowledge workers employed in case organisations C - F are comfortable with technology and have the ability to teach themselves or upgrade their skills through their own initiative. Although training helps those who are novice Wiki users, those who got the most out of the training are people who already know something about technology, have a specific need, and are able to get sufficient training to try new ways to integrate the Wiki in their daily work. Those who lack technological competency do not gain much from training. More importantly, like

in all things, interest and an open attitude help novice Wiki users overcome the initial nervousness in learning a new tool.

Case organisations C - F have a view of what the future will look like and work to prepare their organisations for what they see as inevitable. In this vein, management understands that as their ranks of knowledge workers become filled with the technology-savvy younger generation, this will lead to greater impetus to adopt Enterprise 2.0 technologies (see section 2.3.7.1.6). Case organisation C's R&D Project Manager says that its corporate Wiki will be "linked to an enterprise blog." Case organisation D's IS Project Manager says "regular RSS feeds will inform users of new content and draw them to visit frequently."

Younger workers or 'info-ententials' (see section 2.3.7.1.6) may not accept corporate reluctance to adopt what they consider to be basic tools and autocratic leadership style and will be less effective with this work group (Dye, Mills & Weatherbee, 2005; Muchnick, 1996). 'Info-ententials' prefer to seek their own information rather than trust the opinions of business or government authority figures. They prefer to trust people like themselves as well as academics, doctors, and financial analysts. In other words, people who are specialised experts with professional credentials (Edelman, 2008).

A young knowledge worker from case organisation D when interviewed says that, "I will expect consultation". Another young knowledge worker from case organisation E says, "I want to participate in decision-making processes that affect me". They are likely to be highly competitive and materialistic rewards appeal to them. "I want my work on the Wiki to be counted as work" says an engineer from case organisation D. "My work (on the Wiki) must be tied to organisational performance" says the Project Manager from case organisation E. "Rewards do not have to be monetary, rewards can be a day off", suggests an technology consultant from case organisation F. They will be more likely to embrace and want to create change in the work place. When faced with siloed and static applications of the enterprise, they may either demand that they be given the tools that they need or they will bring their own tools to work (Nass & Levitt, 2007).

Success, finally, is largely attributed to knowledge workers. Case organisation C's Wiki champion said that, "Age is not a limiting factor. 50 people in each department actively use the Wiki, their ages range from 20 to 55." Technology must meet knowledge workers' needs and fit into their ways of working and communicating (see section 2.1.4.11). It is noteworthy that all the Wiki champions are Project Managers except case organisation F, who comes from line management rather than senior management. This revelation contrasts sharply from the textbook notion that the Information Systems (IS) champion must come from top management. It indicates that the success of Wiki adoption/implementation favours a bottom-up approach. Yet, paradoxically, for the long term survival and sustainability of the corporate Wiki to take place, approval and support must come from top management.

4.3Chapter Summary

This chapter has presented six cases, which is summarised as follows.

- Case organisation A is a failure using the criteria set forth by Lyttinen and Hirschheim, (1987, p. 265). They state that if an IS development process does not result in a workable system or never implemented, or "the inability of an IS to meet a specific stakeholder's group's expectations" (Lyttinen & Hirschheim, 1987, p. 263 - 264), then it is undoubtedly a failure. In terms of pragmatism and good business management, exploring why the initiative permits these lessons to be applied for case organisations B - F.
- The Wiki implementations in case organisations A and B failed the corporate Wiki did not meet individual/organisational needs (see section 2.1.4.11).
- Case organisation A and B have traditional and hierarchical organisations which are not conducive to Wiki implementations where social technologies are relatively new and not well understood.

- Case organisation B's Wiki implementation outcome seems to have been affected by a change in top management and lack of support from higher level managers and participation from knowledge workers fails to sustain it in the long term.
- Case organisations C, D, E and F have successfully implemented a corporate Wiki and are using it to derive improvements in their KM projects. These organisations have built a KMS that is able to meet organisational and individual needs i.e. capture the tacit knowledge buried among experienced staff and turn them into corporate memories and organisational knowledge assets for their organisations. This is witnessed through the increasing number of documents created, uploaded, new articles in the knowledge repository, frequent hit rate, visitors and user registrations. Case organisations C, D, E and F are also pursuing research and development efforts in Enterprise 2.0 technologies to add greater functionality to their corporate Wikis.

History teaches us that innovation is driven by need, and the need to develop technological solutions is necessary, but it is not sufficient by itself to practically develop and implement higher performing solutions. For example, the discipline of HCI emerged with the realisation that it is still too hard for people to work together through their computers, because of the artificial constraints of technology, inadequate interface designs, and the poor integration of conventional software with groupware (Suchman, 1987). CSCW responded to a real need for supporting people working together in a computer mediated environment based on the notions of collaboration and cooperation (Grief, 1998). For example, e-mail allows people who work in disparate environments to interact and accomplish their work. Since the ubiquitous availability of the Internet via the World Wide Web, there have been significant changes in the evolution of the application of technology to support real-time collaboration by bringing together and supporting many existing and new technologies (Turkle, 1996). The use of the corporate Wiki among groups of collaborators, while still being as simple to use as e-mail, is a good solution to e-mail overload and groupware such as IBM's LotusNotes (see section 2.3.1). One of the contributory causes for Wiki failure in case organisations A and B

was that the corporate Wiki did not meet individual/organisational needs, proves that innovation is driven by need.

The empirical findings also show that traditional approaches to KM will not suffice in organisations that lack both the IT personnel and the financial resources to implement traditional approaches. The answers illuminate that unless the KM approach incorporates methods of leveraging cumulative experience, information that is placed on line will remain information.

The implications for learning organisations is the need for bottom-up implementation methods and end-user involvement, supplemented with increased government investments in IT R&D for universities and appropriate government policies such as fast speed bandwidth, will result in the development and implementation of superior performing KMS embedded with Enterprise 2.0 technologies and applications. The point is that technological solutions either exist or are being developed which can address the developing knowledge crisis. However, they must be further developed and implemented. The biggest change in mindset required for organisations when working with Enterprise 2.0 is letting go of control and giving it to their knowledge workers which is related in the experiences of case organisations A and B. The daily influence of Enterprise 2.0 tools has caused younger knowledge workers' minds to be wired differently from their older knowledge workers' minds. Although younger knowledge workers may not be any savvier in terms of the use of technology for knowledge work, they do have built-in preferences for certain types of Enterprise 2.0 tools that they find familiar and comfortable.

In order to explicate both the core KM activity and other related activities associated with a corporate Wiki, a general CHAT analysis of a corporate Wiki used for KM is presented in Chapter 5, section 5.1. The theoretical framework outlined in section, draws on key concepts from Activity Theory to answer the research question as to how Activity Theory can be used to analyse the potential of the corporate Wiki and other Enterprise 2.0 technologies to support knowledge work by democratising organisational knowledge (see section 1.1.1). It will provide a way of looking at how a corporate Wiki can mediate activities in different settings by introducing both possibilities and

constraints. These will have both beneficial and negative effects on knowledge work activities, which are discussed in section 5.3.

Chapter 5 Activity Theory Analysis

This chapter aims at using Activity Theory in conjunction with the case findings to discover how the corporate Wiki is able to support knowledge work and become a next generation knowledge management systems (KMS). Adopting a cognitive approach to KM has limitations. It does not provide an appropriate conceptual basis for corporate Wiki usage in its social, management, legal and technical context, in relation to the goals and motives of the user or in the context of tool development. Nor does it consider the dialectical relationship between subject and object as an indivisible unit, which is considered to be a fundamental unit of analysis for all human activity because it includes purpose, motive and context. The previous chapter recognises organisational culture, leadership styles and perceptions of knowledge work that may affect Wiki adoption and implementation outcomes. This chapter extends the previous chapter's description and discussion of the corporate Wiki's ability to support knowledge work by analysing the potential of other Enterprise 2.0 technologies to support the corporate Wiki and understanding the democratising effect on organisational knowledge as well as the dynamics of the whole socio-technical system during this process. This chapter begins by analysing the basic components of an activity system found in two primary case organisations, A and B. The focus is on the activities that knowledge workers and managers are engaged in, the tools that they use in the activities, the social and contextual relationships of collaborating knowledge workers, the goals, intentions, objects and outcomes of those activities. Next, the analyses of four other supporting case organisations C – F, together with the analyses of case organisations A and B, are presented to examine the activities which feature knowledge creation in the form of auxiliary activities aided by interaction through the use of the corporate Wiki that are central to the process of knowledge work. By identifying the auxiliary activities such as social, management, legal and technical issues, this chapter generates some useful insights and emphasises the potential areas of contradiction, system tensions and dualities.

The previous chapter presented a series of interpretive case studies with the objective of revealing a rich understanding of current practice. Often, interviewees focus on the contradictions between organisational culture and organisational performance or the relationships between knowledge worker and managers. In order to integrate the findings from the case studies, Activity Theory is applied to provide a holistic unit of analysis of knowledge work within the framework of an activity system (Hasan & Pfaff, 2007a). As Activity Theory analysis is essentially interpretive and iterative, the analysis begins with the core activity of the corporate Wiki (what is knowledge work?) and then moves on to the broader issues of organisational performance at the next stage of the analysis.

5.1 Using Activity Systems to Interpret the Findings for Case Organisation A

This section focuses on the central activity to analyse the different elements of the central activity and identify the problem in the knowledge workers' work processes and the possible impacts of the corporate Wiki on knowledge work activity.

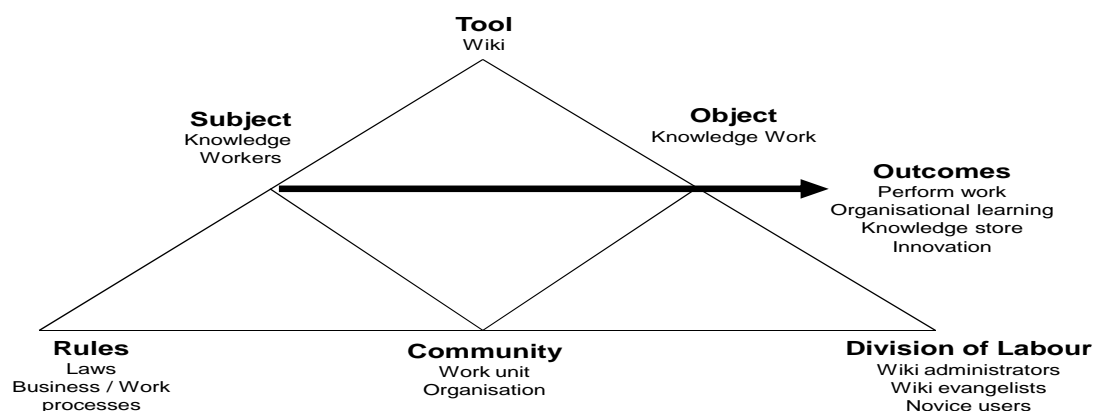


Figure 5.1 Core Activity of Knowledge Work Mediated by a Corporate Wiki
Published in: Hasan and Pfaff (2007b)

An activity diagram (Figure 5.1) is initially constructed for the core KM activity in order to explicate both the core KM activity and other related activities associated with a corporate Wiki. As described in Hasan & Gould (2003), following the work of Engeström (1987), and Kuutti and Virkunen (1995), an activity system normally has one central activity, which is the focal point of holistic investigation, surrounded by other activities with some link to the central activity.

It is discovered that the central activity, for which a corporate Wiki will be used in case organisation A, is not KM per se but knowledge work (Pfaff & Hasan, 2007). An activity is the engagement of a subject toward a certain goal or objective where the project team is a collective subject composed of individual knowledge workers who bring different skills and understandings to bear on a common tool, the corporate Wiki. This is a conceptual level about the level at which most business analysis takes place, i.e. at the level of action, which is undertaken towards specific goals (Hasan, 2000b). In essence, knowledge workers use the corporate Wiki not because they want to interact with it, but because they want to reach their goals that go beyond their use of the corporate Wiki.

In Figure 5.1, Activity Theory illuminates the dialectic interactions between the subject (i.e. knowledge worker) and the ways the object (i.e. knowledge work) are influenced by all elements of human activity and in turn, human activity is influenced by subjective interpretations of the object. The activity of the subject is not viewed in isolation but connected to the larger cultural context. This means that the knowledge worker's actions cannot be isolated from the work environment in which they take place. In effect, actions cannot be understood without a context because providing context to captured information and data allows recipients to gain a greater insight and understanding of how the knowledge is obtained and applied.

Understanding the hierarchical structure of activities is important (see section 3.2.4.4.3). An activity has a specific motive, for example, to search for a particular piece of information on the corporate Wiki or attach a work report. An action is carried out to achieve goals. Actions can be decomposed into operations, which are the subconscious steps we take to fulfil the conditions needed in order to carry out an action.

The three-level hierarchical model of activity gives a graphical description of how a set of secondary concepts translates into isolate specific activities. If the goal is to search for a particular topic on the corporate Wiki then the corporate Wiki user will need to type a search topic in the search engine and click search. Operations are carried out at a subconscious level, with the subject unaware that they are occurring, for example, to move the mouse, and to double click.

The corporate Wiki like most computer systems, incorporate routine and standardised actions including determining knowledge sources, writing and editing the corporate Wiki can become automatic when decomposing to a lower level of operation under certain conditions. To get novice Wiki users to move to higher levels, case organisation F's Chief Technology Officer said that "The trick I've used to get people over the editing hurdle is to deliberately include a mistake in their profile, for example an incorrect phone number, so that they have to edit the page very early on. This enables them to discover just how easy it can be, after which they are generally less reluctant to contribute due to fear of the technology."

Corporate Wiki use may be the core business activity at the top level. In Activity Theory, Wiki technology is not an end in itself, but, more often; it is a support for other knowledge activities at all three levels in the Activity Theory structure. Corporate Wiki management is an addition to the core business activity, with value adding projects such as improved project management at the second level. These systems are viewed by Activity Theory as actions towards specific goals, but not as core business activities themselves. The third level in the Activity Theory hierarchy is that of operations where the corporate Wiki is seen as a primary tool for automating basic KM processes.

Since activities, actions and operations are constantly in a state of flux; this means that a reverse reaction can take place as well. An obstacle may cause an operation to become an action. For example, if a novice user needs to create an unfamiliar corporate Wiki entry which includes image files, they will have to start from scratch, requiring them to pay attention again to what the corporate Wiki rules are on formatting so that they will know how to attach image files. In this way, the operation moves up to become a conscious action.

The analysis of the central activity provides a foundation for understanding both the dynamics of knowledge work changing over time and for understanding changes in knowledge workers caused by employing new technology such as the corporate Wiki. The dialectic relationship between knowledge and work, i.e. thinking and doing or what employees do and what they know.

The corporate Wiki activity system of case organisation A consists of the meaningful context of the user's goals, environment, available tools and interactions with other people. It is important to note that KM is not an end in itself but is undertaken in order to improve the performance of an organisation and enable it to learn and even transform itself to meet the changing demands of its environment (Hasan & Pfaff, 2006b).

5.1.1 The Subject

The subject(s) are the knowledge workers in the work unit or organisation community of case organisation A. The corporate Wiki activity system is perceived from their point of view. Each participant subject will bring different personal characteristics that may change over time, including innovative methods, individual motivations, goals, and perceptions of self. For example, past experiences with other technologies such as case organisation A's intranet, personal preferences for different work practices, the time and motivation to learn to use the corporate Wiki and integrating them into their other activities will be brought to the corporate Wiki activity.

5.1.2 The Tools

The tools are the corporate Wiki technology together with social and learning processes within the organisation (see section 3.2.4.3.2). The inclusion of both communicative and collaborative aspects makes Activity Theory an appropriate basis for addressing important aspects of the Wiki as a KMS, including computer-supported collaborative knowledge work and cross-cultural aspects of Wiki use. One of the challenges of IS is the difficulty of taking into consideration the phenomena that exist outside it, i.e. the social, organisational and cultural context in relation to the goals, plans and values of the user. Activity Theory shifts the focus from interaction between knowledge workers and the corporate Wiki to the wider context of interaction between knowledge workers

and their environment. From an Activity Theory perspective, case organisation A's corporate Wiki is considered a mediating tool that needs to be seen in the context of the entire environment within which it will be used (e.g. the work unit or organisational setting, the presence or lack of presence of Wiki evangelists and their roles; and the role of other Wiki administrators and users, both experienced and novice etc.).

The corporate Wiki both empowers and constrains what knowledge workers can do, but it is in a constant state of evolution as it meets new demands from the activity. For example, the corporate Wiki in case organisation A may drive changes that allow the division of labour to change and younger knowledge workers to function more as teachers of more senior knowledge workers, or even as teachers of managers. As the complexity of knowledge work expands, knowledge workers increasingly depend on tools to help them perform. There is a two-way concept of mediation where the capability and availability of tools mediates what is able to be done and tools, in turn, evolve to hold the historical knowledge of how the communities behaves and is organised. Moreover, knowledge grows through the *always active* subject who learns and grows while the object is interpreted and reinterpreted by the subject in the ongoing conduct of the activity.

5.1.3 The Object

The core activity (object), for which a corporate Wiki is used, is not KM but knowledge work (see section 3.2.4.4.2). In order to achieve the organisation's decided outcomes; conscious actions are motivated by goals to produce a certain object. According to Engeström (1987), the object (knowledge work) of the community (work unit/organisation) brings forth the division of labour (Wiki evangelists, administrators and users) and the alignment to certain rules (laws and business/work processes) that constrain the availability and the use of possible operations and tools. The mediating elements include the tools (Wiki, social and learning processes), artefacts and concepts used by subjects (knowledge workers) to accomplish tasks, and the community (work unit/organisation) that defines the social context for the activity. Case organisation A's corporate Wiki will serve as a mediating tool enabling the interactions with knowledge work (object), aiding knowledge creation and collaboration, but also as the object of the

activity (knowledge work) that turns implicit knowledge workers' personal knowledge externally observable.

Activities are often said to be 'object oriented' as the object usually defines the purpose of the activity as interpreted by the subject in a dialectic relationship. The analogy of this dynamic holistic aspect of Activity Theory to Object Oriented Programming (OOP) was drawn earlier (see section 2.1.3). In OOP an object includes all methods and attributes one normally associates with a data structure to serve many different situations and applications so as to reduce costs, the need for customisation and development time; and benefit overall quality (Mahabala, 2000). In the same way, before an organisation can use knowledge, it must have knowledge to reuse it. This suggests that an organisation must first focus on what collaborative knowledge work is before it can think about computer support. In essence, it frames the first research question: Does a corporate Wiki support knowledge work? (See section 1.1.1) And the answer to this question lays the premise of finding out what is the nature of knowledge in the corporate Wiki.

5.1.4 The Rules

Rules consist of the code and guidelines for actions and behaviour that mediate the relationship between subject (knowledge worker) and community (work unit/organisation). Humans as subjects are a part of communities and this relationship is mediated by social rules (Nardi, 1996b). Immersion in a culture helps learners become increasingly independent in their learning (Vygotsky, 1978). Thus, it is important to consult existing rules and practices in the activity system so that they can better support the knowledge and culture of the user's community.

Case organisation A is constrained by socially and contextually explicit and implicit rules. These rules may either be explicit e.g. formal laws and work procedures, or implicit e.g. cultural norms that are in place within a particular community. Explicit rules govern the organisation's operations. These include industry norms as well as formal laws such as copyright, trade mark, privacy and libel laws (see section 2.3.7.4). The rules and conditions under which the corporate Wiki technology is to be applied are

important because legislation guides activity that comes under explicit rules. However, legislation is not so clear cut in the case of an emergent technology such as the corporate Wiki. Legislation concerning the corporate Wiki is still emerging.

Implicit rules are guided by the informal norms of behaviour in the affected work unit or organisation and how this may affect the corporate Wiki. They include work practices, teamwork, knowledge-sharing, equity, risk and reward incentives (see section 2.3.7.1.2), corporate Wiki rules and organisational cultural norms such as business processes and work procedures. In other words, the way we do things over here. In section 4.1.1, we learned that case organisation A exhibits a bureaucratic organisational culture and the managers advocate an autocratic leadership style. Rules distinguish different types of behaviour over others, and there are rewards for preferred behaviour. The preferences are reflected in salaries, promotions, bonuses, and other material rewards. But informal rules also point the way to these as well as social rewards such as respect and consideration, rewards that may increase a knowledge worker's influence and authority. However, case organisation A does not offer material nor social rewards. Individuals are punished for not following the rules and these individuals become socialised as they learn the rules.

5.1.5 The Community

Case organisation A's corporate Wiki community consists of a variety of subjects (i.e. knowledge workers) within the work unit or organisation. In the corporate Wiki activity system, there is the broader socio-cultural corporate context. In large corporations this becomes complicated because it involves not only a corporate culture but also the cultures of the individual work units. As knowledge workers engage in the corporate Wiki community of practice, their knowledge and beliefs about the work environment influence and are influenced by that community and their beliefs and values. Knowledge workers change and learn as they expand their involvement with others in a community. Through legitimate peripheral participation (Lave & Wenger, 1991), people absorb part of the culture that is an integral part of the community, just as each member influences the culture of the community, creating a type of information commons (Pfaff & Hasan, 2006b) (see section 2.1.11).

When organisations learn, they create new innovative products and processes, and explore strategic options. Activity Theory shows that the corporate Wiki community is central in organisational learning. As their members share knowledge activities, they develop a sense of common identity and culture. Organisational knowledge (see section 2.1.1.3) emerges as subjects work their way through contradictions (see section 3.2.4.4.4) within and across activity systems in a process that appears to corroborate Engeström's view of expansive learning (Widen-Wulff & Davenport, 2007). The theory of expansive learning is based on the dialectics of ascending from the abstract to the concrete. The corporate Wiki demonstrates organisational knowledge has a *dynamic* aspect. One does not learn alone but learns mainly through tacit knowledge gained from social interactions with others. The key of knowledge sharing here are the interactions among members of the teams which happen voluntarily. Knowledge is communicated between knowledge workers, novice Wiki users are learning while Wiki administrators are teaching. The initial simple idea transforms into a complex object, and then into a new form of practice. Organisational learning takes place as the corporate Wiki evolves over time and new knowledge accumulates as the participants change or learn in the process of performing work (Hasan & Pfaff, 2007b).

5.1.6 Division of Labour

The relationship between community (people within the work unit/organisation) and object (knowledge work) is the division of labour that refers to both the horizontal division of tasks between the subjects (knowledge workers) involved and to the vertical division of power and status. Different members of case organisation A's corporate Wiki community will be allocated responsibility in defining and influencing the object (knowledge work) via tasks specialisations. The division of labour affects the workplace relationships mediating roles within collaborating teams. Some play the role of corporate Wiki administrators who write and edit entries. Administrators can also take on the role of corporate Wiki evangelists, promoting the corporate Wiki cause among the unconverted in the organisation. Novice users who are new or unfamiliar with the corporate Wiki may initially take on the role of readers.

The variations of job roles suggest the division of power and status from the way tasks have been allocated (Engeström, 1993). Members of the community can have cross

purposes about the end user's needs and means with which best to satisfy them and different interests to participate in the needs satisfaction. As novice knowledge workers work collaboratively with longer serving staff members on the latest version of a particular project document, novice knowledge workers become more knowledgeable as they work. Novice knowledge workers pick up confidence because corporate Wikis are easy to use and edits can be automatically applied. Senior staff members are less concerned about mistakes because edits can be tracked and reverted to the original state.

Jonassen (2000) argues that the extent of flexibility in the division of labour in any work organisation to adapt to circumstances will determine the ability of the activity system to engage in different activities. That is, how work is distributed throughout the organisation determines to some degree the nature of the work culture and the climate for those involved in any activity system. For example, case organisation A's work culture is delegated by ordering employees to do the work without any consultation. Therefore, this might go against the spirit of volunteerism inherent in the Wiki where the sharing of knowledge is considered a social good.

5.1.7 The Outcome

Activity Theory makes a distinction between the object (knowledge work) and the outcome. In terms of the corporate Wiki activity system, the object (knowledge work) can be defined as the content to be appropriated, to be internalised by the knowledge worker, the outcome is the final goal as really attained by the knowledge worker. The outcomes of the activities' transformation process may produce intended or unintended results in case organisation A. The intended outcomes of the corporate Wiki system are to build, share and manage knowledge in encyclopaedic form, which acts as a knowledge store, and organisational learning takes place as the corporate Wiki evolves over time. Just as the object is transformed during the production process, the object (knowledge work) may also transform the subject (knowledge worker). For example, as new knowledge accumulate the subject (knowledge worker) change or learn in the process of performing work. It is noted that the goals for corporate Wiki users change the longer they spend time on the corporate Wiki. The transformation of goals is fundamentally linked to the transformation of participation.

Unintended outcomes are to increase recognition of knowledge worker's value to organisation, improve performance appraisal and promotion prospects, and/or attract monetary rewards. Another unintended outcome is to create *infotopia* (Sunstein, 2006) where people with diverse talents and interests try to achieve common goals (see section 2.3.2.2). People contribute to a Wiki to show off, or to share their knowledge or simply to experience the joy of building things with other people.

5.2 Auxiliary Activities for Case Organisation A

This section analyses case organisation A's capacity to sustain the corporate Wiki in use and to identify the supporting activities (Figure 5.3). The outcomes of the total activity system for case organisation A's corporate Wiki will affect other activity systems in the organisation.

Activities are complex and interactive which necessitates collaborative effort (Jonassen & Rohrer-Murphy, 1999). Each component of activity is the result of other activities which produced it. It is important to note that an activity system is made up of nested activities and actions all of which can be conceived as separate activity systems or other instances of the same system depending on one's perspective as seen in Figure 5.2.

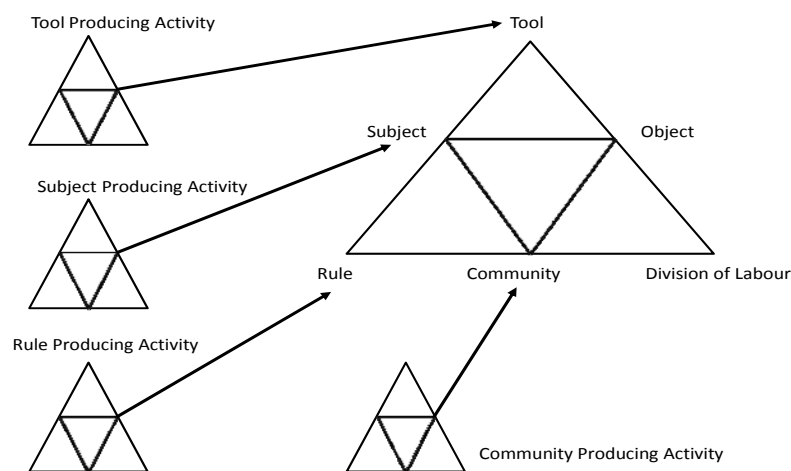


Figure 5.2 Nested Nature of Activity Theory Dynamics
Source: Jonassen & Rohrer-Murphy, 1999

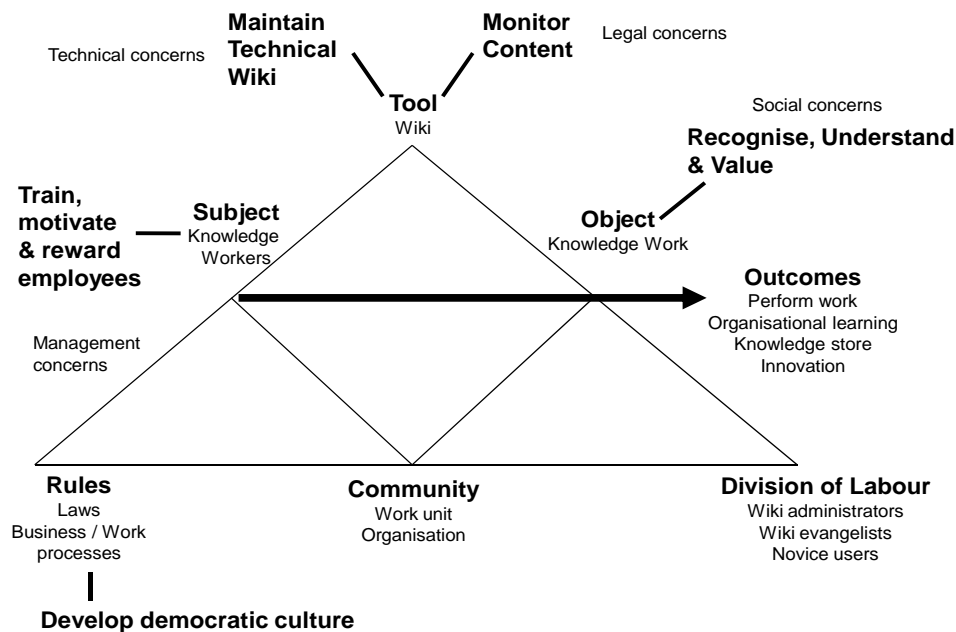


Figure 5.3 Elements of Secondary Activities related to Knowledge Work Using a Corporate Wiki

Published in: Pfaff & Hasan (2006b)

The distinctive attributes of a corporate Wiki for case organisation A described in Figure 5.1, give us an indication of the auxiliary activities that link and reflect the true purpose and motives of the core knowledge work activity (Pfaff & Hasan, 2006b) shown in Figure 5.3.

5.2.1 Tool Producing Activity

Auxiliary activities focus on the production of tools to be used in the central activity. The tool producing activity indicates the technical concerns of installing and maintaining the corporate Wiki and the legal concerns of monitoring its content (see Table 4.18). Given the corporate Wiki's simplicity, there are minimal technical concerns if it is hosted internally. As case organisation A chooses to host the corporate Wiki in its own environment, the main challenge is coping with the huge volume of data. Servers and databases that are ill-equipped to handle its rapid growth and the corporate Wiki will grind to a halt regularly, frustrating corporate Wiki users. As case organisation A wants to build its corporate Wiki from scratch, then the other challenges include establishing the technical corporate Wiki as a KMS to manage the various

information and knowledge resources during the installation stage (see section 2.3.7.3). This requires some experience of databases and server configuration to install the corporate Wiki. More knowledge about how corporate Wikis work and the types of corporate Wiki software that are available will be required (see section 2.3.4).

Given the open nature of the Wiki of allowing any employee to edit and its ability to disseminate information rapidly, the legal concerns for the Wiki include copyright, trade mark, defamation and privacy infringements (see section 2.3.7.4). The implications of these legal issues for corporate Wikis will be discussed in section 5.2.4.

5.2.2 Subject Producing Activity

Another type of activity is subject producing. These activities focus on management concerns such as preventing vandalism and unreliable information, limits to power sharing, maintaining centralised IS control and discouraging technology innovation. The subject producing also highlights the participatory problem of recruiting, training and educating subjects or potential subjects for the corporate Wiki.

5.2.2.1 Preventing Vandalism

Case organisation A's management is concerned about avoiding vandalism such as the insertion of spam links, insertion of incorrect information as a prank or a joke; and false and malicious content about groups and individuals on the corporate Wiki (see Table 4.14). However, management refuses to note the differences between public and private Wikis. A public Wiki such as Wikipedia can be seen and edited by anyone surfing to its internet address. Case organisation A wants to adopt a private corporate Wiki which means that it can only be seen by those employees who have been invited by the owner or administrator of the Wiki. The level of editing privileges can be granted accordingly. Management also overlooks the fact that Wiki vandalism often occurs on public Wikis. Any vandalism that occurs on the corporate Wiki is akin to vandalism done on written group project reports because corporate Wiki users are not anonymous as they need to key in the user id and password to gain access into the Wiki.

5.2.2.2 Preventing Unreliable Information

Management wants to be assured that the information on a corporate Wiki is credible and correct. Unreliability is impacted by issues such as carelessness, redundancy of information, outdated information, contradictory statements; and incorrect spelling and grammar (see Table 4.14). Avoiding unreliable information while working on a group report or writing an academic paper with multiple authors, works in a similar way as work on a private corporate Wiki. It is in everybody's vested interest to avoid unreliability issues and work in a professional and efficient manner as their reputations are at stake.

5.2.2.3 Challenge to Management Authority

Based on research findings for case organisation A, there is some indication that the corporate Wiki may challenge management authority by attempting to engage the knowledge worker in a more participatory KM capability and environment (Hasan and Pfaff, 2006b) (see section 4.1.1). Case A managers want to set limits to power sharing and this may introduce endemic conflict due to the blurring of management/knowledge workers' responsibility to make decisions regarding knowledge creation and sharing, where traditionally this is the domain of upper management in case organisation A.

5.2.2.4 Maintaining a Centralised IS control

Case organisation A wants to continue to maintain a centrally situated mainframe where all processing of information and storage operations are operating in a central location. All information on its intranet is checked and approved by a senior manager before the IT staff uploads the information onto the intranet. The use of a corporate Wiki will give control of the information creating process to the users and bypass the managers.

5.2.2.4 Discouraging Technology Innovation

Case organisation A's attitude towards discouraging innovative technologies that encourage knowledge workers to democratically generate and participate in knowledge producing activities may be linked to its desire to maintain centralised control. Traditional hierarchies like case organisation A need to realise that a flat organisation

cannot be eliminated, neither can it be subjugated because the flat organisation consists of a complex but dynamic network of interpersonal relationships between employees, necessary for the production of knowledge work (see section 2.1.4.1.5.1). What is needed in order to generate innovation is an organisational culture based on openness and mutual respect. A certain degree of informality is necessary to ensure a fast flow of information and knowledge and the exchange of ideas between different hierarchical levels.

5.2.2.5 Overcoming Participatory Problem

Management has similar concerns that the corporate Wiki will have the problem like its current intranet where it is difficult to motivate employees to contribute to it and then use its contents (Hasan, 2000a). Trying to order employees to volunteer their time to become Wiki administrators and users or trying to enforce rules will not work. Case organisations C – F allow participation to emerge from the bottom-up. Their Wiki champions are the first to participate, recruiting other Wiki evangelists whom they have close ties, to help them train and educate users to contribute and this process is on-going until all employees are utilising the corporate Wiki. Altruism and reputational concerns are positively associated with the decision to volunteer as Wiki evangelists and administrators. Section 6.1.4.2.1.4 gives examples of how to adopt the incremental principle to overcome participatory problems in the corporate Wiki.

5.2.3 Object Producing Activity

The process of doing knowledge work has produced a number of social concerns. They include ease of use, perceived usefulness, lack of incentives, lack of time, low work morale and distrust (see Table 4.12).

5.2.3.1 Ease of Use, Perceived Usefulness and Lack of Incentives

The Technology Acceptance Model (TAM) highlights two constructs, ease of use and perceived usefulness (see section 2.1.4.1.1) that underlie technology acceptance (Davis, 1989). This fact is confirmed by the case organisation E's IS Director, "the ease of use favours an informal approach to sharing documents with a corporate Wiki which may

be appropriate in some environments and less so in others.” There have been several extensions to the original TAM model. These extensions include user involvement, argument for change and prior usage (Jackson, Chow & Leitch, 1997).

When it comes to user involvement, none of the managers from case organisation A wanted to be involved in the design and implementation of the corporate Wiki, especially, if it means additional work (see section 4.1.1). A director from case organisation A is adamant to let “our IT people to handle that kind of stuff” to keep in line with centralised IS control.

The argument for changing the technology (ibid.) from the current intranet to the corporate Wiki does not emanate from higher level managers. This influences the ease of use and perceptions on the usefulness of the corporate Wiki. “I don’t use the intranet very much, I am not sure I would use the Wiki,” says a Department Head. Adopting a Wiki will mean a loss of power and centralised IS control. In addition, case organisation A’s managers have no interest in IT and see user involvement as more work and a waste of time to learn a new technology which they are not familiar with.

Prior usage affects users’ intention through its effect on ease of use and perceived usefulness (ibid.). Case organisation A’s managers have never heard about Wikis or Wikipedia. All of them admit that “I’ve never heard of a Wiki.” The term, Wikipedia also drew blank looks. A Department Head asked, “What does ‘Wiki’ stand for?” He thought that the term ‘Wiki’ was an acronym of a technical term. Familiarity with a computer system tends to colour the perception of other systems (Benbasat, Dexter, & Todd, 1986). Users from case organisations C – F who are familiar with Wikipedia and other Wikis tend to carry their experiences to the new corporate Wiki and are more likely to form intentions to use the Wiki. Case organisation C’s R&D Project Manager says that he was influenced by a colleague who was the first Wiki champion in his company, who in turn was “was inspired by Wikipedia.” “I got the idea from Wikipedia,” explains case organisation D’s IS Project Manager who is an active participant of Wikipedia. “The success of Wikipedia made me think about how useful it would be for my department,” reflects case organisation E’s Technical Project Manager. “My staff and I are keen users of Wikipedia,” says case organisation F’s CTO.

This research proposes an additional factor, a lack of incentives, to explain a person's behavioural intention to use a new technology. A lack of incentives is established as a major source of failure in the adoption of corporate Wikis (see section 2.3.7.1.2) for case organisations A and B. An activity is said to be poly-motivated, that is, corporate Wiki users participate in contributing to the corporate Wiki because it is part of their job description, or it is interesting way to share accurate and timely information or they see it as way to get to appear visible and get promoted. When incentives are aligned with how much others use the knowledge corporate Wiki contributors make available to them, they provide an impetus and motivation to make corporate Wikis succeed. The activities of the knowledge workers are mediated not only by the functions of the corporate Wiki itself but also by the attitudes and customs of the organisations in giving workers the resources and authority to do so. If there is no incentive for case organisation A's managers to use the Wiki i.e. no perceptions of value or usefulness, then there is no reason to adopt a corporate Wiki.

5.2.3.2 Lack of Time

The most common complaint among knowledge workers is that they are too busy to contribute to the corporate Wiki so as to share knowledge with other colleagues due to the heavy workload and already long working hours. In section 4.1.1, the knowledge workers in case organisation A stated that "our workloads are already heavy, but wasting time on intranet makes it even more challenging." Since knowledge workers work under great pressure to finish their increasing workload to keep their jobs, it is not surprising that they do not care much about sharing and disseminating knowledge.

5.2.3.3 Low Work Morale

It is found that managers in case organisation A do not provide commitment and support for long-term learning in the form of resources (e.g. money, personnel and time) which determines the quantity and quality of learning. Training courses are repeated again and again and all employees are expected to attend. "I dread going to these courses," complained a knowledge worker from case organisation A. "I don't learn anything new", says an administrative staff member. More significantly, case organisation A's managers do not provide a nurturing environment to encourage leadership qualities in

their knowledge workers. Case organisation A, in particular, stifles all attempts at leadership. These cumulative factors result in low work morale. A lack of openness to change/innovation culture is detrimental in cultivating a knowledge sharing culture (see section 2.1.4.1.5). The assumption that a corporate Wiki can be implemented by altering the power relationships or organisational behaviour is the most unwarranted assumption made concerning the corporate Wiki. In case organisation A the ingrained work processes and work practices have slowly evolved over a long period of time. The more ingrained a process is, the more difficult it is to change, regardless of the logic in making the change.

5.2.3.4 Distrust

The communicative aspect of knowledge sharing is demonstrative in the use of the corporate Wiki. The level of trust an individual has in the corporate Wiki will influence its use (see section 2.1.4.1.4). There is mutual distrust between case organisation A's knowledge workers and managers. Knowledge workers have a poor self-perception and self-confidence. "I am not paid to think," retorts a knowledge worker from case organisation A. Managers lack confidence in knowledge workers to act on incomplete information, trust their own judgments, and take decisive actions and managers' lack of consultancy with knowledge workers, make it clear that there is a correlation between productive work and trust. Trust issues will influence the use of the corporate Wiki.

5.2.4 Rule Producing Activity

There are rule-producing activities where the focus is on creating rules, policies, and adhering to government legislation impacting the central activity. It is assessed that management are more concerned with prevailing legal concerns which include copyright, defamation, publicity, and trademark issues (see Table 4.16).

5.2.4.1 Copyright

A familiar threat is that of copyright (see section 2.3.7.4.1). Since the corporate Wiki allows users to own, modify, and exchange data, it is probably inevitable that intellectual property holders will initiate lawsuits investigating perceived

misappropriations (Pfaff & Hasan, 2007). Those responsible for a copyright infringement include the author of the infringing content, case organisation A which owns the corporate Wiki, and the organisation that hosts the corporate Wiki such as the Internet Service Provider. If case organisation A chooses to host its corporate Wiki, then it is liable. The situation is further complicated by the fact that many authors contribute to a Wiki entry and will be difficult to resolve should an authorship dispute arise.

5.2.4.2 Trade Mark

Trade mark infringement predates the Internet but the Internet makes it increasingly difficult for trade mark holders to protect their trade marks because they are part of society's culture and speech (see section 2.3.7.4.2). Trade mark infringement may occur if case organisation A uses the trade mark of a competitor in the meta tags for their corporate Wiki so that search engines will direct customers looking for the trademark products to their website instead. Trade mark infringement also occurs if individuals from case organisation A copy trade mark logos and use these logos on the corporate Wiki to imply some authorised connection to a well-known product.

5.2.4.3 Defamation

Declaring a false statement of fact that is harmful to someone's reputation, and published with fault, meaning as a result of negligence or malice constitutes as defamation (see section 2.3.7.4.3). It can be said that a person who contributes to defamatory information on a corporate Wiki entry is guilty of libel because it is considered a written defamation. Libel can also be a false statement of fact expressed in a picture, sign, or electronic broadcast. If case organisation A chooses to host the corporate Wiki, then it is also potentially liable.

5.2.4.4 Publicity/Privacy

Publicity comes under the privacy laws where unreasonable publicity is given to another's private life; and publicity that unreasonably places the other in a false light before the public (see section 2.3.7.4.4). Although there is no right of publicity in

Australia, it does not mean that the offending party cannot be held liable by foreign laws. Publication on a corporate Wiki will generally be considered a public disclosure. Case organisation A has also raised the concern on how the use of the corporate Wiki will affect the privacy of individuals and its organisation if it depends on the Wiki as their primary method of KM. Personal information that affects the privacy individuals include real names, street addresses, personal telephone numbers, similar to information that is given to the government census. Corporate information that will affect the privacy of the organisation include, names, street addresses, personal telephone numbers, customer profiles such as purchasing habits, and business processes etc.

5.2.5 Community Producing Activity

Finally, there are community-producing activities that concentrate on the community impacting the central activity.

5.2.5.1 Developing a Democratic Corporate Culture

The case studies in Chapter 4, demonstrate that whether an organisation is private or public, organisational culture is unanimously named as the key success factor for innovation. “I do not like being ordered around”, says a knowledge worker from case organisation A. This sentiment is shared among his peers. “The command and control tactics (of management) are overbearing,” says an IT professional from case organisation A. Case organisation A’s managers have the delicate role of balancing order and spontaneity. Case organisation A needs to develop a democratic corporate culture within the work unit or organisation that rewards knowledge workers for sharing their ideas and knowledge and shows them that management has their best interests at heart. Managers can be the catalysts to promote knowledge sharing by encouraging an information sharing culture based on mutual trust and mutual influence with appropriate job descriptions and incentives in place (see section 2.3.7.1.2), within the organisation.

Management needs to create a work environment in which people will feel comfortable participating. Once employees start participating, they feel a sense of ownership, which in turn motivates them to keep participating. Sometimes something worthwhile is

conceived on the margin of order and chaos. A corporate Wiki is a social phenomenon because it encourages democratisation and innovation of experimentation and rethinking to create new knowledge. Hence, in the emerging business model, corporate Wiki communities should be rightfully treated as external extensions of case organisation A's service and support the IT infrastructure. The challenge is to convince the corporate Wiki community in case organisation that its organisation recognises their worth as knowledge workers and their contributions to the corporate Wiki provides them with a user-friendly and useful resource of work related content that will be checked and verified by their peers.

The openness to change/innovation culture typified by case organisations C – F have been rewarded with the successful implementation of the corporate Wiki as a KMS. Their managers learn to separate diagnosis from intervention and act to invite collaborative knowledge creation processes, joining with knowledge workers to expand corporate Wiki resources. This openness is inherent in corporate Wikis, both ideologically and technologically. Hidden management is required to foster a supportive role where managers need to respond promptly to questions, suggestions, and criticisms, and carefully evaluate the ideas that corporate Wiki users contribute, yet not appear to be meddling in the democratic creative process of organisational knowledge.

A sensible organisation has the mandate to align its operations and culture according to the network-centric approach (see section 2.1.7). Managers have to allow that emergent space to exist in the organisation to allow knowledge workers generate their own contents, categories and multiple perspectives of business strategy or the learning community. In essence, the corporate Wiki can act as a conceptual space for types of problems. The sensible organisation requires knowledge workers to constantly re-evaluate their assumptions, their operating procedures, and their products. It does not cling to long-held assumptions about the best way to do things; rather, it continuously seeks improvement.

5.2.6 Outcomes of a Corporate Wiki

The outcomes of a corporate Wiki will benefit case organisation A because they will help to acquire new insights into knowledge workers on how they perform knowledge

work, create a knowledge store and recognise important best-management practices to support organisational learning and technology innovation.

For knowledge workers in case organisation A to perform knowledge work unencumbered, they must be given autonomous roles of self-leadership and self-regulation and managerial functions as sense makers because they are in the best position to sense the dynamic changes in their immediate business environment. Knowledge workers can participate as readers, writers and peer reviewers, giving them opportunities to define problems and generate their own solutions, evaluate and revise their solution-generating processes.

The corporate Wiki in case organisation A will have a dual purpose of creating a knowledge store and introducing organisational learning at the same time by engaging knowledge workers, peers and managers with the aim of fostering organisational performance at the end of the day. A knowledge store is created when knowledge workers co-create work related knowledge in a form that is meaningful for knowledge workers to access as needed. They gain organisational knowledge, which affects their actions, and changes their individual knowledge that results in learning and making them more knowledgeable and this in turn, affects their performance.

Technology innovation has created new and innovative ways for people to shape and share their knowledge, and express themselves (see section 2.3). The rise of Enterprise 2.0 technologies such as Wikis, blogs, social networking sites and other online interactions allows a community of users to communicate and work more collaboratively (see section 2.3.3). When the corporate Wiki engages knowledge workers to grow the Wiki organically, knowledge becomes the by-product of Wiki usage, rather than an end in itself. However, to case organisation A, technology innovation can appear to be something to fear. A corporate Wiki gives knowledge workers too much power by inviting people to write or speak out their views without going through corporate censorship, vandalising and putting forth unreliable information are considered risky behaviour.

5.3 Multiple, Interacting Activity Systems for Case Organisation B

The purpose of this section is to describe how *third generation* Activity Theory, with its emphasis on multiple perspectives and networks of interacting activity systems (see section 3.2.4.1), has informed research for case organisation B's implementation of its corporate Wiki. According to Engeström (2001, p.139) the central challenges for a third generation Activity Theory is to acquire new ways of working collaboratively, and to develop concepts and tools to account for dialogue, multiple perspectives and networks of these interacting systems (ibid, p.135). The analysis offered represents an advance beyond second generation Activity Theory, which is concerned with single activity systems.

When Activity Theory is applied to KM and the ramifications of organisational and social issues are uncovered in the previous analyses, the activity systems are only described by one subject, the knowledge worker. Since activity systems interact and overlap with other activity systems, Activity Theory is able to portray the two overlapping activity systems, the knowledge worker and the project manager in case organisation B. One is faced with the contradictory double form of object-oriented activity systems. First, the object is directly functional knowledge work. Second, the goal is the social production of labour (Daniels & Warmington, 2007). Individuals who are involved in a particular activity are members of other activity systems may have different objects, tools and outcomes (Uden, 2007). By taking other employees as the subject of the activity systems, it is evident that two systems exist because the object of the work differs between knowledge workers and the project manager, and so, too, their perspectives.

Activity diagrams are constructed for four groups in case organisation B: the knowledge worker and the Project Manager (Figure 5.4); and CEO and senior/line managers (Figure 5.5). It is found that knowledge workers are transformed by knowledge work (the object of activity) which in turn are influenced by complex interactions between the subject (knowledge worker or Project Manager), tool (the corporate Wiki), rules (business procedures and processes; legal issues, organisational culture), community

(work unit, organisation), and division of labour (collaborative work). Diagrams are used to distinguish between the knowledge workers' experience and project manager's experience. There is some divergence in the resulting profiles, notably in the areas of outcomes, subject, community and division of labour.

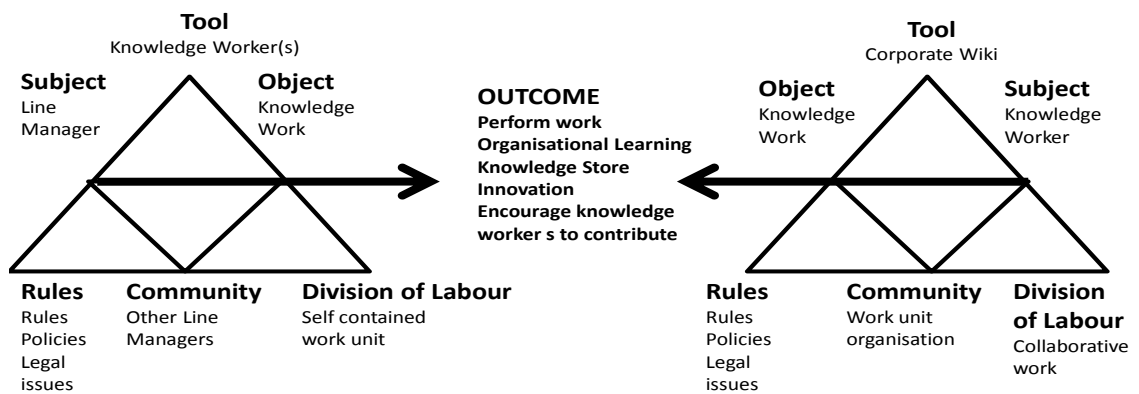


Figure 5.4 Multiple Activity Systems – Project Manager's Perspective

In Figure 5.3, we see that the subject of the corporate Wiki activity system is the knowledge worker and the object is knowledge work. Yet, in Figure 5.4, the subject is the Project Manager who is a line manager in case organisation B. The tool of the line manager's activity system can be an individual or a group of knowledge workers. As case organisation B's Project Manager is the Wiki champion for his organisation, the object of the project manager's activity system is to stimulate knowledge work by encouraging like-minded knowledge workers through the facilitation of new ways of learning and contributing to the corporate Wiki while working on a project.

Just as objects differ between the project manager and knowledge workers, so do their communities and the division of labour. The Project Manager's community usually consists of other managers, but for the knowledge worker, it is made up of their peers from the work unit or the organisation and his/her managers. Accordingly, the division of labour for the project manager is the work unit which determines the tasks and decision making powers of the Project Manager, whereas for the knowledge worker it is collaborative work on projects which may result in a different division of labour for

each new project. Rules, which may be both explicit and implicit, would normally be the same for both, and so, too.

The outcomes may be slightly different. Both the Project Manager and knowledge worker share a similar outcome to transform of the object (knowledge work) into a knowledge repository of organisational knowledge, and in the process of performing innovative knowledge work, stimulate organisational learning, intersecting expertise in unexpected ways and creating new insights. However, for the Project Manager, there is an additional outcome of encouraging knowledge workers to contribute to the corporate Wiki. Other outcomes include recognition from top management for a successful KM project, greater responsibilities and possible promotion and pay rise.

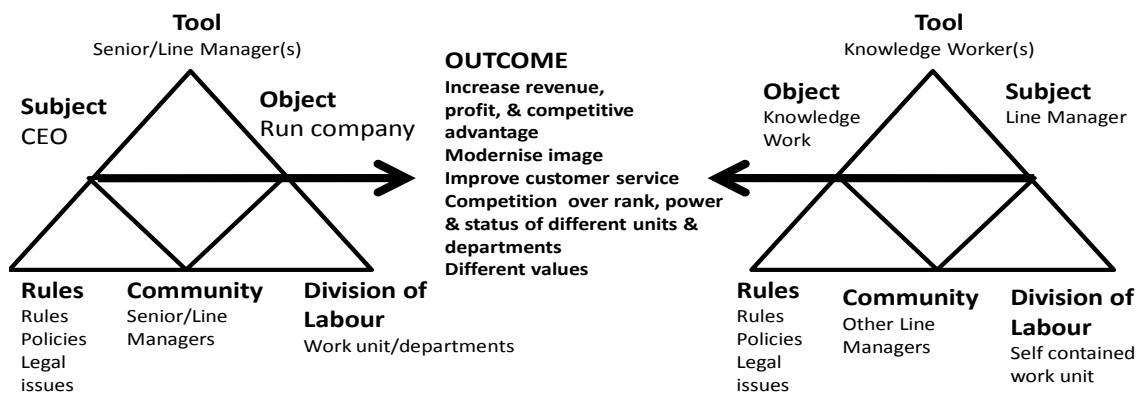


Figure 5.5 Multiple Activity Systems – CEO's Perspective

Just as the perspectives of the knowledge worker and Project Manager differ, so too the perspectives of the CEO and the senior/line managers. In Figure 5.5, the tools of the case organisation B's CEO are the group of managers to perform the day to day operations of the company under his direction and guidance. These managers will help assess the day to day operations of the employees that they manage (Waite, 2005). The CEO also depends on knowledge workers to share and apply knowledge across the organisation. The object of the CEO is to oversee the day to day management of the company and lead the company to make it healthy and successful. The intended outcomes are competing goals such as to increase revenue, profit and competitive advantage, improve customer service and modernise the image of the organisation. A variety of undesired outcomes exist. These include achieving critical mass (see section

2.3.2.3), competition over rank, power and status of the various managers' different work units or departments, and differing values on the limits of organisational and social boundaries for a corporate Wiki. One of the difficulties of adopting a social technology such as the Wiki is that it requires critical mass to be useful. The shared knowledge repository is limited in use and not truly social until it is well populated with information/knowledge contributed by a variety of users across social communities i.e. different work units or departments. Achieving critical mass in every topic area within a closed corporate environment will continue to be a challenge. This dual (or multiple) nature of case organisation B's activity will influence the type of KMS chosen.

A corporate Wiki based on Microsoft SharePoint collaboration software (see section 2.3.4.4), for instance, may be more appropriate for the traditional organisation such as case organisation B that insists on retaining control where the CEO, senior and line managers and knowledge workers can have the same object of performing knowledge work. Collaboration is managed at a central server where all data are exchanged via a central point of access. SharePoint is able to provide case organisation B with advanced administrative controls to secure information resources through site provisioning, site management, and support.

This analysis is helpful in understanding organisational learning which is always local and situational. The structures, practices, habits and ways of thinking in an organisation are all shaped and produced in the historical development of that particular organisation. Transformation from the current situation to a new one cannot be done without a historical perspective (Virkunen & Kuuti, 2000) if researchers cannot uncover the relationship between knowledge workers and the obstacles to KM.

Although the implementation of the corporate Wiki is more agreeable to a bottom-up grassroots approach (see section 4.2.5.5), support from case organisation B's CEO is crucial. Case organisation B looks to their CEO as the leader of the organisation to lead, inspire and motivate. This includes giving projects the right kind of impetus, since many are unable to foresee the benefits from such a project while still under development. Once the CEO provides capital and human resources support, the resistance to such projects will diminishes considerably. However, knowledge sharing and innovation

require shifts in organisational culture, deep organisational involvement, expensive resources, open communication and management commitment. Therefore, if case organisation B wants to introduce knowledge sharing and innovative behaviour to ultimately become part of its culture, then an effective CEO will constantly look for opportunities to demonstrate and reinforce behaviour that they wish to instil in an organisation.

5.4 Decomposing the Activity System with an Activity Notation

This section consists of the Activity Theory analysis done for all the six cases, A – F. The activity system produced so far is very complex because it incorporates the various sub-activities that together make up the main activity system being analysed because it aims to answer a complex question i.e. the primary research question of whether a corporate Wiki is able to support knowledge work. Mwanza (2001) suggests that an activity notation can be used to break it down into smaller manageable units or sub-activity triangles to generate specific questions from the case studies aimed at obtaining meaningful data. A breakdown of these specific questions can be found in Chapter 3, see section 3.3.1. The sub-activity triangles generate some useful insights and emphasise the potential areas of contradiction, system tensions and dualities.

There are four mediating triangles around this central line to reveal the differences in corporate Wiki users' perceptions of the object and motive to show that people are often at cross-purposes, by the community, rules & routines, the distribution of power, and the tool. The object and motive of the activity system are inevitably contested, negotiated. Similarly, the tools, rules, community and division of labour are often perceived differently, and thus also resisted, contested, and/or negotiated—overtly or tacitly, consciously or unconsciously (Russell & Yañez, 2002).

5.4.1 Sub-Activity Triangle Subject-Tool-Object

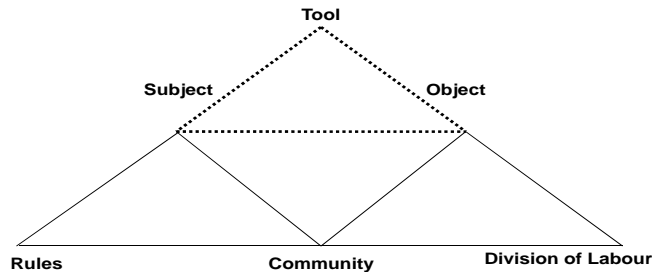


Figure 5.6 Sub-Activity Triangle Subject-Tool-Object
Source: Adapted from Mwanza, 2000

This relation deals with the applicability of the corporate Wiki to knowledge workers and the knowledge workers' utilisation of the corporate Wiki so as to create, share and disseminate knowledge about work to provide better KM support.

Focusing on the level of the activity also meant taking into account how using the corporate Wiki complemented or did not complement other tools that were used for the activity. In case organisation A, there is a conflict of interest between the choices of technologies to create a KMS, e.g. traditional approach versus a newly emergent Enterprise 2.0 technology approach.

There is conflict between the tools used to support KM activities. In case organisations C – F, knowledge workers are encouraged to use the corporate Wiki, instead of email, to submit reports via the corporate Wiki. Although all corporate Wiki users recognise the constraints of the corporate Wiki, some choose not to use them and sometimes revert to other tools such as email, others persist and learn ways of using the corporate Wiki that is beneficial and support their knowledge needs. For some knowledge workers, the corporate Wiki can be used as an alternative to email. Alternatively, some knowledge workers feel that email can be used effectively in conjunction with the corporate Wiki. This means that some knowledge workers make very little use of the corporate Wiki, preferring to continue with traditional methods of communication. Users will persist in

sending emails to alert colleagues of new information that is available on the corporate Wiki. This may be because these knowledge workers do not yet have confidence in their own ability to use the technology to support knowledge sharing or it is difficult to do away with the habit-forming tendency of using email. Thus the knowledge workers' perceptions of efficiency have an impact on the ways in which they use the corporate Wiki. "Preventing escape routes can be useful here - ensuring that there aren't alternative paper systems that the reluctant converts can't leak out to," advises case organisation F's Chief Technology Officer (see section 4.16). Case organisation C's corporate Wiki has a feature where users can be notified about new content via email on the corporate Wiki's watch list or through RSS feeds, "incorporating email notification of page changes really helps to pull people back into the Wiki," said case organisation C's R&D Project Manager (see section 4.13).

5.4.2 Sub-Activity Triangle Subject-Rules-Object

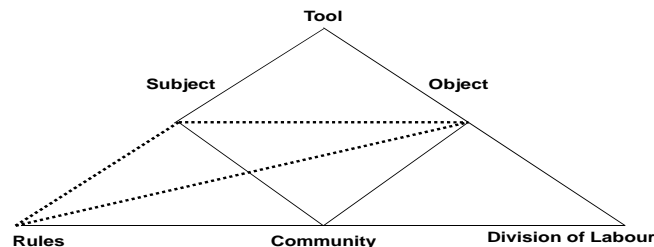


Figure 5.7 Sub-Activity Triangle Subject-Rules-Objects
Source: Adapted from Mwanza, 2000.

The second sub-activity triangle asks how the rule of creating, writing and editing corporate Wiki entries as knowledge sources while working affect the way knowledge workers share work knowledge in order to provide KM support.

Knowledge workers are seen to be restricted in their behaviour by social rules. Conflicts for knowledge workers existed between their previous KMS, between previous notions of what constitutes as knowledge work and the concepts of organisational knowledge to be acquired, between management's historical expectations that KM was the manager's

job and knowledge workers' need to independently co-create and manage knowledge themselves. The impact of historical context of prior technology was discussed in section 3.2.4.3.5. Case organisation C's R&D Project Manager comments on the problems they had with their previous KMS, "with no centrally maintained metadata store it is difficult to track (or even be aware) of data across the organisation (especially for new employees)" (see section 4.1.3).

The action of constructing the corporate Wiki does not necessarily diminish the level of confusion because although it brings resolution to some contradictions (see section 3.2.4.4.4), it also creates others. A knowledge worker in case organisation E admits that, "there is some limitation due to the (Confluence) software used." The contradiction between software limitation and case organisation E's goal of obtaining a more robust KMS leads them to take steps to research on MediaWiki to resolve that contradiction (see section 4.1.5).

According to the rules of the activity, it is important for knowledge workers to have easy access to knowledge resources on the corporate Wiki. There appears to be a contradiction between the tool and the rules of the activity. For example, in case organisation C, the corporate Wiki does not adequately fit in with the rule of being easily accessible if the knowledge worker is trying to access it outside the office environment. "The decision is taken to lock the Wiki down to just R&D and for viewing and editing", said case organisation C's R&D Project Manager (see section 4.1.3).

Other contradictions include: "It's not a magic wand; some functions are best left in their current homes", said case organisation F's knowledge worker (see section 4.1.6). "Editing long documents is problematic, for example - including external files and rich media can be painful with some Wiki platforms, others can have a very intimidating interface", acknowledges case organisation C's knowledge worker (see section 4.1.3). "Wiki mark-up is less than intuitive to non-technical people, so a platform without a rich text interface may be less appropriate in a non-technical environment", comments case organisation D's IS Manager (see section 4.1.4).

5.4.3 Sub-Activity Triangle Community-Rules-Object

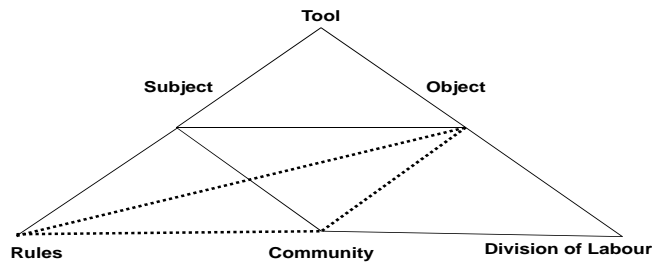


Figure 5.8 Sub-Activity Triangle Community-Rules-Object
Source: Adapted from Mwanza, 2000.

The fifth activity triangle questions how organisation's rules and cultural norms affect the way teams of knowledge workers share work knowledge so as to provide better KM support. This is especially so, when multinational corporations are involved. The work unit or organisation community's set of rules involves a shared terminology or jargon. Newcomers have to learn the jargon through reading e-mail and notes, conversing with peers, and inductively reason over examples of the terms found in informal communications and project documents.

There may be different expectations as to appropriate types of interactions among learners, instructors, and workplace supervisors related to different cultural backgrounds (Arya, Margaryan & Collis, 2003). The conventions for communications across stakeholder groups included gaps. Case organisations A and B are hierarchical, typical vertical organisations, whose divisions are mandated from the top down (see section 2.1.4.1.5). "Dissemination (of information) is almost always a one-way process with little user feedback or follow-up about how the material was used", said a knowledge worker from case organisation A. "We are very good at micro-managing", case organisation A's Department Head proudly said. "We follow an orderly "chain of command" when it comes to the flow of information", he adds (see section 4.1.1).

In contrast, the Wiki champions from case organisations C – F do not want to be hampered by large committees represented by different departments which will slow

down the decision-making process, making it “too elaborate, too slow, too expensive”, comments Case E’s Wiki champion (see section 4.1.5). It is for this reason that Case C’s Wiki champion said, “I didn’t engage IS or KM (departments)” (see section 4.1.3). Case D’s Wiki champion has a similar thought, “I aimed to trial it (the corporate Wiki) within my team”. This supports the argument that self-directed teams of knowledge workers will need advanced collaboration tools in the form of social technologies such as the corporate Wiki to fully implement a successful network-centric approach that promotes informal, network-centric interaction and activity between people, allowing and enhancing informal access to create and distribute knowledge which is part and parcel of knowledge work activities (see section 2.1.7).

Due to the ad hoc nature of project work and striving for openness to change/innovation culture, case organisations C – F’s division of labour are negotiated on an activity-by-activity basis, deploying project teams of knowledge workers to work on certain projects. Furthermore, the increased complexity of research and development projects for case organisations C, D and E; and for case organisation F whose business focus is to produce many products and services, people have specialised their knowledge according to a particular division of labour. Somehow the knowledge of different specialised people has to come together, and shared in order to establish the desired outcome. A knowledge worker from case organisation C points to this diversification as a strength. He notes that, “the growth of multi-disciplinary teams continues to add functions and responsibilities without disregarding older commitments” (see section 4.1.3).

The analysis shows that knowledge workers are not restricted in their behaviour by the division of labour, but rather by the social and work culture. In case organisation A and B, older and more senior staff often take on the responsibility of the intellectual property for an organisation and they are often hesitant to pick up and use new technology, hence the decision not to adopt the corporate Wiki. In case organisations C – F, knowledge workers are required to move around to other teams which are working on completely different projects. Different teams have different team work cultures. Getting *experts* from different teams is a way of sharing knowledge that presumably will lead to better project outcomes. However, this interrupts the team social and work

culture. There is also a lack of appreciation among authors of the needs of other user groups. Knowledge workers who recognise the contributions of each other, have worked together before and anticipate working together again are more likely to collaborate effectively using a corporate Wiki than those that have not. The competitive work culture also seems to discourage some unofficial experts from spending too much time helping others.

The analysis reveals the different and conflicting rules within and between the different groups of knowledge workers. Case organisations A - F are monitoring individuals and team performance through performance appraisals which creates a competitive work culture, especially so for case organisations C - F whose work involves project management. In this culture, workers are concentrating more on improving their own performance ratings which means completing as many projects as quickly and successfully as possible. However, in case organisations C – F, performance ratings are tied to the work on the corporate Wiki. This means that “new constituencies and new tasks are absorbed comparatively readily”, said case organisation D’s knowledge worker.

5.4.4 Sub-Activity Triangle Subject-Object-Division of Labour

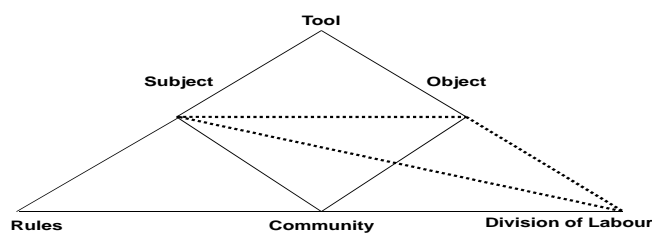


Figure 5.9 Sub-Activity Triangle Subject-Object-Division of Labour
Source: Adapted from Mwanza, 2000.

The third sub-activity triangle questions how incorporating individual knowledge workers in a project team or working with another project team affect the way the team(s) share work knowledge so as to provide better KM support.

The corporate Wiki is a social technology (see section 2.2) so it is important to consider the different ways that Wiki users use the corporate Wiki and the different motivations and investment that they were prepared to make. Some users are prepared to overcome challenges and adapt to using the corporate Wiki but others are not prepared to invest much time. Case organisations C – F manage to overcome this hurdle through education and training. For example, the use of Wiki evangelists, general meetings and posters to create awareness of the corporate Wiki and preach to the unconverted; and using Wiki administrators to mentor novices via online help or at workshops.

The Wiki transforms users into active participants receiving and creating ubiquitous knowledge by taking advantage of the collaborative efforts of all members of the organisation to create an effective library of knowledge (Hasan et al. 2007a). “The current KMS only allows editing to a handful of users in clearly defined roles, the Wiki is a significant departure from this position”, said case organisation D’s IS Project Manager. “Working on the Wiki fosters a collaborative spirit that was not there before”, says a scientist from case organisation D. Users can co-create knowledge collaboratively in groups or through individual efforts and to disseminate knowledge anywhere and anytime via the information commons (see section 2.1.11) which welcomes a collaborative and collegial atmosphere. A scientist from case organisation D is impressed with the Wiki’s networking and collaborative abilities. She can “interact with collaborators within the Research Areas as well as build a network of external collaborators in support of pre-clinical projects, and in clinical study teams” (see section 4.1.4).

The corporate Wiki is viewed as a social tool, one that can capture tacit knowledge from stories, conversations and knowledge sharing (see section 2.2). Case organisation D’s Wiki champion lauds the permanency of the Wiki repository, “I have a knowledge of what has been done even if staff leave or are replaced by others (living knowledge)” see section 4.1.4). “The Wiki is great as a lessons learnt and tips store so that when we solve a problem we record it in the Wiki so that in the future others can learn from this knowledge”, states case organisation E’s Wiki champion (see section 4.1.5). In a number of instances which occurs in case organisations C – F, knowledge workers who are prepared to invest effort in learning how to best use it for their own purpose, they

can benefit from this investment as they are using the corporate Wiki over a long period of time.

It is important to determine the zone of proximal development (ZPD) of novice knowledge workers and corporate Wiki users to help them learn how to carry out knowledge work activity and to use the corporate Wiki (see section 3.2.4.4.6). This can take the form of the help necessary to Wiki users if they are not familiar with knowledge work activity and/or the help necessary for Wiki users who do know how a corporate Wiki works. Novices can learn more with guidance or by working in groups than they can learn by working alone. The skills and experience of the users vary as a function of their history, experience and training. The Wiki users in case organisations C, D and E have technical skills and are computer savvy and using the corporate Wiki did not pose any technical concerns. However, case organisations A and B and for clients of case organisation F, the corporate Wiki is perceived as a new system and users need to be trained to learn to use the new system.

The transformation of goals is affected by the users' self-perceived identities and the role of participation within the system. Roles are a key concept in any group undertaking and the corporate Wiki can be used to reinforce those responsibilities. Knowledge workers and roles on the corporate Wiki can be defined by the User Profile/contact pages. More importantly, role behaviour can actually be applied in the corporate Wiki. Instead of using email, the corporate Wiki is used to establish and delegate tasks, roles, and responsibilities. For example, the corporate Wiki tries to replace other technologies such as email for case organisations C – F. Knowledge workers are encouraged to submit reports via the corporate Wiki instead of emailing them to colleagues. As information in emails is difficult to search, and knowledge tends to get lost, so the purpose is to store organisational knowledge in a central repository such as the corporate Wiki for easy accessibility.

However, knowledge workers are familiar with email and it has become a deeply ingrained work practice, and this makes it difficult to wean them from using email to using the corporate Wiki. Knowledge workers have established their own preferred

ways of working, sometimes the corporate Wiki matches these preferences and sometimes it does not.

Novice corporate Wiki users appear not to be aware of the roles associated with division of labour. They do not consider it their responsibility to maintain the knowledge repository such as repairing defects, adapting or extending to related problem characterisations. As they become more adept at using the corporate Wiki, their roles shift from the role of reader to editor. However, the possible roles they can play are still largely hidden.

When case organisation B adopts the corporate Wiki, it finds it difficult to get the project off the ground (see section 4.1.2). On the surface level, this seems to be a problem with the corporate Wiki, perhaps it is too difficult to learn, or users may find using the corporate Wiki uninteresting, or users do not get along with each other, etc.

Using Activity Theory, the failure can be traced to contradictions within the corporate Wiki activity system and other activity systems (see section 3.2.4.4.4). The contradiction appears between the motive of the corporate Wiki activity system for users' collaboration and the motives of the activity systems they are involved in. Though users find the corporate Wiki to be novel and interesting, their participation on the corporate Wiki is not part of their job description and not evaluated by their managers. The organisation's requirement that knowledge workers create, write and edit Wiki entries for the corporate Wiki is seen by some knowledge workers as an increased burden that takes away time and effort to work on projects so as to improve their personal performance ratings. This situation creates internal contradictions within the *Rules* (see section 5.1.4) as it is difficult to find a suitable compromise between working efficiently to improve personal work performance ratings and finding time to write and edit suitable Wiki entries for the corporate Wiki for case organisation B.

The fact that knowledge workers are not officially recognised for their involvement signifies that management finds it difficult and that it takes time to move away from the established order of the bureaucratic environment to one that embraces a culture that is open to innovation. This shows management's difficulty in shedding the familiar old

culture to new Wiki practices. Based on case organisation F's Chief Technology Officer's wide experience in implementing a number of corporate Wikis for client organisations, he has this to say about management. "Some management will *get it* and others won't," he said (see section 4.1.6).

A combination of time pressures and other activities in the everyday lives of knowledge workers and the lack of a shared motive constrain their ability to contribute to the knowledge repository impinging on corporate Wiki usage. However, these disruptions lessen over time. The Wiki champions who are project or IS/IT managers use their positions to help their organisations move away from the traditional hierarchical structure to acknowledge knowledge workers' work on the corporate Wiki. "I make it part of the core job of my development project team to use the Wiki", said case organisation E's Project Manager (see section 4.1.5).

The Wiki champions and evangelists in case organisations C - F are actively involved in encouraging knowledge workers use and contribute to the corporate Wiki by supporting the emergent link between regular work practices and use of the corporate Wiki. For example, the corporate Wiki is used as an integral part of the resources they can access to perform their professional duties such as searching for project reports. As time goes by, more and more knowledge workers form the habit of contributing to the corporate Wiki by storing noteworthy literature review articles and narrating tacit knowledge experiences to add to the encyclopaedic body of knowledge.

5.4.5 Sub-Activity Triangle Community-Tool-Object

The fourth activity triangle inquires about the perception of KM needs where case organisation A sees technology as solely a solution to fix their KM problems while ignoring the socio-technical process (see section 2.1.4.1.2) and the effect of leadership style (see section 2.1.4.1.5) has on knowledge sharing. It becomes clear in case organisation A that there is a contradiction (see section 3.2.4.4.4) between management's perception regarding knowledge workers' KM needs. Case organisation A's management is clearly concerned with providing a tool that facilitates knowledge workers' access to essential knowledge. However, many knowledge workers want to use a tool to produce, as well as access knowledge.

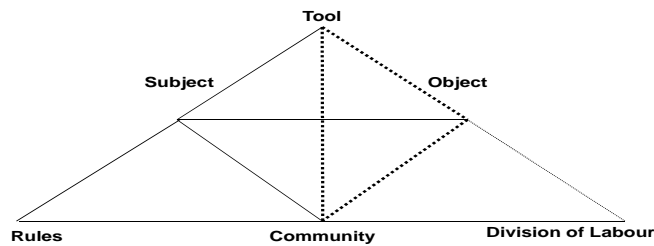


Figure 5.10 Sub-Activity Triangle Community-Tool-Object
Source: Adapted from Mwanza, 2000

The corporate Wiki is described as a social software (Swisher, 2004), implying that there are social factors that must undergo some changes before the Wiki will be accepted to improve the organisation's KM. "The two main issues are overcoming management's suspicion of anything that is not overtly centrally-controlled and overcoming people's reluctance to make their first few posts", comments case organisation F's Chief Technology Officer (see section 4.1.6). A knowledge worker from case organisation C agrees. "The apparent lack of control can be very unsettling, particularly if they are less-able in terms of their management capabilities", he said (see section 4.1.3).

Changes in the tools may affect the subject's behaviour toward an object and this in turn, will affect the community culture. The corporate Wiki does not capture changes in thought and/or ideas, but creates artefacts of those changes. Changes in community culture may facilitate the creation or reworking of a tool. For example, many knowledge workers regard a tool as anything necessary to do their job, or anything they can use to accomplish a task such as relying on their colleagues to correct gaps in their knowledge. "It is a natural transition to look up information on the Wiki, instead of asking their colleagues," said case organisation D's IS Project Manager. Since the corporate Wiki is able to codify tacit knowledge that individuals acquire through experience, it offers great value to the organisation (see section 4.1.4).

A contradiction occurs when case organisations A and B do not see a direct relationship between business results and its investments in formal organisational learning because

they do not equate knowledge transfer in the daily workplace (see section 2.1.8). There is too much focus on propositional or conceptual knowledge (knowledge that) and too little on procedural knowledge (knowledge how) (Collis & Margaryan, 2002).

In addition, case organisation A's leadership style is autocratic and knowledge workers need to be given little scope to express their opinions or participate in any aspect of the decision-making mechanism of the organisation. The reason for this is because they believe that the motives of knowledge workers will always conflict with that of the organisation, and as a result, by allowing knowledge workers to make contributions or express opinions will only lead to a dysfunction within the organisation (see section 4.1.1).

Furthermore, case organisation A is hierarchically organised with competition for promotion, such that the collaborative, knowledge sharing principles typified by the corporate Wiki are counter-cultural. Collaborative KM occurs when the organisation understands how knowledge sharing occurs in emergent and self-designed communities of practice to cultivate business relationships with collaborators as well as potential competitors (see section 4.1.1).

In case organisation B, leadership style is laissez-faire. When knowledge workers do not know what is expected of them and there are no incentives (see section 2.3.7.1.2) in place to reward work on the corporate Wiki, management is failing to take advantage of one of the most basic of management principles – to hold employees accountable for measurable results and reward outstanding performance. Although knowledge workers work best when left alone to manage their own areas of the business; case organisation B managers evade the duties of management and very little communication occur. This leads to a lack of staff focus and sense of direction in the corporate Wiki project, which in turn leads to much dissatisfaction (see section 4.1.2).

As pointed out in section 2.3.2.2, social networking has a role to improve the process of knowledge workers learning and engagement in the organisation. The corporate Wiki provides a social mechanism to keep employees connected to each other and foster a sense of community. As the corporate Wiki champion from case organisation E puts it,

“People do not use the Wiki because it is good for the organisation. They use it because I ask them to” (see section 4.1.5).

Effective knowledge sharing is built upon the bedrock of human relationships. Within such a community a shared understanding or collective mind is developed over time. By leveraging the collective resources available, a prompt response is forthcoming and the team works on problem resolution together. Regularly sharing ideas makes it easier for community members to show their weak spots and learn together in the public space of the Wiki community. As a result, they can spread the insight from that collaborative thinking across the whole organisation.

Case organisations C – F adopts a consultative style of management where knowledge workers take part in the decision-making process, but the managers will ultimately make the final decisions. This style is particularly suited to complex decision-making processes which require a range of specialist skills which is consistent to the type of work performed in organisations C – F which is mostly in Research and Development and in the ICT sectors.

Leadership styles do not fit into neat, ordered and recognised definitions. The leadership style adopted by managers may have components or overlap the three leadership styles. Leadership requires flexibility in recognition of the individual nature of people. Cases C – F’s managers understand that as their ranks of knowledge workers become filled with the technology-savvy younger generation, these younger workers may be reluctant to accept what they consider to be basic tools and an autocratic leadership style (see section 4.2.5.7). A good manager needs to have the ability to use the appropriate leadership style at the appropriate time (see section 4.2.2). For example, a directive style (is more appropriate for newer staff members who need supervision. In other situations, such as implementing Enterprise 2.0 technologies within the organisation and implementing new policies and staffing structures to support such technologies may require a consultative approach to management.

Government organisations which are traditionally autocratic are mellowing to "develop and pursue changes on a cooperative basis by using a consultative approach"

(Australian Public Service, 2008) as evidenced by Case E. It draws on the experience, knowledge and ideas of people in such activities as designing jobs and setting realistic work objectives. At the same time it recognises the final responsibility of management to make decisions and allocate resources in order to meet agency and portfolio priorities.

In addition, it is revealed that the corporate Wiki complements other tools because it is available online and can be used in conjunction with the desktop computer, personal digital assistants (PDA) and laptops at home and at work. This is seen to extend its capabilities. In all cases, the corporate Wiki is not seen as replacing paper documents but is used in addition to paper documents. Both are used to support similar functions. However, it is noted that some knowledge workers in case organisation C who rely more on the corporate Wiki, feel that paper documents conflict with the Wiki, rather than complement it. In addition, paper documents are portable and therefore always available at home and at work, unlike the corporate Wiki that can be only used in the work server enabled environment.

5.4.6 Sub-Activity Triangle Community-Division of Labour-Object

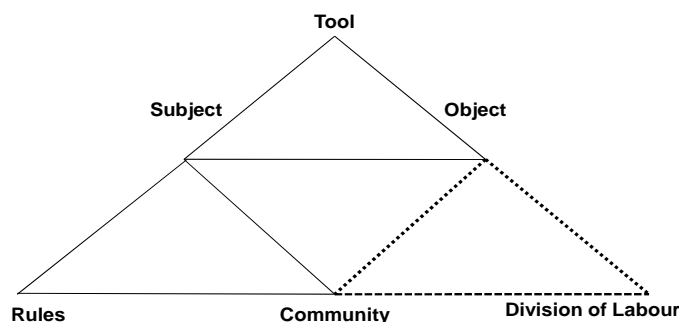


Figure 5.11 Sub-Activity Triangle Community-Division of Labour-Object
Source: Adapted from Mwanza, 2000

This sub-activity triangle asks how the roles of Wiki users affect the way knowledge workers share organisational knowledge. It also highlights the Wiki support structure which affects the way teams of knowledge workers share work knowledge so as to provide better KM support. In the corporate Wiki environment, the Wiki support

structure comprises of the Wiki community which is composed of the knowledge workers' peers and managers with whom they share their work, jointly creating and maintaining the knowledge instead of a few individual experts.

This sub-activity triangle examines if the object can be transformed in the desired way with the current division of labour. The corporate Wiki community does employ division of labour within the corporate Wiki activity system. Initially, knowledge-authoring responsibilities in this system are primarily the responsibility of corporate Wiki administrators. This is not considered self-sustaining in the long term as evidenced by case organisation B (see section 4.1.2).

The corporate Wiki administrators will initially author the majority of the new knowledge because they are familiar with the rules and guidelines to perform quality control on the structure, terminology, and clarity of the knowledge. Besides writing and editing corporate Wiki entries, corporate Wiki administrators have a different role to play such as mentoring so that new users can move from information gathering and reading, into editing and writing activities. Novice users initially start by being readers in the corporate Wiki community. Novice users can make the transition to writers when they contribute good quality articles that come from users' personal knowledge, which is related to fields that they feel comfortable and competent such as work projects or knowledge specialisations.

It is noted that knowledge workers who are technically savvy or younger workers who tend to be familiar with the use of search engines, can easily locate and read articles out of interest by typing keywords in the search box. One of the goals of participating in a corporate Wiki is information/knowledge gathering i.e. gathering specific knowledge that is work related. Based on case organisations C – F experiences, younger knowledge workers are more confident and keen to see their roles change from readers to Wiki administrators and their goals change to assume responsibility for the overall quality of the corporate Wiki as they begin to note mistakes or omissions, and correct them. Another important contribution from Wiki administrators is to organise the article structure and leave blank spaces. This is most effective in lowering the barriers of participation and allowing novice users to contribute their own knowledge to fill in a

perceived gap or mistake in the corporate Wiki content. Novice users need to feel that they have something to offer such as improving the quality of a particular article.

Activity Theory explains how when working with a tool human skill progresses from novice to expert, therefore the community needs to support these transitions. The sense of community in the corporate Wiki does not appear to be particularly strong with novice users. The corporate Wiki appears to be like a collection of articles with random people adding information here and there rather than a community of knowledge workers writing, editing, and sharing knowledge. Case organisation D's IT Project Manager recommends that this behaviour can be corrected by instilling a culture in his team to use the Wiki. "If they find an article or useful information, I will ask them "Have you put it on the Wiki?" (See section 4.1.4).

"Regular contributions let me learn of other rules and guidelines such as proper formatting and syntax", said a self proclaimed Wiki novice from case organisation E. Some users are coached by corporate Wiki administrators when they do not format their contributions according to convention. As novice users continue participating in peripheral activities, they not only become aware of the community but also are exposed to and learned the rules that guide the growth of the corporate Wiki.

5.5 Chapter Summary

Activity Theory is used as a theoretical framework to understand collective human thinking and knowledge work activities as embedded within an organisation and mediated by an artefact, the corporate Wiki. It defines the elements of collaborative knowledge work activities in a social-software supported KM environment. The Activity System model (Engeström, 1987) describes general knowledge flows at the individual level within or between the teams/groups/units of knowledge workers. In any Activity System the contradictions emerge between the subjects about the object, the division of labour, the alignment to the community rules, and the application of tools.

The distinctive attributes of a corporate Wiki indicate a set of five auxiliary activities that link to the core knowledge work activity. The activities include maintaining the technical Wiki, monitoring Wiki content, developing a democratic culture, recognising and understanding value participation; training, motivating and rewarding employees.

In keeping with Kuuti's (1996) recommendation for researchers to constantly re-focus the object of the activity so as to provide different views and advance the activity as much as possible, I have put this recommendation into practice in order to improve the research outcome. The Activity System model suggests Object-producing activity, Rule-producing activity, Subject-producing activity, Tool-producing activity, and Community-producing activity will affect the outcomes of the central activity. It is especially useful in explaining how a wide range factors work together to impact a socio-technical system, the corporate Wiki. An important discovery in this research is that a lack of incentives has contributed to a major source of failure in the adoption of corporate Wikis (see section 2.3.7.1.2) for case organisations A and B. It is proposed that a lack of incentives be included as an additional factor in the TAM that might explain a person's behavioural intention to use an information technology (see section 5.2.3.1).

Case organisations A and B present the emerging base of lessons that can inform both new and existing corporate Wiki projects, with regards to the nature of knowledge work activities and how the corporate Wiki supports knowledge work. They also have the potential to improve the design and implementation of corporate Wiki implementation. In case organisation A, the intention to develop a KMS fails because of its conception of what KM is. The Activity Theory analysis revealed the goals and motives those managers and knowledge workers have or the context in which the Wiki will exist. Case organisation A prefers a reactive, rather than proactive approach to technology innovation. For a successful implementation of a corporate Wiki, there needs to be a flatter organisational structure, one that allows exploration of different ideas and is very responsive to an environment that requires quick decision making. Because of case organisation A's inflexible bureaucratic nature, the organisation may not have the optimal structure to implement and sustain a corporate Wiki. Case organisation A's managers see no incentive to use the Wiki i.e. no perceptions of value or usefulness,

therefore there is no reason to adopt a corporate Wiki (see section 5.2.3.1). Adopting a Wiki will mean a loss of power and centralised IS control. In addition, case organisation A's managers have no interest in IT and see user involvement as more work and a waste of time to learn a new technology which they are not familiar with. In short, the corporate Wiki does not meet individual/organisational needs.

Case organisation B's corporate Wiki is designed as an experiment and hence its implementation is likely to be fraught with unforeseen difficulties and challenges with unintended and unexpected consequences. The informal network approach that is currently favoured in a corporate Wiki, imply loss of central management control of corporate knowledge and changes to organisational structure and culture for case organisation B's managers. The other managers (Project Manager's peers) in case organisation B, see no incentive to use the Wiki i.e. no perceptions of value or usefulness (see section 5.2.3.1). The other managers regard the corporate Wiki as the project of the Project Manager who will solely reap the benefits, in terms of kudos from top management, greater responsibilities and even possible promotion and a pay rise, should the corporate Wiki is successful. It can be concluded that the corporate Wiki did not meet individual/organisational needs in case organisation B. It is from case organisations C, D, E and F that most can be learnt about the benefits, limitations and challenges of the corporate Wiki as it is already in operation.

Chapter 6 Outcomes – Emerging Models

This chapter brings the findings of the research together as emerging models. It is not intended to be a complete and exhaustive presentation of all facets of corporate Wikis nor all the efforts involved in each of the individual cases, since it will be difficult for all these details to be captured adequately in one thesis. As we move towards the future and more technology becomes available, Enterprise 2.0 tools such as the Wiki may well supplant other KMS with their superior ability to capture tacit knowledge, best practices and work experiences and knowledge from knowledge workers and disseminate them easily to more users. These new technologies are significant because they can potentially enable an enterprise to facilitate knowledge work in ways that were simply not possible previously. This chapter illustrates the extent to which these issues have been encountered by this research and addresses their shortcomings through a variety of recommendations. It is only fitting that this thesis should end by considering some possible solutions to these problems. It is unwise to give general prescriptive solutions especially to organisational cultural problems. Not only will public sector organisations differ from the ones in the private sector but also each organisation will be unique. However, based on the analysis of the case studies done in Chapter Four, in addressing the problems some guidelines may be appropriate.

6.1 Recommendations

The case studies have provided a good understanding of the needs of knowledge workers to be addressed and capabilities to be developed. Empirical studies observed in case organisations A and B, noted how knowledge workers currently work and changes to the routines and behaviours that may be necessary for knowledge workers and their managers if they want to adopt and implement a corporate Wiki. Using Participative Action Research (PAR) to study case organisation B's implementation of the corporate Wiki provided a valuable source of research of who is (and is not) using the Wiki and what contributes to Wiki failure such as knowledge workers' issues pertaining to the Wiki and their work processes (see section 4.1.2). Studying the limitations of case

organisations C – F prior KMS, as well as the nature of knowledge each organisation requires and its organisational culture, leadership style and structure allows an accurate evaluation on the impact of existing corporate Wiki implementations. The following recommendations may assist organisations which are about to implement a corporate Wiki or make additional improvements to existing implementations.

6.2 Knowledge Work

Research findings indicate that the corporate Wiki consists of both explicit and tacit knowledge (see section 4.2.1). In the case of explicit organisational knowledge, this is expressed as autonomous work processes while individual tacit knowledge is expressed in terms of competencies, skills, expertise and the social construction of this capability.

Is the nature of knowledge different in different contexts, for example, across the different cases? It appears the nature of knowledge in corporate Wikis in the six case organisations remains unchanged (see Tables 4.9 and 4.10). Common to all the case organisations, is the need to capture and share tacit knowledge about the business domain, processes, and requirements; and in the case of project management, design of the product, the development process, and the project status. The corporate Wiki's ability to capture tacit knowledge reduces the probability of knowledge loss as a result of knowledge holders leaving the organisation. There are some natural applications for corporate Wikis such as collaborative work on projects, competitive intelligence, reports and many other things where knowledge workers are trying to go beyond just getting broad information and input on a specific topic.

Looking toward the future of knowledge work, as it becomes more centred in virtual relationships and spaces both within and across organisations; creating and maintaining knowledge and its social context will only become more vital. Enterprise 2.0 is about enabling people to better find information and working with it to produce knowledge. Instead of relying on electronic notes and email messages to communicate and with that comes the added burden of tracking and capturing information/knowledge, case organisations C – F adopt the corporate Wiki because it does not neglect the social

embeddedness of knowledge production in everyday work practices (see section 5.4.1). A corporate Wiki as a socio-technical system can provide minimal disruption to the knowledge worker's daily activities while giving them the functionality to impute a significant level of detail to create useful knowledge for sharing and collaborating as opposed to producing mere data or information (see section 5.4.4). It provides daily opportunities to create an environment where individuals and groups can jointly generate new ideas and get feedback on their own ideas from peers while working in complex learning situations in their own workplaces. The interactions can provide possibilities for individuals to articulate their own tacit knowledge and share it with others.

6.3 *Matching Organisational Culture with KM Technology*

The research findings demonstrate that cultural acceptance of a corporate Wiki will be influenced by the importance of KM within the organisation which reflects the culture of the organisation (see section 4.2.2). Organisational culture such as the shared values and beliefs, expressed as the formal and the unwritten rules and norms of behaviour have a direct impact on the take-up of the corporate Wiki (see section 5.4.3). Technology is only part of the network-centric equation (see section 2.1.7). It is usually the easier part to implement. The bigger challenge for organisations to adopt a network-centric model is to match the organisational culture with the KM technology especially in the case of corporate Wikis. The move to the network-centric model requires a change in policies, procedures, practices and culture. These changes cannot come from knowledge workers, line managers or even middle managers. They must be directed from the top.

The Wiki adoption and implementation outcomes are not successful for case organisations A and B because knowledge workers and their managers fail to recognise 'perceived usefulness' of the corporate Wiki. If there are no incentives to use the Wiki i.e. any perceptions of value or usefulness, then there is no reason to adopt Wikis.

We have seen that in case organisation A (see section 4.1.1) that the existing power structure in an organisation has the ability to permit or cripple the creation of knowledge and the functionality of the corporate Wiki (see sections 5.2.2.3 and 5.2.2.4). Organisational knowledge can be a source of power. Centres of organisational power influence what topics are discussed and organise communication flows. It is interesting to note that case organisation E manages to retain its public bureaucratic environment typical of a public sector organisation by becoming a soft bureaucracy (see section 4.1.5). By recognising the professionalism of knowledge workers, and by incorporating its most prominent members in its hierarchy, central management reinforces its own authority and legitimacy.

Open source KM is not compatible for organisations such as case organisation B which wants to allow public access to their corporate Wiki (see section 4.1.2). Case organisation B runs the risk of having vandals pose as legitimate users and misappropriate or vandalise their knowledge assets which are considered intellectual property and intellectual assets. The purpose of a corporate Wiki is to tap into the wisdom of crowds (see section 2.3.2.3) by giving a variety of users the opportunity to contribute and edit content. The difference with case organisations C – F is that their Wiki administrators only allow pre-approved visitors among their employees to edit content on their corporate Wikis.

Securing access to invited members of the public makes it contradictory to the corporate Wiki's open access policy. Case organisation B's corporate Wiki fails not only because of a discontinuity of management support but more so, because their invited members are not keen to become members, or willing to improve their conditions of work as well as their work practices so that they can encourage the engagement of a critical mass (see section 2.3.2.3). Different interests must be represented for the Enterprise 2.0 environment to work as an ecosystem (see section 2.3.6). When an organisation encourages knowledge workers to participate in the democratic process of creating and sharing knowledge, greater transparency of the organisation is achieved, and knowledge workers learn to trust that management is serious about genuine change.

Overcoming organisational cultural barriers is a matter of education and publicity as demonstrated by case organisations C - F. Corporate Wiki evangelists may act as publicists for any successes because credibility is earned by those who have experienced beneficial results first hand. Through training, newsletters, interest groups and personal visits to corporate Wiki users by Wiki evangelists, trust and co-operation may be built up.

6.4 Wiki Suitability

This section reports whether the corporate Wiki is suited to all types of organisations or pertinent to just learning organisations based on industry type, organisation size and structure; and location (see section 4.2.4).

6.4.1 Size of the Corporate Wiki Community

The research findings imply that it is not the industry type or the size of the organisation that affects corporate Wiki success but the size of the corporate Wiki community does matter, especially during the initial stages (see section 4.2.4). Size is a factor in participation, awareness of others, technology choice, rapport, commitment and participation.

When planning to implement corporate Wikis for distributed teams, and to deploy technology to support teams, size should be a consideration. According to case organisation C – F's successful Wiki adoption/implementation outcomes, it may be advisable for the organisation to create work spaces on the corporate Wiki i.e. multiple independently managed Wikis that can be connected as part of the one site. Von Krogh et al. (2000) argue that groups of people working together are more than just teams; they are micro-communities of knowledge. This is an important distinction, because "larger communities of knowledge can share certain practices, routines and languages, but for new tacit knowledge to emerge through socialisation, the group must be small." These teams are in a better position not only to create competitive position-enhancing knowledge, but also to communicate and integrate this knowledge back into their own

areas and across the organisation. As information and knowledge in a corporate Wiki are user maintained, entries are living, constantly changing and growing to reflect the most up-to-date and comprehensive information.

“Instead of introducing large corporate IS to solve its knowledge needs, smaller enterprises are more suited to individualistic, organic models and networking that would match its modest budgets and limited personnel”, advised case organisation F’s CTO who has much experience in designing and implementing corporate Wikis for his client companies. This study represents a cautionary tale as it highlights the adverse effects of large corporate Wiki community size. The lure of social networks may, in fact, undermine their effectiveness when team size is permitted to expand unchecked at least during the initial stages. A better solution will be to adopt the network-centric model that advocates smaller groups because they are generally more favourable to collective action than larger ones (see section 2.1.7). Sensible organisations seeking to organise collective action need to consider what the minimum number of participants will be necessary to provide a collective good and how many the total number of decision makers will influence the ability to reach consensus.

However, this does not mean that a corporate Wiki is not suitable for the entire organisation to use. Case organisations C, D and E trial the corporate Wiki on a project management team but this jumpstarted to other project teams and the corporate Wikis are merged to form a large corporate Wiki for the entire organisation.

6.4.2 Organisation Structure

The emerging models of the next generation KMS such as the corporate Wiki are taking the concept of KM further to encompass the roles of organisational culture and leadership styles (see section 4.2.2). As advances in IT continue to weaken the bonds of command and control leadership styles as experienced by case organisation C and E, this has resulted in a shift towards decentralised management and employee empowerment across all levels of the organisation.

For case organisations C - F which adopt a flat organisation structure and openness to change and innovation organisational culture, knowledge workers can easily become the

new power centres (see section 4.2.2). A corporate Wiki invites critique, present multiple points of view, and seek to change others' ideas (Wagner, 2006). Case organisations C - F value this type of exchange for the tool to be successful. With flattened, less rigid, less hierarchical companies, they need to hire managers who can act as coaches and have high expectations for knowledge workers to be flexible and have the attitudes and behaviours necessary for working in teams. The transformation of organisations inevitably requires the transformation of its leadership. It calls for a new leadership style and leaders with different skills than was previously required. Research findings imply that leaders who adopt a consultative leadership style are needed to marshal, filter, and aggregate contributions from interested participants.

Cooperation rarely succeeds in the absence of an effective leader. The corporate Wiki champion's sustained role as a leader in case organisations C – F proves essential to motivate knowledge workers to contribute and use the corporate Wiki as well as to guarantee that the Wiki will fit actual needs of work practices. A valuable lesson is learnt from case organisation B's experience (see section 4.1.2). If an organisation wants to get participants to participate in the corporate Wiki, the organisation cannot do it halfway. Case organisation B tries to control user generated content. It needs to give their consumers a free rein on the Wiki to spread their brand. A corporate Wiki cannot be sustained on the back of a sole leader. Sustained peer leadership is a critical condition for the bottom-up implementation of a corporate Wiki, until a sub-group of participants earns the legitimacy to design and implement a system of governance.

6.4.3 Location Matters

The prospect of technological advances with such potential impact as IT require guidelines and backing from the government in order to be effective (see section 4.2.4). The most pressing needs are for Government policies and funding to support IT research and development; and coordination and integration of the needs of the public and private sectors' continuing awareness of the state of the art in IT.

The success of technological leapfrogging in the UK are the result of the broad initiatives of the Government and the EU and also the take-up, implementation and investment of Government initiated projects and research and development by

universities, research institutes and public and private sector organisations (see section 4.2.4).

Technological advances and globalisation with its demand for quick responses requires that firms change their structure. The research findings reveal that technological advances and globalisation are pushing case organisations C, D, and F which are located in the U.K. toward vertical disintegration and specialisation, decentralised decision-making, and attaching a premium to acquiring and sustaining knowledge as a means of achieving competitive advantage. Australian case organisations A and B with the exception of case organisation E, perceive a loss of sovereignty for their managers and knowledge workers fear that they will lose control of their futures and positions in the organisation. Less hierarchical and less rule-bound organisation structures mean a major adjustment in how workers work such as a shift to a more team-based work environment which is more suitable for the adoption of a corporate Wiki as a KMS (see section 4.2.2).

The Australian Government is funding a cooperative research centre (CRC) program which was established in 1990 to enhance collaboration between business and researchers. However, the Australian Government has directly committed only \$2 billion to the program since its establishment and Commonwealth Scientific and Industrial Research Organisation (CSIRO) has committed \$1 billion. In addition, the Australian Government grants awards of between \$20 million and \$40 million to CRCs over a seven-year project period (DFAT, 2008). As part of the 2008-9 Budget, the Rudd Government has pledged \$11 billion to an Education Investment Fund (EIF). The key priorities of the EIF will be capital expenditure and renewal and refurbishment in universities and vocational institutions as well as in research facilities and major research institutions (ATO, 2008). However, at this point of writing with the economic crisis deepening, it is unclear if the Australian Government is able to deliver its promise.

The Australian Government will do well to emulate the British Government when it comes to sustaining a competitive, productive economy that requires an ever-growing proportion of highly skilled and qualified people. Britain compares well internationally on higher skills. It is not only just the number of graduates produced that counts, but also the type of skills they possess is also important. In particular, the British

government is committed to improving the supply of graduates with science, technology and engineering skills in response to the findings of the Roberts Review, to safeguard the UK's future research, development and innovation performance (HM Treasury, 2004). The Government recognises that innovation lies at the heart to improve the UK's productivity, and underpins manufacturing excellence. It relies crucially on a vibrant flow of skills and ideas from universities and research institutes. The Science Budget, delivered through the Office of Science and Technology, will increase to £2.9 billion by 2005-06. This includes an extra £400 million over this period to fund an expansion in research activities. The Government is also providing a substantial injection of £100 million a year by 2005-06 via the Science Budget to improve the flow of the most highly skilled people in science, technology and engineering into the economy (Roberts, 2001).

A report by Richard Lambert on business-university collaboration (Lambert, 2003) which commissioned by HM Treasury, the Department for Education and Skills and the Department for Trade and Industry have brought the challenges clearly into focus at the front of the UK's economic policy. To ensure that this investment pays off, and that universities can continue to deliver the research and skills which the economy demands, a series of recommendations were made. They include:

- a greater role for the Regional Development Agencies in facilitating knowledge transfer in their regions;
- a new funding stream for business-relevant research, along with increased and improved "third stream" funding for knowledge transfer;
- encouraging new forms of formal and informal networks between business people and academics, including the establishment of a business-led R&D employers' forum; and
- universities to provide more information on student employability, and businesses to take a greater role in influencing university courses and curricular.

There is recognition that British universities are a major national economic asset. The UK's university research base continues to perform strongly, and is now underpinning significant real increases since 1997 in public investment (ibid, 2003).

6.4.4 Reducing Wiki Rejection

The research study discovers that providing knowledge workers with knowledge at the point of need has implications for social, management, legal and technical concerns, with regard to the activities of knowledge workers and for the provision of the underlying Wiki technology. These recommendations are based on case organisations C – F’s experiences which are used to overcome Wiki rejection (see section 4.2.3).

6.4.5 Management Challenges

Section 5.2.2 focuses on management concerns such as preventing vandalism and unreliable information, limits to power sharing, maintaining centralised IS control; and the participatory problem of recruiting, training and educating subjects or potential subjects for the corporate Wiki. The recommendations for these management concerns are discussed below.

6.4.5.1 Preventing Vandalism and Misinformation

Corporate Wikis have rollback facilities and emails to alert Wiki administrators to new changes, to ensure information integrity. Case organisations E’s Technical Project Manager said, “Vandalism is a non-existent threat because it is a private Wiki, each employee needs to login to get on the Wiki.” Case organisation C’s Project Manager said, “Matters of responsibility and accountability are expected from each employee.” “Why do you hire people you do not trust?” questions case organisation F’s CTO. “If vandalism does occur and a Wiki article is vandalised, Wiki administrators can be requested to protect the article or locking a section of the article to prevent further edits,” continued case organisation F’s CTO.

In public Wikis where the threat of vandalism is higher, a number of automated bots created for use in Wikipedia helps with maintenance functions such as identifying and reverting vandalism and spam, to reduce the workload of Wikipedia’s administrators (Wikipedia, 2007). Wikipedia also has a watch list of pages which lists recent changes and new pages to alert the corporate Wiki community to what other users have contributed. The watch list can be an effective tool to maintain the integrity of the corporate Wiki pages (Bryant et al. 2005). Vandalism can be reverted, and controversial changes can be addressed.

Case organisation F's CTO said, "Wiki Administrators (Admins) can tell the difference between vandalism and unintentional errors and are able to correct the vast majority of errors within minutes." He was referring to PC Authority's experiment on Wikipedia. To test how quickly Wikipedia's administrators respond to errors or deliberate vandalism, two PC Authority's journalists introduced deliberate major and minor errors into ten entries, ranging from composer Edward Elgar to the GeForce 8 Series to West Ham Utd FC. The Admin corrected nine errors within twenty minutes, tracked the IP address which were the source of these errors and tagged the errors as 'identified as vandalism'. Only one error, the atomic number of Xenon took more than an hour to be rectified. However if the errors are not spotted within the first day the chances of them being corrected dwindle, because it is dependent on someone spotting the mistake while reading the article rather than reviewing the edits (Andrews, 2007).

Organisations need to educate their employees through corporate policies and user friendly guidelines, the need to be more conscious about the information they reveal through their personal profiles in online social networks. They also have to accurately maintain their profiles through periodical review and necessary modification of the profile contents to ensure appropriate disclosure of information (Hasib, 2008). Employees need to learn how to set appropriate defaults, since most of the users are not aware of the necessity for changing the default privacy preference (Rosenblum, 2007). For example, additional user-friendly guidelines offered by the organisation can help their employees change the privacy settings successfully.

6.4.5.2 Overcoming Limits to Power sharing

Case organisations C – F find it useful to organise itself into alliances of self-directed teams, invest in collaborative teamwork and develop an information and knowledge sharing culture underpinned by social technologies (see section 5.4.4). Can traditional hierarchies like case organisations A and B overcome limits to power sharing and copy the network-centric model (see section 2.1.7)? Adopting a network-centric approach may be problematic for firms such as case organisation A and B because of the unwillingness of those at the top to share their authority. The Activity Theory analysis presented in section 5.2.2, gives an indication that the corporate Wiki may challenge management authority. Furthermore, a lack of understanding of certain KM practices

and that these KM practices need to be adopted as a whole can hamper KM and technological innovation efforts. A major challenge is that micro-communities which are typically not stable or perpetual would mean the tacit knowledge gained and developed by them is lost (Allred, 2001, p. 162). This tacit knowledge need not be lost if it can be retained in the corporate Wiki. Significant cultural changes need to be made for KM and technological innovation to be accepted in hierarchical organisations. This can only be accomplished through education and research and development, starting with government-funded initiatives for greater collaboration between universities and enterprises (see section 6.4.3).

6.4.5.3 Maintaining Centralised IS Control

A corporate Wiki based on Microsoft SharePoint collaboration software, for instance, may be more appropriate for the traditional organisation that insists on retaining control (see section 2.3.4.4). Site administrators and IT managers can control exactly how Microsoft SharePoint is used to tailor workspaces to specific business processes by helping knowledge workers share knowledge assets across teams, departments, and organisations while maintaining IT control. Contributor settings can be set up for each user role defined in your SharePoint site, and control access to specific actions such as making changes to master pages and cascading style sheets.

6.4.5.4 Overcoming Participatory Problems

Since a corporate Wiki relies on social capital, a loss of attention and/or volunteer energy would be devastating to the Wiki. The recommendations below may rectify these problems.

6.4.5.4.1 Recognise Contributions

Knowledge workers in case organisation A cite that they have insufficient time to commit to the Wiki project. Knowledge workers who are at the hubs of information flow need to be recognised and given ownership of those contributions through acknowledgement and incentives. Wiki contributors can be rewarded financially and in

other ways such as larger budgets to experiment with emerging innovative technologies, greater responsibility and flexi-time so that they are motivated to contribute even more (see section 4.2.3).

6.4.5.4.2 Management Commitment

For self-synchronisation to take place management is required to provide a clear and consistent understanding of intent, appropriate rules of engagement and sufficient resources (see section 5.2.2). As well as supporting bottom-up adoption of the corporate Wiki, it is beneficial to have top-down support based on quality information, shared situational awareness, competent taskforce, and trust. Managers must learn to trust their staff to use the tools correctly, but forgiving if mistakes are made. Management should never ask people to contribute to something if it is not prepared to actually implement it.

6.4.5.4.3 Enrol Enthusiastic Individuals

To promote the corporate Wiki initiative, it is important to enrol individuals who are sympathetic to its aims and has an enthusiasm for innovative technologies (see section 5.4.6). Case organisation C's Project Manager suggested, "Rope in fresh university graduates or generation Y-ers because they play with Enterprise 2.0 technologies and are keen to use them in the workplace." The background of the individual can have a large influence on the acceptability of the corporate Wiki.

The research findings reveal that younger knowledge workers are more apt to take control of their learning and choose unconventional, technological methods used in their personal lives to learn and communicate better, rather than adopt the KM and communication style of their workplace. They also expect to be challenged and rewarded handsomely for their proficiencies.

6.4.5.4.4 Training

Getting corporate Wiki evangelists to conduct specific training in appropriate corporate Wiki use will be very beneficial to new corporate Wiki users, particularly regarding

corporate Wiki culture and social aspects of corporate Wiki use (see section 4.2.5.7). Knowledge workers can be trained by corporate Wiki evangelists/administrators who provide coaching and training in KM and Wiki use and the appropriate skills to implement KM practices to manage organisational knowledge throughout its life-cycle, thereby providing better access. As corporate Wiki evangelists work alongside their colleagues, they have the opportunity to provide effective training on a far more informal, ad hoc basis (see section 5.4.4).

6.4.6 Social Challenges

The process of doing knowledge work has produced a number of social concerns. They include achieving a critical mass of users, ease of use, perceived usefulness, lack of incentives, lack of time; low work morale, distrust and lack of democratic culture (see section 5.2.3).

6.4.6.1 Achieving Critical Mass

An active community of contributors helps the Wiki to achieve critical mass by helping to create conditions for more widespread contributions. Without this critical mass, the Wiki may fall into disuse as experienced by case organisation B (see section 4.1.2). The critical mass that produces the collective good of organisational knowledge suffers daunting start-up challenges, but if initial contributions can be obtained, optimisation and sustainability can be achieved due to increasing marginal rates of return (Prasarnphanich & Wagner, 2008). The factors below are based on case organisations C – F experiences to successfully achieve critical mass (see section 2.3.2.3) when trying to develop a corporate Wiki community.

6.4.6.2 Launch the Corporate Wiki Quickly

It is important to launch the corporate Wiki as quickly as possible and make frequent updates, which gives the organisation the double advantage of lower development costs and market research feedback from day one. Case organisations C – F which have successful corporate Wiki implementations recognise the importance of not doing everything from scratch. Seeding the Wiki suggests that the need for substantial initial Wiki content. A lot of the material in the corporate Wiki knowledge repository comes

from their existing/prior KMS, intranet or website. Organisations need to think small to keep a sense of proportion when it comes to any initial corporate Wiki implementation. Case organisations C – F experimented with Wikis for small project teams before embarking on larger Wikis for the entire department.

6.4.6.3 Provide Peer Leadership

To extract long-term benefits from shared resources, the organisation needs to identify or help create this critical mass. Depending on the size of the corporate Wiki, it may be useful to have a full time team from one to four members to maintain the corporate Wiki and provide peer leadership until a critical mass can be reached. Making work on the Wiki part of the job description encourages active contributors. For instance, a Project Manager may tell his/her project members that they are expected to spend one hour each week writing up notes on their project work on the Wiki. Behind the successful instance of corporate Wikis encountered in this research are a few highly interested and highly resourceful people that contribute to a common resource. These people provide the social capital and technical expertise that other participants build on.

6.4.6.4 Achieve Meaning

KM must be practical or no one will see the value in it or the need to implement it. The initial focus is on something practical so that it can be successful. Project documents such as project proposals, work schedules, budgets, etc will provide both a source of content and contributors to have a stake in the Wiki. During the initial stages, the corporate Wiki has a better hope of success if it receives a low corporate profile at the senior-management table. Successful initiatives create positive perceptions of the corporate Wiki. The corporate Wiki must achieve meaning for the user base quickly.

Once the network (corporate Wiki community) increases in size, its value equals approximately the square of the number of users of the system. Given that each new user of the corporate Wiki community brings the ability to interact with other users, the value of a corporate Wiki community has the potential to increase exponentially with each user (see Metcalfe's Law section 2.3.2.3).

How quickly the corporate Wiki achieves critical mass depends on how attractive it is to new users to get access to the Wiki (for instance, ease of use, perceived usefulness and incentives (see section 5.2.3.1). The success of garnering support from the collective efficiency will depend on how easy or difficult it is to contribute to the corporate Wiki. Wiki technology has three features that contribute immensely to mass contribution efforts. They are:

- A simple markup scheme which is plain text and requires no programming.
- Instant publication that enables a contributor to see his/her work published immediately. As a result, it gives a contributor and not a free-rider, instant personal satisfaction and reward.
- Version history which has the ability to roll back to earlier versions.

Participation can be further promoted by maintaining a strong community portal. Case organisation D's Project Manager suggests, "Give users something to do so that they will contribute to something worthwhile." Putting up a list of administrative things that needs to be accomplished encourages new participants to adopt one of the tasks as their own, where some contributors focus more on content creation, while others focus on content integration (Majchrzak et al. 2006). Participants may be encouraged to contribute in small chunks, by implementing the "1-minute" model. It will take no more than one minute to write down an idea, suggestion or information and add it to the Wiki.

Constant and creditable advertising to individuals and constituencies in the organisation on how the corporate Wiki will benefit the individual and the group are encouraged. If the propaganda manoeuvre proves impossible, then an effort must be made to demonstrate that the corporate Wiki will not actively oppose the perceived interests of that individual or constituency. Failure to quickly attract a critical mass of Wiki users may doom an otherwise high-quality offering.

6.4.6.5 Adoption of Incremental Principle

The adoption of an incremental principle points out to the non-existence of pages, which tempts users to create new pages of content. A way to get knowledge workers to start using the Wiki is to begin with a task that is part of the workload e.g. produce the

annual report or submitting ideas for a group project. As employees grow more confident, the corporate Wiki can harvest contributions about declarative (know-what) e.g. best practices, business procedures and rules, procedural (know-how) e.g. stories, conversations and other context-rich knowledge, and conceptual (know-why) e.g. principles and laws (Agarwal et al. 1997). If this is made easier using the corporate Wiki than in previous years without it, employees may take on board the benefits and readily move to other tasks.

Another way to motivate and gradually ease knowledge workers into using the corporate Wiki to overcome the free-rider problem and low participatory rates, is to encourage novice users to contribute to editing entries, even if that amounts to correcting spelling errors. For example, case organisation D's Project Manager says, "I purposely enter incorrect contact details such as telephone numbers or email addresses to get Wiki members to correct their own contact details. Once they see how easy it is to edit on the Wiki, it changes their perception on how easy it is to use it." Even if the majority of contributions are small, removing unnecessary or low quality content can be an effective way of improving quality and contribute to the collective good.

6.4.6.6 Introduce New Features

For organisations that want to take on a more comprehensive Enterprise 2.0 approach, it is proposed that Enterprise 2.0 technologies such as RSS feeds, mashups, blogs, social networking sites, social bookmarks, podcasts and YouTube are added to the Wiki base; so that greater structure, functionality and social networking are supplemented to the core.

Stickiness is anything in the corporate Wiki that encourages users to stay longer. A corporate Wiki is said to be sticky if a visitor tends to stay for a long time and returns frequently. It can achieve stickiness by having a great deal of content, and also by finding ways to involve the user with the site. Some approaches include: providing content that the user really wants and using numerous hypertext links to other parts of the corporate Wiki and the Web. New features e.g. new Wiki articles, message boards, news, classifieds, sports, entertainment, online publications and blogs via RSS feeds (see section 2.3.3.6), are some of the social perks that must be constantly added to

provide new and fresh reasons for members of the Wiki community to engage knowledge workers and increase participation and adoption outcomes. Stickiness can be encouraged by allowing the user to personalise the site such as those found in Yahoo, Excite, and MSN Network e.g. Web and desktop personalisation such as Windows Live and Windows Live Gallery of desktop gadgets, inviting user feedback in response to columnists e.g. ZDNet, and adding games to the site. There are many business benefits from increased interaction. Users can create a personalised environment that is stickier and more relevant. This allows the organisation to capture behavioural data on users, and to segment them in order to better target advertising, offers, content and so on.

Organisations need to recognise the importance of information repetition in multiple venues to increase credibility. For example, RSS allows users to define their own information 'feeds' from data stored in corporate applications. Efficient use of RSS will essentially redefine how information is located and consumed in the enterprise. Another interesting development is the application mashup. Mashups provide rich user interfaces that address the need for worker productivity by making it easier to find and use the information that a worker needs for a particular task or role (Nass & Levitt, 2007). For example, Wikirage is a mashup that lists the pages in Wikipedia which are receiving the most edits per unique editor over various periods of time. Popular people in the news, the latest fads, and the latest and most popular video games can be quickly identified by monitoring this social phenomenon.

The merger of casual games and social networking is predicted to be the next big thing, so an acquisition of Take-Two, the creator of X-box games such as Bioshock and Grand Theft Auto, will provide the games to help News Corp. consolidate its premier position in social networking via MySpace and IGN Entertainment. Incorporating Enterprise 2.0 applications such as RSS for news feeds and stock quotes, and MySpace to build online communities will make it more appealing for users. Murdoch's purchase of Dow Jones will turn this into a reality. The idea is to move away from a community of visitors to a community of participants that will make up the critical mainstream users.

To reap the benefits of Enterprise 2.0 technologies and minimise the risks, the organisation can choose to adopt video sharing websites e.g. YouTube, podcasts, blogs

and corporate Wikis, arranged according to technologies that provide a high level of content control. Video sharing websites permit producers of video content to post their video often with a commentary. Viewers cannot edit content directly but they review the commentaries. Podcast developers can exercise complete control over content. Transmitting an entire lecture or training session is likely to have little impact. Instead, a short, particularly difficult segment may be selected to be transmitted that will more likely result in use by knowledge workers. Podcasters can also choose whether to accept listener feedback and what comments to include in future podcasts.

If blogs can be described as personal knowledge repositories, learning journals or networking instruments (Efimova, 2004), then blogs may address the personal needs of a knowledge worker, but also create an opportunity for others to benefit from having emergent ideas and personal notes captured in public spaces instead of private collections. Blogs are purposeful in building brand awareness and establishing the organisation or entrepreneur as an expert in a field to better highlight the company's expertise. It can also be used to alert the general public about company news and information and to use it as an internal vehicle for updating employees. Given bloggers' propensity for linking, not to mention the ability to search links, this is useful in helping knowledge workers research further sources. Knowledge workers can search the blogosphere for political commentary, current cultural items, public developments in science, business news, and in their professional fields. Bloggers control what content is posted to their blogs. However, it is standard practice for them to invite commentary from readers. Bloggers often reserve the right to moderate comments and sometimes decide not to accept them. However, closing comments defeats the primary purpose of a blog, which is to encourage conversation and debate.

Companies can move away from providing a static, one-size-fits-all customer experience. Ask any customer who is not fed up with generic answers or long telephone hold times when calling a customer service number and navigating a maze of numbers or non-responding email addresses. Or worse still get transferred to a Bangalore-based call centre with equally foreign accents and the inability to understand local conditions. Customers are reduced to a state of powerless frustration when they have to communicate with an uncommunicative company. Customers have to put up with rude

and aggressive customer service officers who will not give their names to the customers to avoid complaints and are not reticent about terminating the telephone call if the customer persists. In the same vein, customers are afraid to hang up for fear that they have to go through the entire rigmarole of waiting in the call queue just to speak to a customer service officer. The average call queue is 25 to 30 customers and the wait time is 45 minutes (Galvin, 2008). All of which does not give customers much confidence in the current situation with the customer service provided by many companies. MyCyberTwin which is a social networking tool has the capability to let human clones of company representatives to hold life-life conversations to engage their customers. It can serve as a real-time personal assistant for online businesses (Holmes, 2007).

Intuitive Social Networking Sites have also been developed to allow the broad mapping of relationships throughout organisations and between any organisations that agree to pool their networks. An enterprise known as Aptima is developing a new generation of social-networking software that will allow users to build impressive webs of connections and also conduct organisational network analysis to provide different insights to users. Aptima, for example, monitors a network's online communications, such as e-mail and instant messaging, to trace the digital footprints of who communicates with whom. Its keyword analysis determines what kind of problems and expertise that being discussed. Aptima will be able to suggest instantly who the best person is on the network to consult when a specific problem comes up. Aptima's software takes into account the human and social factors that come with the work environment. For example, the software searches for a person who is knowledgeable, a good collaborator, has the time to collaborate, and compatible work style.

eTelemetry is another enterprise that offers a \$35,000 self-contained box that can be attached to a corporate network to trace an organisation's electronic communications and map out a network analysis chart that shows which individuals in the organisation serve as the hubs or linchpins between different groups. It has the limited ability to recognise employee's areas of interest via their Web-surfing habits. It is hoped that organisations will use the information to see who the thought leaders are in an organisation and bridge gaps between departments (Freedman, 2007).

Other Enterprise 2.0 applications to implement are social bookmarking services such as Del.icio.us and Digg. These applications are excellent for organisations who want to build traffic and improve their link-popularity. This is useful for increasing the number of visitors to articles and blogs, and also for link-popularity for the public Wiki and blog. It gives the organisation real-time feedback on what people actually like and do not like about what your organisation are writing about. Social bookmarking can aid knowledge discovery. For example, a Human Resource Department can use an employee's social bookmarking profile to understand his/her interests and use this knowledge to place the employee into their next assignment. Or a manager can read an executive level summary of the types of links knowledge workers are viewing. Social bookmarks also encourage users to return because resource collections are constantly evolving.

For more conservative organisations that insist on command and control strategies which may not be prepared to adopt the corporate Wiki or a social networking site or a social bookmarking site, but want to enhance collaboration and productivity, it is recommended that some of the philosophies that have made those sites so popular in the consumer realm can be applied to Intranet portals. Learning from Enterprise 2.0's success, conservative organisations need to realise that there a move away from connecting computers together to connecting people together. It is not just providing compelling content but providing compelling experience and part of the experience may be something that extends beyond traditional hierarchies. Another good option is MS SharePoint. It is a reliable method is to develop internet and intranet sites incorporating social technologies that provide a measure of control over content and dialogue. It provides important tools that help knowledge workers perform their jobs more efficiently such as, email, calendaring, discussions, up to date documents and discussion threads, document sharing and management, people profiles, search, security, tagging, version history, and workflows.

6.4.6.7 Introduce Incentives

Corporate Wiki participation, even when very valuable, can easily be surpassed by more pressing tasks, especially for corporate Wiki administrators. The result is often that the corporate Wiki administrator has to fit sharing, peer interaction, and reflection, into his

own time outside of the workplace. Case organisations C – F reinforce the notion that the reputations and their attractiveness as knowledge workers are enhanced by participation in Wiki projects (see section 5.2.2.5). Such reasons hold promise of marketing job skills and knowledge to employers; and increasing social recognition and prestige, just as people are rewarded for voluntary services on a professional association board.

Many different strategies may be attempted, but short of building support for the corporate Wiki into their job descriptions to compensate for the time spent working on the Wiki, the effort to effectively involve corporate Wiki administrators is an uphill battle. KM practitioners recommend the need to create a reward system to share knowledge, instead of focusing on individualistic goals and self-promotion (Paul, 2003; Davenport & Prusak, 1998). The time and energy knowledge workers invest in the corporate Wiki community need to be counted toward their performance appraisals (see sections 4.2.3 and 5.2.3.1).

6.4.6.8 Balancing Governance with Trust to Improve Work Morale

Instead of worrying about winning the corporate KM war, the organisation needs to work with individuals and constituencies to help facilitate KM and improve work morale in the organisation. To a degree, governance in a network-centric environment can no longer be about strict control, policy must be created and enforced based on peer-to-peer cooperation and trust rather than hierarchical control. Wiki administrators need to use mechanisms based on influence and persuasion rather than direct authority.

Many self-organising communities engage in self-policing, self-organising and self-managed mutual monitoring. Informal mechanisms can be utilised effectively because the environment is collectively owned; and this helps knowledge workers take responsibility for how it is used. Examples include, promoting responsible corporate Wiki members to administrators where they can exercise higher levels of decision-making, promote reputation by naming good articles and authors, and the withdrawal of certain access or use rights. Authentication is becoming increasingly necessary due to the risk of overwriting, not by hostile individuals, but by spam bots (programs that

extract email addresses from Web pages for the purposes of spam) using the Wiki space to link to a set of sites in the hope of earning an improved search engine page ranking.

6.4.6.9 Tasks for the Corporate Wiki Pioneers

The first pioneers of the corporate Wiki will have to generate enough utility for it to take off as a more commons-oriented production model. Without the corporate Wiki community, it is unlikely that a corporate Wiki will succeed as seen in case organisation B. Knowledge creation projects must indicate what specialised roles each knowledge worker will have to play. From the onset, the organisation needs to appoint a core group of knowledge workers who are good writers and experts in their specialised fields who can come to a consensus on what the encyclopaedia should look like and seed the corporate Wiki.

The early elite users of Wikipedia built up enough content, procedures, and guidelines to make Wikipedia into a useful tool that promoted and rewarded participation by new users (Kittur et al. 2007). Initial corporate Wiki implementation for successful organisations, as studied in this research, is believed to be largely ad hoc and grass-roots oriented, concentrating on the publishing of policies and procedures. Policies, procedures and structures which are implemented and updated on a regular basis are needed to support a large influx of users.

When starting a corporate Wiki, it is important to focus on structure rather than content. A corporate Wiki can be achieved in an incremental manner, with software and protocols developed among a relatively small group of participants, and gradually adopted by larger online community systems as the organisations see fit. An excellent structure acts as a framework for the content, even if it is incomplete. Incomplete content is good because corporate Wiki contributors like to fill in the blanks, and an incomplete but well designed structure attracts people to create the content. Corporate Wiki pioneers need to visit the corporate Wiki very regularly, preferably daily. The corporate Wiki community will take their cue from the corporate Wiki pioneers. If the pioneers participate daily, then they are far more likely to follow suit. If the pioneers are invisible, then the corporate Wiki community will disappear as well.

6.4.6.10 Democratise Knowledge

Case organisations C – F try to cultivate a democratic culture of knowledge sharing by reinforcing the notion that every employee has a stake in the growth of the organisation. It is the community of knowledge workers that jointly creates and maintains organisational knowledge where successive contributions to the collective good yield progressively larger payoffs (Prasarnphanich & Wagner, 2008). The program/service delivery and democratic creation and access to organisational knowledge are fuelled by user-driven content that provides meaningful content to improve the users' job performances, can develop loyalty and usage amongst the corporate Wiki community. "The diversity of voices is a radical change. It offers employees a sense of what others find interesting or debate-worthy", says the IS Project Manager from case organisation D.

6.4.7 Legal Challenges

Section 5.2.3 highlights the prevailing legal concerns which include copyright, defamation, publicity, and trademark issues. The recommendations are listed below.

6.4.7.1 Protecting Copyright

Using open content licensing such Creative Commons licences or GNU Free Documentation Licence (GFDL) for corporate Wiki content is an important part of the equation to assist in protecting the organisation against intellectual property infringements. The Free Software Foundation has developed GFDL Version 3 (FSF, 2007) to enable corporate Wiki content to be automatically licensed. This means that the corporate Wiki receives a licence from the original licensors, to run, modify and propagate that work, subject to the licence. It remedies the shortfall in the current GFDL which states that a full licence must be attached to every reproduction. On a cautionary note regarding Creative Commons licensed content, all of the licenses contain a disclaimer of warranties, so there is no assurance whatsoever that the licensor has all the necessary rights to permit reuse of the licensed work. The disclaimer means that the licensor is not guaranteeing that he/she owns the copyright to it, or that he/she has received permission for the use of third-party content. The onus falls on the user to

obtain the necessary rights of to use or re-use the corporate Wiki contents and makes the user liable for copyright infringement.

To prevent an authorship dispute and encourage responsible authorship, individual contributions can be tracked as each user will log in to create or edit entries. Adopting Citizenpedium's argument to identify individual contributors in the corporate Wiki will help to avoid similar scenarios such as Wikipedia's Siegenthaler debacle. Knowing identities is necessary for a democratic polity. If a corporate Wiki wants to democratise organisational knowledge, then anonymity is an impediment to democracy. Anonymity makes it possible for people to create a new account and thus create a new identity. This is not democratic because multiple identities allow people to vote multiple times and to amplify single voices into multiple ones, which is inherently unfair.

The adoption of open content licenses is a reliable method to protect the organisation's intellectual property that exists on these websites and control distribution and use. These licenses provide a way for authors to declare their works 'some rights reserved', instead of 'all rights'. If the source of quotations has a Creative Commons' license or public domain dedication, this translates to extra rights to use the content. The attribution licence for example, enables others to reproduce, copy, distribute and display their work provided they are credited as the author. Share-alike allows others to make derivative works as long as they use the same licence for their re-mix (EFF, 2007). For organisations who want to make their corporate Wikis public, they can post links on discussion forums and blogs which are related to the corporate Wiki's subject matter to generate traffic and avoid being labelled as a spammer.

Writer comments on a blog are for the purpose of public display, so the user giving an implied license at least for that display and the incidental copying that goes along with it. By applying a Creative Commons licence to the blog's comment post page and a statement that by posting comments, writers agree to license them under it.

The organisation can apply a Creative Commons license to its podcast if it is the creator of all of the materials included in the podcast, or if it has the permission of the creator or copyright owner of materials included in your podcast to license their materials under a

Creative Commons license. A Creative Commons license can apply to some elements of the podcast (e.g. interviews and general conversation) but not others (e.g. third party music to which the organisation may only have a limited license). In that case, it is important that the organisation clearly identify which components of its podcast are under a Creative Commons license and which parts are not (Creative Commons, 2007).

6.4.7.2 Preventing Publicity/Privacy Issues

Knowledge workers need to understand the potential value of organisational knowledge which reflects KM principles in the way they create, use and otherwise manage organisational knowledge ethically and with professionalism. Corporate Wiki administrators need to educate users to be more careful that the contents of the corporate Wiki focus on work and not about private facts. Private facts are personal details about someone that have not been disclosed to the public. For example, a person's sexual orientation, a sex-change operation, and a private romantic encounter can be deemed as private facts. Once publicly disclosed by that person, however, they move into the public domain. It is advised that the following topics needs to be avoided. They include: sex, race/ethnic bias, religion, politics, and too much patriotism. Too much patriotism can exist at the expense of someone else's nationality.

Organisations have to be aware that because of the global nature of the Internet, potential and existing customers can come to their public Social Networking Sites (SNS) or blog from any country. The writer needs to deliberate carefully before writing an entry or post. Questions such as whether the topic will compromise the organisation's position in the market, or compromise the writer's position as a representative of the company, or will the sharing of business strategies and insights reduce competitiveness if another employee or competitor learns about it? Microsoft has posted a 'common sense policy' listing guidelines for its employee such as, "If you doubt the appropriateness of a blog entry, publish it to an internal blog first, ask a peer what they think, and then read it the next day before posting externally" (Kuchinskias, 2007).

A privacy policy helps to understand the terms of using the corporate Wiki and that by accessing and using the Wiki, users consent to these terms which include:

- use of visitor identification ‘cookies’,
- collection of personal and non-personal information,
- purposes for which personal information is collected,
- information storage and processing, and
- security, review and accuracy of personal information.

Since the corporate Wiki has a huge amount of information in its repository, it is physically impossible to keep track of every single piece of information. It helps to remind corporate Wiki users with a warning on the edit page of the corporate Wiki, placed strategically at the top of the page that clicking on *Save Changes* means that content will be published instantly.

Given that an organisation is responsible for their employees’ actions in the capacity of their employment; it is in the organisation’s best interest to adopt clear policies and procedures with regards to the use of Enterprise 2.0 technologies. For example, the organisation should produce a clear Terms of Use and Acceptable Rules statement that lists appropriate and inappropriate behaviour on these websites and get employees to provide a signature of acceptance and a copy kept in their personnel files.

Writing Wiki entries or blog posts should be treated as any other writing communication that is done for the organisation for public consumption. Even for public wikis or blogs, the writer needs to log in and identify his/her user name. This may be the writer’s real name or he/she may choose to publish under a pseudonym. Publishing is permitted even if the writer is not logged in, because he/she can be identified by his/her network IP address. For example, in vandalism cases of a Wiki, the offender’s IP address will be stored on the Wiki servers and can be seen by Wiki administrators and by users who have been granted "Check User" access. For corporate Wiki users, it is very easy for their employer to identify their IP address and find all of their IP based project contributions.

6.4.7.3 Protecting Against Defamation

Since corporate Wikis rely on user-generated content, this means that an organisation could end up being liable for defamatory remarks made by an employee. The

organisation can exercise reasonable care where corporate Wiki administrators can monitor the corporate Wiki for appropriateness of content, and implement editing and take-down procedures if anyone does cross the line. Innocent dissemination can be used as a defence against a defamation suit. The common law defence protects innocent publishers of the defamation provided they do not know that the material contained defamatory matter; they have no grounds to suppose that it is likely to contain defamatory matter; and their lack of knowledge is not due to their own negligence (Lawlink, 1995).

6.4.7.4 Trade Mark Issues

Names and trademarks are important items of intellectual property and as such users must obtain prior written permission from trademark owners. Once permission is given, the trademark TM symbol can be directly inserted into the Wiki content via the Wiki Markup Editor, custom Wiki software such as Confluence understands the importance of placing trademarks and has an additional feature such as {tm} macro to allow greater functionality⁵⁰.

6.4.7.5 Usage Policy

When an organisation sets up a corporate Wiki, it is good practice to declare a usage policy of all postings to the corporate Wiki, proper warnings and user guides since many users may not be aware of the legal responsibility they have as contributors of corporate Wiki content. It is arguable that this usage policy is similar to that for a company website so as to prevent intellectual property disputes.

An organisation may seek to limit its liability for the actions of third parties by including its own terms of use, codes of conduct or indemnity clauses on its webspaces. Offenders must be disciplined according to the organisation's code of conduct. The monitoring of these websites must come under the purview of the web content manager and his/her team. Organisations need to be aware that having a disclaimer on their websites to deny responsibility for infringement of copyright infringement, defamation, etc, will not provide indemnity from legal liability. However, having a disclaimer on

⁵⁰ <http://www.adaptavist.com/display/AtlassianConfluence/tm+macro>

their website is worthwhile because the organisation's conduct in any given situation will be taken into consideration. The disclaimer may also have the effect of breaking the chain of causation between the organisation's conduct and the loss suffered by the party alleging the organisation's misconduct (ArtsLaw, 2007).

To protect intellectual property, it is a common practice for an organisation to require its employees to sign a confidentiality agreement to stop them from revealing the organisation's secret or proprietary knowledge during and after their employment or association with your business (IP Australia, 2008a). These agreements can come in the form of non-disclosure agreements and non-compete agreements (see section 2.3.5.4.1). Clauses in the confidentiality agreement pertaining to the secret or proprietary knowledge engaged in Enterprise 2.0 technologies will serve as an added protection. If an agreement is breached, employers will have evidence of what was agreed and protection through the law.

Other procedures include a notice and take down procedure so that there is a swift removal of inappropriate material and a disclaimer including a statement that users are solely responsible for their content so that it can mitigate the risks of employees unlawfully interfering with the rights of others when operating in online environments. The use of software analysis tools to vet potentially illegal content, and clear guidelines are also displayed on any Business-to-Consumer (B2C) sites so that users know what they can and cannot upload. The organisation may choose to disable the comments functionality of social networking sites or YouTube. Although these sites do not directly permit comments to be disabled, this can be done by manually removing the comments HTML from the page. However, this is detrimental to these websites' ability for organisations to obtain feedback from customers. Another option is for customers to email their comments and their comments vetted before they are published.

Sometimes, the openness can give way to pragmatism. It is significant to note that the corporate Wikis in case organisations C – F like many other corporate Wikis do not allow open access. Their corporate Wikis are on intranet platforms that allow corporate Wiki administrators to lock down pages from editing or restrict access to authorised

users. Only employees are allowed access to the corporate Wiki. This reduces the risk (if any) of legal infringements substantially.

6.4.8 Technical Challenges

Section 5.2.1 indicates that the technical challenges include installing and maintaining the corporate Wiki. For organisations such as case organisation A and B which have little technical expertise to install the corporate Wiki, engaging a firm to host the servers, will require little or no knowledge of server administration, and cost less than learning or hiring more advanced technical skills.

However, with shared hosting, the organisation will not have full access to the operating system and be limited to those applications that are already installed by the hosting company on their shared servers. With a shared server, server response times will be greatly impacted by what is happening on other sites on that server. The Wiki's content and the information hosting online will likely to be less secure than if it is running on dedicated servers, especially if firewall(s) are to the servers. The level of security for the content can be dictated. In addition, only your organisation has access to the dedicated servers; all of which allows for a higher level of security. For case organisation B which want to store highly confidential information such as intellectual property and/or wants to engage in e-commerce and accept credit card payments, increased security in the form of dedicated servers should be a high priority for case organisation B.

Using dedicated servers is the best option for corporate Wiki because they can run any application or software as long as it is compatible with the organisation's operating system. A Wiki requires a great deal of database resources, storage and processing, which is best handled by dedicated servers.

Companies such as Confluence offer the installation of a corporate Wiki or blog on shared hosting and dedicated hosting option, so that their clients can get the benefits of hosting: nothing to install, no additional license cost, automatic upgrades and integration with internal applications. Confluence's SharePoint Connector⁵¹ enables a wiki page or blog post to be edited directly from SharePoint. For example, Confluence

⁵¹ <http://www.atlassian.com/sharepoint/features/>

page trees can be included into SharePoint to easily navigate wiki content. SharePoint users can also access Confluence's plugins like charts, diagrams, image galleries, maps and database content within their pages.

The maintenance of the corporate Wiki cannot happen by itself. Case organisations C – F which have successful corporate Wikis adoption/implementation outcomes budget one to four technical people to act as corporate Wiki administrators who will engage the participation of other knowledge workers to grow the Wiki community.

Of greater concern are security risks if it is a public Wiki or it is supported by other Enterprise 2.0 technologies such as blogs, social bookmarking and social networking sites which allow for greater public access. Some of the recommended strategies for circumventing the threats associated with Enterprise 2.0 technologies are described below:

Wearing (2007) says that for social networking sites such as FaceBook, the user's privacy settings can be limited to users you know, who can see your news feed. In their Internet policies, organisations need to request employees to create two profiles, a professional one for work contacts and clients which does not contain much private information and a personal profile where a user can be free to express him/her to family and friends.

Social bookmarking websites and social networking sites need to add CAPTCHA⁵² (Completely Automated Public Turing test to tell Computers and Humans Apart) protection against spam and improve authentication and access control. CAPTCHA is an authentication mechanism that can strengthen e-mail verification. Developed at Carnegie Mellon University, random words or letters are displayed in a distorted fashion so that they can be deciphered by people, but not by software. Users are asked to type in what they see on screen to verify they are, in fact, human.

Certain operations, such as reading or updating the Distributed Hash Tables(s), are restricted to trusted nodes and other operations performed by untrusted nodes, such as

⁵² <http://www.answers.com/topic/captcha-1?cat=technology>

moving pages, require approval by a trusted node. A DHT routing performs the requests to the nodes hosting the pages. It is recommended that trusted nodes remain under the control of corporate Wiki administrators and untrusted nodes are corporate Wiki participants. This approach based on digital signatures has already been applied successfully in other web documents (Popescu et al. 2005).

Though AJAX applications can be more difficult to test, security professionals already have most of relevant approaches and tools needed. As the use of AJAX requires client-side scripting code, however it is insufficient just to implement security controls on the client-side. Security controls should either be completely implemented on the server or always re-enforced on the server (Hayath & Kalath, 2006). AJAX developers tend to produce a number of server-side pages, each page performing some tiny function e.g. looking up a zip code to automatically complete a user's address. Each small page will be an additional target for attackers. Many web services within an enterprise were originally designed for Business to Business (B2B) use, and therefore designers and developers often did not expect interaction with actual users. The use of Cross Site Scripting (XSS) introduces vulnerabilities to Enterprise 2.0 applications because there is no wait-state. For example, during the process of checking an email with an Ajax-enabled application, the malicious code can be sending email to all your friends without the user's browser giving any visual cues at all.

The most common way to measure the security of a website is to simulate thousands of attacks known as a vulnerability assessment. A vulnerability assessment can be performed either manually, or with an automated scanning tool, or preferably with a combination of the two. Real-time code analysis of web content, performed on the gateway between the browser and web servers through local proxies such as Burp⁵³ or Paros⁵⁴, is one effective method for protecting users from malicious AJAX queries (Ben-Itzhak, 2007). This process is called footprinting the application. The intent of the footprint phase is to capture the requests and responses so that the tester understands how the application communicates with the server and the responses it receives. After that step, the tester will start the process of methodical fault injection, either manually or

⁵³ <http://www.portswigger.net/proxy/>

⁵⁴ <http://www.parosproxy.org/index.shtml>

using automated tools, to test parameters that are passed to and from the web server (Hayath & Kalath, 2006).

6.5 Chapter Summary

This chapter presents a comprehensive and timely look at the Enterprise 2.0 landscape and its implications on KM; and the resulting emerging organisation models. It should provide a number of ideas for those who are evaluating their current systems. The lack of theoretical models of Enterprise 2.0 technologies can be explained in different ways. Some organisations see that there is not much need to understand about Enterprise 2.0 technologies. First, Enterprise 2.0 technologies are viewed a fad and do not support specific knowledge activities of knowledge workers. Second, these technologies may bring valuable results, but many of them do not fit work practices of knowledge workers and are perceived as an overhead instead of being an integral part of work (Davenport & Glaser, 2002).

Yet the attraction of these Enterprise 2.0 technologies remains because of their low cost, intuitive functionality and connectivity. Emerging organisation models have appeared by organising its processes and operations around pervasive, persistent connectivity – Enterprise 2.0 technologies which capitalise on already established social networks. These network-centric organisations not only capture organisational knowledge by digitising business processes and functions, but also creating and deploying new processes that would not have been possible without a ubiquitous corporate Wiki. Because Enterprise 2.0 technologies are software-based, this set of KM solutions is able to work with other software applications and network management solutions of the organisation's current systems. Enterprise 2.0 technologies can electronically link knowledge workers to create and transfer organisational knowledge pertinent to the organisation's existing and future business creating the inclusive ecosystem.

The paramount challenge is technology's ability to subvert traditional means of information and knowledge asset protection and make copyright infringement a reality, either deliberately or through ignorance (Hasan & Pfaff, 2007a; Maxwell, 2002). However, I do not see the legal issues as any worse than those associated with any other

Web activity. Lessons learnt include the need to adopt clear policies and procedures with regards to the use of Enterprise 2.0 technologies and conducting a vulnerability assessment to simulate thousands of attacks so as to measure the security of a website. Pioneering companies such as those reflected in the case studies have made some inroads in the corporate Wiki arena, but so long as they are treated as forays into this new territory rather than bridgeheads, they will struggle for support. This chapter has brought to light various strategies on how to start-up and sustain a Wiki. However, the challenge remains that a lot of research has to be done before we can understand how to best create long term sustainability which appears to be a much larger problem than initial start-up of the corporate Wiki.

Chapter 7 Conclusion

In order to understand the impact of ubiquitous Enterprise 2.0 technologies in organisations, this research investigates the use of the corporate Wiki as a KMS, by observing its authentic use and subsequent co-evolution of knowledge work activities. The concluding chapter's primary objective is to provide the necessary argument based on the research findings to answer the research questions. The chapter begins with an overview of whether a corporate Wiki can support knowledge work, by delving in the nature of knowledge that can be supported by the Wiki, and the suitability of the Wiki based on organisational culture, industry type, organisation size and structure; and location. The case studies presents six organisations like many enterprises which are just coming to terms with the significance of Enterprise 2.0 in the commercial world and the need to brace themselves for its impact. Enterprise 2.0 does not refer to straightforward incremental technological change on the Web. Rather, it describes the development of a second generation of websites and utilities whose focus is on social networks. The aim of using Enterprise 2.0 technologies is to create environments where the gap between humans and technology become less and less. It has the ability to transcend existing corporate Wikis from its mainly hypertext domain to permit the integration, not just the current state of attachment of other forms of media ranging from movies and animations, but to sharing of datasets, and the creation and utilisation of social network information to support community interaction. This involves the transference of the online tools used in people's social lives to their work lives and capitalising on their innate desire to interact. Enterprise 2.0 means that this phenomenon is now happening in their work lives. This chapter addresses the shortcomings of this research and charts a course for future research in KM. The accomplishments of the research efforts are reviewed and remaining research challenges are identified. Inherent in KM are difficult issues in the social and management implications of Enterprise 2.0 technologies and the challenges of identifying critical gaps in KM and knowledge ecosystems poised for imminent change.

7.1 Addressing the Research Questions

This chapter begins by detailing how the thesis has addressed the research questions. To answer the primary research question, “Does a corporate Wiki support knowledge work?” it is further sub-divided into sub-questions (see below) to uncover the real nature of knowledge work practices that reside in a space between the organisation and individual perspectives. To answer the main question, it is logical to proceed to the next question, “What is the nature of knowledge in corporate Wikis?”

- What is the nature of knowledge in a corporate Wiki? (See section 4.2.1)

The research begins with the aim to discover if the nature of knowledge is different in different contexts, for example, across the different cases that are presented in Chapter 4. The research findings indicate that the nature of knowledge is not uncommon in the six organisations studied. The corporate Wiki is able to support both types of knowledge, explicit and tacit. Explicit knowledge work documents pertaining to policy and procedural work and project data and documents. Tacit knowledge includes business processes, sales and distribution methods, lists of clients and suppliers and patents; ideas, conversations required to stimulate innovative ideas for project management; and research and development processes.

Case organisations C – F is successful in implementing the corporate Wiki to support knowledge work. The Wiki enables knowledge workers to create and share organisational knowledge and goes beyond the role of its KMS predecessor of just disseminating information (see section 5.2.6 for outcomes of the corporate Wiki). The corporate Wiki is fulfilling its objectives as a KMS when it comes to retaining knowledge within the company when knowledge workers have left, and also encouraging learning and the flourishing of communities of interest (see section 2.1.10) across functional boundaries.

- How does organisational culture impact on corporate Wiki implementations?
(See section 4.2.2)

This question attempts to see if organisational culture and leadership styles have an impact on KM in organisations in terms of acquiring, access to and dissemination of knowledge. It also aims to uncover the effects of organisational culture and leadership styles on Wiki adoption/implementation outcomes. The research implies that a bureaucratic organisational culture and autocratic leadership style exhibited by case organisation A; and a competition and control organisational culture and laissez-faire leadership style displayed by case organisation B are not helpful in creating a culture of knowledge creation and sharing which aids in supporting the flow and management of knowledge within the organisation (see Table 4.11). In addition, these organisational cultures and leadership styles have an adverse effect on the adoption/implementation of Wiki outcomes because management authority is challenged when knowledge workers are democratising organisational knowledge when engaged on the corporate Wiki. Openness to change/innovation culture and consultative leadership style adopted by case organisation D and F are most conducive to KM. The Wiki succeeds in becoming an information commons (see section 2.1.11) where knowledge workers can share innovative and creative experiences and develop external relationships which are necessary with the externalisation processes involving the conversion of tacit to explicit knowledge. Case organisation C's task oriented organisational culture and case organisation E's soft bureaucracy organisational culture is balanced by a consultative leadership style. Case organisations C - F have built a KMS that is able to meet organisational and individual needs i.e. capture the tacit knowledge buried among experienced staff and turn them into corporate memories and organisational knowledge assets for their organisations. This is witnessed through the increasing number of documents created, uploaded, new articles in the knowledge repository, frequent hit rate, visitors and user registrations. Case organisations C, D, E and F are also pursuing research and development efforts in Enterprise 2.0 technologies to add greater functionality to their corporate Wikis.

- Is a corporate Wiki more suitable to a specific type of organisation or industry sector? (See section 4.2.4)

This question assesses corporate Wiki usage in several organisations to identify whether it is suited to all types of organisations or just learning organisations based on industry type, organisation size and structure; and location. The research findings agree that that corporate Wiki are more suitable to learning organisations. They also reveal that there is no correlation between industry type and organisation size when it comes to successful Wiki adoption/implementation outcomes. Case organisations D and E have demonstrated that it is possible for bureaucratic organisations to change and become learning organisations. However, the question is, can the introduction of a corporate Wiki act as a major catalyst for a bureaucratic organisation to change into a learning organisation? Based on case organisations A and B's experiences where the adoption/implementation of a corporate Wiki was unsuccessful, the answer is no. The change to become a learning organisation cannot happen overnight. It is noted that case organisations C – F introduced KM and organisational learning principles between two to four years ago. These organisations also have been using Lotus Notes/Domino and Intranets as KMS. There is a need for awareness, willingness and commitment to realise that KM principles and learning is necessary to become a learning organisation. Designers of a system are not perfect, and mistakes will be made. Since it is already a difficult challenge to build robust KMS, designers should not pay the price of building a sophisticated infrastructure only to find that it falls far short of addressing KM goals. Finding the right technology to fit knowledge workers' needs by switching from Lotus Notes/Domino and Intranets is considered part of the learning process.

Introducing a corporate Wiki can provide a stimulus for an organisation to change into a learning organisation. "Adopting a Wiki is a step in the right direction", said case organisation E's CTO who has implemented a number of Wikis in bureaucratic organisations for his clients which undergo this change to survive and adapt in the face of globalised competition. "You have to start somewhere", said the Technical Project Manager from case organisation C. The

Wiki is a tangible project that provides an opportunity to be innovative, and needs to overcome a number of obstacles which are restrictive to learning to succeed. The Wiki draws on many of the processes and techniques that turn tacit knowledge into explicit knowledge, and Enterprise 2.0 tools for knowledge workers to become effective at learning.

Research findings indicate that learning organisations such as case organisations C – F have more successful Wiki adoption/implementation outcomes because of these characteristics: incentivisation, leadership, knowledge workers' participation, training, technological characteristics, and organisational structures. Incentivisation serves to motivate knowledge workers by including external rewards such as increased pay, promotions, and job titles, as well as intrinsic rewards such as job satisfaction, increased responsibility and autonomy. There is a significant role for committed and involved leadership which can come from different levels of the organisation. In case organisations B - F, most of the Wiki champions are line managers. Only case organisations D and F's Wiki champions are senior managers. The corporate Wiki depends on knowledge workers' participation to contribute their ideas, information, knowledge and skills to make the technology a valuable resource, into something they can build on and improve upon. To adapt to different styles of learning, case organisations C – F provides beginner-level training and Wiki administrators are engaged in a supportive role acting as mentors and teachers. For knowledge workers who prefer self-instructions, quick-time videos offer an alternative learning style. Another research finding determines that a flat organisational structure is a crucial building block of infrastructure that is already in place in learning organisations C – F. Case organisations C – F favour a decentralised approach which decreases the layers of control. With greater decision-making ability, comes greater responsibility. The job descriptions are enlarged and enriched in scope. Case organisations A and B's hierarchical organisational structure set the competitive framework for management where internal competition is fierce, collective action is discouraged and collaborative efforts are not rewarded.

- Why do corporate Wikis fail in some organisations? (See sections 4.2.3 and 5.2)

Much has been learnt from the failed experiences of case organisations A and B to adopt and implement a corporate Wiki within its organisation. Not all the organisations studied in the case studies hold the same concerns with regards to social, management, legal and technical issues. However, research findings prove that social, management, legal and technical issues will affect the Wiki's adoption/implementation outcomes (see section 5.2). The process of doing knowledge work has produced a number of social concerns. For all the case organisations, the common social concerns are ease of use, perceived usefulness and incentivisation. Case organisations A and B have additional social concerns such as lack of time, low work morale, distrust and lack of democratic culture. Emerging social concerns are examined with respect to the impact they are expected to have on the knowledge workers' ability to access organisational knowledge and contribute to knowledge repositories and the organisation's ability to respond in a democratic participatory electronic environment.

Management concerns raised by case organisation A include preventing vandalism and unreliable information, limits to power sharing, maintaining centralised IS control and discouraging technology innovation, and the participatory problem of recruiting, training and educating subjects or potential subjects for the corporate Wiki. Case organisation A expresses the most concern for the open nature of a Wiki and rejects its use outright. Case organisation B is quite enthusiastic about the use of a Wiki and its implementation is approved at the highest level, that is, by the CEO himself.

It is assessed that management are concerned with prevailing legal concerns such as copyright, defamation, publicity, and trademark issues. Case organisation B is eager to collect content and to make it publicly available. Nevertheless, Case organisation B voices legal concerns because the Wiki will be hosted outside the organisation, and it will be difficult to monitor its content. Case organisation C, D, and E have no particular legal concerns. The only

concern that case organisation F has is a problem of confidentiality because case organisation F's documents have to be classified.

Technical concerns that were raised by case organisation A include installing and maintaining the corporate Wiki. Case organisation B raises security concerns because the corporate Wiki is part of a research endeavour among small business owners and case organisation B will not have the final responsibility of the knowledge that will end up in the SMEs. The IT savvy knowledge workers from Case organisations C – F do not have any technical concerns when it comes to Wiki installation and maintenance.

- How can a learning organisation take steps to decrease the possibility of a corporate Wiki rejection? (see section 4.2.5)

Case organisations C – F have taken several steps to overcome corporate Wiki rejection. They include: research in technology innovation, having a mission and vision for KM, nurturing an organisational culture that is conducive to KM, engaging consultancy partners, adopting an implementation approach for successful Wiki implementation outcomes, meeting individual/organisational needs and understanding knowledge workers.

Knowledge workers in C - F spend a lot of time researching emerging technologies that can contribute in the collaborative building of knowledge to facilitate better KM and improve job performances for their project groups (see section 4.2.5.1). Case organisation D's IS Director said, "Knowledge workers gain a sense of empowerment by working in small, self-directed groups. I want them to use collaborative learning strategies with their fellow knowledge workers as they refine their knowledge creating and sharing techniques using new technologies."

The implementation of the corporate Wiki means that senior management support needs to be tied to the mission and vision of KM itself (see section 4.2.5.2). These include dedicated resources available to support implementation

e.g. use of servers and budget, commitment to the decision to adopt the Wiki through the re-writing of job descriptions to acknowledge Wiki work and freeing up time for such work; and incentives made available to knowledge workers responsible for engaging in the Wiki.

The research findings show that the organisational form the organisation takes has consequences for the communication and dissemination of information and its ability to engage in organisational learning. Organisational learning develops new knowledge and insights and has the position to influence organisational culture (see section 4.2.5.3). Case organisations C - F have a learning culture (see section 2.1.6) that encourages knowledge workers to try new things without fear of reprisal if they are not successful and this has a direct on the success of efforts to implement technology innovation (see section 5.4.3).

Engaging consultancy partners to assist in KM efforts is evidenced by case organisations C – F (see section 4.2.5.4). These organisations are careful to engage knowledge workers to be involved in the peer-to-peer discussion. They also consulted with third parties with credentials, like academics and business leaders who have experience with innovative technologies.

The research findings indicate that a bottom-up Wiki implementation approach results in positive outcomes for case organisations C – F (see section 4.2.5.5). A bottom-up approach offers flexible and user-friendly ways to encourage user participation. As the Wiki software is fairly easy to implement and heavy infrastructure is not required on the outset, and participation in the Wiki occurs in daily knowledge work activities, value is delivered quickly. A top-down purchasing process, led by the Chief Information Officer (CIO) and a handful of business executives, often results in tools that people resist or never use which explains why the prior KMS used by case organisations C - F were failures. By contrast, the bottom-up process which is typical of the open source movement relies on free goods to drive demand (see section 2.3.4.5.1). A corporate Wiki is pitched at knowledge workers because they are the ones who will be using the tools. Paradoxically, for bottom-up implementations to gain momentum, senior

management support is crucial for positive adoption/implementation of Wiki outcomes. The top down approach enforced by case organisations A and B is a contributory factor to Wiki failure.

Meeting individual and organisational needs are found to have an influence on implementation success (see sections 4.2.5.6 and 5.2.3.1). For example, knowledge workers in case organisations C – F find that the ease of use and perceived usefulness of the corporate Wiki supporting knowledge work and improving job performance makes an impact on the success of adoption/implementation efforts. “The Wiki meets our need for constant collaboration”, said an engineer from case organisation C. For instance, a knowledge worker can put needed project or research information on the Wiki to be viewed by all the knowledge workers involved in a particular project. Other knowledge workers can comment on these proposals and combine their responses into a final report. Case organisations A and B have traditional and hierarchical organisations where Enterprise 2.0 technologies are relatively new and not well understood. The corporate Wiki is seen as a threat to management authority and fierce competition among managers and knowledge workers so it is not surprising that it is seen as not meeting individual and organisational needs.

Case organisations C – F listen to their knowledge workers that they wanted to transfer their social lives online and bring their social networking tools into the workplace to capitalise their desire to interact and collaborate (see section 4.2.5.7). These organisations demonstrate an understanding that the emerging models of the next generation KMS which uses Enterprise 2.0 platforms like blogs, Wikis, and related social, emergent, freeform Web 2.0-style applications will happen in their organisations entirely by itself, whether they encourage it, discourage it, or neglect it.

- How can Activity Theory be used to analyse the potential of the corporate Wiki and other Enterprise 2.0 technologies to support knowledge work by democratising organisational knowledge?

Section 3.3.1 explains the process on how Activity Theory is used to formulate the research questions necessary to reveal the hidden activities in knowledge work by analysing the influence of the growing use of the corporate Wiki has on knowledge work and collaborative behaviours, and by examining how the Wiki community from different organisations appropriates the corporate Wiki for their own ends.

In Figure 5.1, the object of the corporate Wiki is knowledge work (see section 5.1.3). But in the process where individuals and teams create, process, share and apply knowledge as an integral and important part of their job, it also reveals their true motives and purposes regarding knowledge work (see Figure 5.3). The use of incentives affects knowledge workers' perception of use to impact the success of Wiki adoption/implementation outcomes. As described in section 5.4, the sub-activity triangles confirms that there are differences in corporate Wiki users' perceptions of the object and motive to show that people are often at cross-purposes, by the community, rules & routines, the distribution of power, and the tool. They are often perceived differently, and thus also resist, contest, and/or negotiate—overtly or tacitly, consciously or unconsciously (see section 5.4.4).

Figures 5.4 and 5.5 portray the contradictory double form of object-oriented activity systems (see section 5.3). The two activities exist because the object of the work differs between knowledge worker and the manager, and so too, their perspectives on how KM needs to be conducted. For case organisations A and B, their corporate Wikis fail because managers and knowledge workers cannot reconcile the differences in the object of their work and their perspectives. A corporate Wiki based on Microsoft Sharepoint collaboration software, for instance, may be more appropriate for the traditional organisation that insists on retaining control. This is because collaboration is managed at a central server

where all data are exchanged via a central point of access. SharePoint may also provide case organisations A and B with advanced administrative controls to secure information resources through site provisioning, site management, and support. Case organisations C – F foster network-centric approaches where the CEO, senior and line managers together with knowledge workers have the same object of performing knowledge work.

Figure 5.8 show how organisation's rules and cultural norms affect the way teams of knowledge workers share work knowledge so as to provide better KM support (see section 5.4.3). Figure 5.10 explain about the perception of KM needs and the effect of leadership style has on knowledge sharing (see section 5.4.5). It is discovered that an organisation's chosen leadership style will either increase knowledge workers' productivity or diminish their overall work morale. For example, case organisations C – F's leadership style (see Table 4.21) nurtures the right environment to bring out leadership qualities in their knowledge workers who are brave enough to try out emerging innovative technologies like corporate Wikis even without the blessing of top management because they knew that top level managers are 'forgiving' even when mistakes are made (see section 4.2.2). Case organisations C - F's managers trust their knowledge workers with IT resources such as free access to network servers, the essential infrastructure required to host corporate Wikis. Knowledge workers from case organisation A suffer from low work morale because the autocratic leadership style adopted by management. Knowledge workers feel that they are not paid enough to think, fear job insecurity and resent being ordered around. Based on socio-technical principles (see section 4.2.2), this means that the leadership style that an organisation pursues will always affect its overall profitability. It is recommended that adopting a consultative style of management is most appropriate for an organisation that wants to adopt Enterprise 2.0 technologies because it is a way to strike a balance between authoritarianism and democratism.

- Does a corporate Wiki support knowledge work?

The research findings conclude that a corporate Wiki does support knowledge (see sections 4.2.1 and 5.4.4). It functions as a peer produced information commons (see section 2.1.11) because it supports the democratisation of knowledge where sharing and assimilating differences in perspectives and experiences can be stimulating rather than threatening (see section 5.4.4).

The corporate Wiki is also a social technology (see sections 2.2 and 5.4.5) which gives it the ability to capture tacit knowledge in the form of stories, knowledge sharing and conversations, which are fundamental social activities. Open, curious and varied conversations, telling stories and sharing knowledge are necessary to human development, to become better knowledge workers. Sharing knowledge plays a crucial part of the knowledge workers' social development. Understanding where they sit on issues, or why or when they need to stand up for something or reflect on their own positions. The accessibility and social reach of the corporate Wiki means that it focus as well as reflect knowledge workers' conversations. The continuous flow of dialogue between peers and managers; and private reflection offer a depth of interaction that is conducive to knowledge sharing and creation. These complex processes of interaction may be easily taken for granted, yet it enlarges the world of knowledge workers, highlight their interdependence and illuminate their differences.

This research encounters a series of observations through the analysis of the case studies, most of which will have an impact on future research in this area. The nature of the sample affords to make broad generalisations that are stated below.

7.2 Limitations

The first major difficulty in evaluating Enterprise 2.0 technologies is identifying which technology is the most reliable as a KMS to evaluate. Enterprise 2.0 technologies are fairly new and not well understood by academics and practitioners alike, so it is difficult

to create reliable and robust systems that support knowledge work activity on a continuous basis. The corporate Wiki is chosen as the most suitable KMS because of its perceived usefulness in providing applications that previous generations of KMS could not. The purpose of this research is not simply to provide a demonstration vehicle for successful research results. It is to provide the basis for evaluating the impact of a KMS on the everyday life of its intended population. It is difficult to get organisations for the case studies to share their Wiki success stories because they are afraid to reveal their KM strategies to their competitors. It is even more difficult to get the less successful organisations to share their failed attempts at KM.

A key limitation to this research is that the sample is limited in size, location and convenience. The sample size of individuals representing knowledge workers is small ($n = 26$). Generalisability will therefore be affected to some degree due to the limitations of the sample. This will lead to the sample not capturing a more precise level of variance in managers and knowledge workers' responses. The conclusions for this study are largely drawn on data collected at the advent of corporate Wikis before the Wikis had much opportunity to alter the organisational culture of KM practice. It will appear that the variables do not encompass all influences on organisational culture and performance issues. These influences exist in many forms and this study only utilises those consistent with and described by the interviewees' responses. As the participants are from the U.K. and different parts of Australia, email is used to correspond with participants. The use of unique identifiers on each questionnaire are required so that I can send emails and reminders to those who have not responded, rather than a general notice to all people in the sample. Unfortunately, IDs on surveys may possibly have led to an initial lower response rate as some people feel jeopardised by the lack of confidentiality of the questionnaire.

Although static surveys can produce some useful information concerning the extent to which why corporate Wikis have been adopted in the corporate environment and knowledge workers' attitudes to the use of Wikis, however the analysis of the context and culture of an organisation is better informed by more detailed, longitudinal case studies. Static surveys do not support the study of changes over time and the processes

that occur as attitudes to the corporate Wiki develop and change. Also, studies using surveys to extract opinions run the risk of respondents rationalising their actions.

Another limitation is that the study is exploratory in nature. The study aims to establish if there is a relationship between intention to use corporate Wikis and organisational culture. The study was conducted over a four month period (February 2006 – September 2007) producing a snapshot of knowledge workers who were attempting or using the corporate that particular period. It is possible that the make-up of Wiki users may differ depending on the period of the year. As well, the make-up of the Wiki population may change over time in response to changing social and cultural conditions in these organisations.

It is difficult to say which organisation is the most informative source because each case is different. Case organisation E is particularly unique because it is giving two different viewpoints. One it is an outsider which is a company that is building corporate Wikis for its clients and the other, as users of a corporate Wiki that is established in its own company. Outsiders have the least investment and tend to be more critical in pointing out areas of weakness. However, some insiders, like the Wiki users, are open to talk about the changes and mandates, for good or ill, which are making their jobs more complicated or simpler.

7.2.1 Critique of Activity Theory

The Activity Theory analysis sheds light on the relationship between knowledge workers and the adoption/implementation of Wiki outcomes. However, Participative Action Research (PAR) (Baskerville 1999) is chosen for its utility to allow researchers immerse into the research units being investigated. PAR's ability to examine the unfolding of process-related aspects revolving around collaboration of knowledge work and KMS adoption/implementation processes bring additional rich and in-depth insights into case organisation B. Its iterative approach of 'plan – act – observe – reflect' is especially effective in participating and observing case organisation B's adoption/implementation of the corporate Wiki. As the research emphasises the participation of managers and knowledge workers, and organisational and technological change in practice, this leads to the choice of using PAR as one of the research methods.

The Technology Acceptance Model (TAM) (Davis 1989) is often employed in IS studies. In particular its two constructs, ease of use and perceived usefulness help to explain the unsuccessful Wiki adoption/implementation outcomes in case organisations A and B. There is no question that the Wiki is easy to use because it benefits from user familiarity with other tools used in the social arena such as *Wikipedia* and its relative homogeneity. However, a lack of perceived usefulness of the technology weakens the acceptance and adoption of the corporate Wiki and its associated Enterprise 2.0 tools because of the conflicts in the shared goals of knowledge workers. The research supports that technology acceptance is supported by incentivisation, which is somewhat lacking in case organisations A and B.

Clearly, each approach offers something to our understanding of the issue of corporate Wiki users' adoption/implementation outcomes. At this time, there appears to be little hope for an overarching theory that will encompass both the explanation and the prediction of Wiki users' adoption/implementation outcomes, as well as providing the tools to delve into the nature of knowledge work activities and investigate if the corporate Wiki is able to support knowledge work and become the next generation KMS.

Based on the findings of the qualitative data and multiple case studies of six Australian and U.K. organisations which are interested in using or are using corporate Wikis of the empirical study, theoretical as well as practical implications can be drawn.

7.3 Thesis Contribution to KM Theory

The main theoretical contribution of this thesis is to use Activity Theory as a framework for systematically investigating a corporate Wiki as the next generation KMS and its potential to support knowledge work. Activity Theory reveals several implications for the associated activities related to knowledge work.

7.3.1 Next Generation KM

The research findings support my belief that the next generation of KM will focus on knowledge work activities to reveal the processes of how knowledge workers identify and analyse individual knowledge and available organisational knowledge, produce new knowledge by intuitively adapting to changes and possibilities. In Object Oriented Programming, objects rely on *reusable* code (see section 2.1.3). In the same way, before an organisation can use knowledge, it must have knowledge to reuse it. This suggests that an organisation must first focus on what collaborative knowledge work is before it can think about computer support. Similarly to Object Oriented Programming, knowledge (both explicit and tacit) and human behaviour cannot be separated (see sections 2.1.3 and 5.1.3). An integral part of Enterprise 2.0 is its recognition that knowledge workers are an important source of knowledge resources and its ability to meet knowledge workers' needs by supporting the creative reuse of features. Organisational knowledge which is eligible for reuse can be submitted, tagged, and uploaded to a central and easy-to-use knowledge repository. Knowledge workers can access and create valuable organisational knowledge of their professional experiences of different tasks and user groups, through the process of submitting their ideas and reports of their various tasks into a shared electronic environment where they can be used and reused by others as knowledge resources. Other knowledge workers are given the opportunities to better retrieve and interpret the material based on their experiences which are analysed and documented to derive new improvements. Knowledge workers can add comments and give feedback to the author who is notified by RSS messages in the case of any updates or comments. This contribution-based KM approach is a key stimulus for knowledge worker-produced objects that can serve as knowledge objects for others.

7.3.2 Socio-technical Approach

Activity Theory is supportive of the socio-technical approach which espouses the concept of a dual process of people and tools shaping and being shaped by their social and physical corporate Wiki environment. Although case organisation A in the study is initially concerned about technical problems that may be caused by the corporate Wiki, they are apparently routine and manageable (see section 5.2.1). There is a lot of cynicism around whether it is worth doing or not, but done well, in the right sort of

organisation, it is a way to get greater visibility and awareness of capabilities of Enterprise 2.0 technologies across the organisation. A corporate Wiki that is utilised as an Enterprise 2.0 based KMS is inherently about people and knowledge work; therefore leadership, organisational culture and management issues tend to dominate. Thus this research is concerned about the dynamic interaction between knowledge workers, organisational culture and technology that will result in unique socio-technical systems that produce different attitudes and behavioural patterns toward KMS and the organisational knowledge stored in them. Applying the Activity Theory framework will explore how learning and knowledge creation may occur in these micro-environments.

It has been established that the corporate Wiki is a socio-technical system. Taking a socio-technical approach to identify characteristics of the total system, that is, the IT, the people, and their work processes and requirements, with associated metrics, will allow researchers to focus more on collaborative knowledge work interactions than individual performance. Analysing the invisible nature of knowledge work that is done on a corporate Wiki makes it a tremendous challenge. It is made even more complicated with the use of Enterprise 2.0 tools as computer-supported collaborative learning tools. The application of Activity Theory on the corporate Wiki activity system allows the actions of knowledge workers and management; and the mediating influences on their productive activity to be examined and an understanding reached that are not based on subjective or interpretive analysis.

The softer issues of human and social factors take into account the concept of motive. A knowledge worker may have a number of extrinsic and intrinsic motives not to contribute to the corporate Wiki (see section 5.4.4). For example, in case organisations A and B where the take up of the corporate Wiki was not successful, research found that there were no incentives to use the Wiki because knowledge work on the Wiki did not contribute to a knowledge worker's performance appraisals. There was also no perceived usefulness of the Wiki because there was fear of contributing wrong information; and the perception of giving out personal knowledge will reduce his/her value to the organisation and result in their peers receiving kudos from top management, greater responsibilities and even possible promotion and a pay rise.

7.3.3 Successful Wiki Adoption and Implementation Outcomes

Successful Wiki adoption and implementation outcomes are dependent on knowledge workers using them but also on the organisational culture and management support. A supportive organisational culture and appropriate management support, it is assumed, can provide incentives (see section 2.3.7.1.2), assistance, and social support better than a simple one-way transmission of information.

Knowledge work cannot materialise merely by a top down shuffling of organisational processes, structures and knowledge workers because knowledge work cannot be divorced from knowledge workers and treated as a separate entity from the knowledge workers who create and use it. Creative approaches may be required for the introduction of a corporate Wiki into a traditional organisational culture (see section 5.4.3). Knowledge workers need support in learning how to use the new collaboration technology, and how to adapt it to work processes and social processes. It is strongly recommended that the Chief Technology Officer and other stakeholders who have an interest in the management of organisational knowledge must assume an active role in overseeing the progress being made in building the KM infrastructure - an infrastructure that will enable a vision not only of KM and the corporate Wiki but also, more broadly, a vision of an organisation that is truly transparent and open.

7.4 *Thesis Contribution to the Practice of KM*

The main achievement of this thesis is to present a set of findings on the emerging phenomenon of KM based on the study of several actual cases in forward looking organisations which have experienced developing corporate Wikis as KMS and applying proposed extensions of Enterprise 2.0 technologies to capitalise on the success of their corporate Wikis. This section offers readers a set of ground rules for implementing the corporate Wiki for knowledge creation and distribution.

7.4.1 Evolutionary Process

The corporate Wiki may be supported by the use of Enterprise 2.0 technologies to improve knowledge sharing initiatives and knowledge work to lead to more holistic

approaches to this evolutionary process. Enterprise 2.0 technologies are part of an evolution process because it is not new but merely based on an aggregation of existing technologies. Even when an Enterprise 2.0 tool works well, it may not fit with the way the organisation operates so the organisation needs to adopt a flexible approach and be willing, within reason, to experiment. Based on the ecosystem analysis (see Figure 2.3), the research findings indicate that the organisation must be open to the evolutionary process of natural selection that is, to try out several competing products and cast aside those that do not work (see section 2.3.6). Fortunately, most Enterprise 2.0 technologies are either free or provided for a relatively cheap monthly subscription fee. If something is not working, the organisation can just stop using it. Enterprise 2.0 technologies have the potential to reshape business but the transformation will take some time to solidify. Whether organisations take the plunge or not, evolution will happen without them. And with the case of evolution, not every organisation will survive the transition.

7.4.2 Open Democratic Culture

Organisations that want to introduce Enterprise 2.0 based KMS need to introduce an open democratic culture where everyone is accountable for and values knowledge as an asset (see section 5.2.5.1). Wiki technology is low, or no-cost to organisations. Even so, many organisations do not provide the opportunity for staff to install a corporate Wiki for fear that it would limit the power of controlling organisational knowledge (see section 5.2.2.3). This is a subject that has been much debated in the organisations discussed and demonstrates just how divided opinion on the matter is. A further implication is that the freedom and potential of the corporate Wiki as a new business model for KM is perceived as a real threat to those in charge of the old models. On a lighter note, taking full advantage of Enterprise 2.0 may require Management 2.0.

The experiences from case organisations A and B suggests that management on its own is insufficient to provide leadership and vision to sustain and stimulate KM. Management's reluctance to trust their employees and share power makes it difficult for employees to be empowered if there is a lack of trust from management and vice-versa (see section 5.2.3.4). For knowledge sharing to exist, there must be a climate of trust. The key to coping with this changed way of doing business in today's markets is to be willing to accept compromise because that is what giving up control is all about. The

biggest change in mindset required for organisations when working with Enterprise 2.0 is letting go of control and giving it to their knowledge workers. If organisations are compelled to share their power with knowledge workers, this will result in a democratisation of knowledge. Just as the Internet has a democratising effect on the availability and use of information, the corporate Wiki will introduce a power shift, seeing KM passing from the hands of management to Wiki participants.

Network-centric approaches are particularly well-suited for examining the social and technical dimensions of Enterprise 2.0 technologies; especially collaborative KM technologies such as the corporate Wiki (see section 5.4.3). Similar to so many organisations around the world, whether in the private or public sector, organisations have found themselves in a situation where the only way forward is towards a network-centric organisation supported by a KM infrastructure to build an atmosphere of trust, openness and transparency. This can only be achieved by breaking down the barriers of traditional organisational culture that are inhibiting the ability of knowledge workers to make new connections, creativity and collaborations. Sensible organisations can leverage microcosms of knowledge workers to form self-directed teams based on functionality rather than hierarchy where managers higher up in the hierarchy are often at the margins of the social network. The communicative and collaborative aspects and ‘sense and respond’ abilities of self-directed teams give knowledge workers the information, knowledge and authority to make decisions and take appropriate action.

7.4.3 Meeting Individual/Organisational Needs/Challenges

The real source of difficulties seems to stem from a lack of perceived usefulness by the various constituencies from the organisation as seen in case organisations A and B (see section 5.2.3.1). Case organisation A’s corporate Wiki fails because it did not meet their individual/organisational needs or challenges. In case organisation B, there is a possibility that the human factors of acceptance of a new technology took a back seat to the heady rush of enthusiasm generated by the possibilities of the corporate Wiki. It is clear that the corporate Wiki that delivers the greatest value supports a clear business challenge or problem, and where speed of knowledge transfer and cultural change such as the motivation of people and development of unique and complex relationships are

key objectives. It is necessary to maintain activity in the corporate Wiki in order to create value that encourages further participation, which in turn creates further value.

The research findings show that Enterprise 2.0 has opened several management and legal challenges (see section 5.2.2). For example, security and liability issues relating to data protection, content liability and defamation pose problems for the collection and archiving of content in Enterprise 2.0 environments. In the light of emerging technologies, it is clear that the development of laws is lagging behind (see section 5.2.4). Incorporating the corporate Wiki and democratising organisational knowledge into any organisation will necessarily bring other issues of a more philosophical nature to the fore. Organisations will be forced to grapple over such questions as, 'who will assume the authoritative stance in the democratic processes of KM?' Like other technologies, care needs to be taken to protect both the organisation and the individuals within it from misuse of technology. Appropriate business rules and governance practices need to be put in place to encourage responsible behaviour and awareness about the inappropriateness of sharing trade secrets, private employee information, and copyrighted content.

7.4.4 Bottom-up Approach

While case organisations A and B organisations view the corporate Wiki as a threat to power and authority, case organisations C - F are quick to embrace the corporate Wiki because they recognise that a paradigm shift has occurred in knowledge workers' attitudes. The research findings indicate that there is a strong grassroots movement brewing that will hasten the introduction of many Enterprise 2.0 tools in the enterprise, with or without corporate blessing or sometimes against the wishes of top management or a clear business case for adoption (see section 4.2.5.5). Whilst it may have been acceptable in the past, the new generation of online knowledge workers is moving on from their Web 1.0 expectations where information was fed to them, to the Web 2.0 world where communication and collaboration is two-way. Knowledge workers are growing up with a different set of expectations. It is no longer acceptable to merely push information/knowledge at knowledge workers; they want to co-create knowledge as well. Knowledge workers want what they want when they want it, and by leveraging the

collective power of the Wiki community, the corporate Wiki can provide tailored information at a nominal cost.

The research findings reveal that Wiki implementation favours a bottom-up approach (see section 4.2.5.5). It honours the Internet culture and spirit where the Wiki can be designed simultaneously by knowledge workers enabling the organisation to leverage the sharing of knowledge. Other Enterprise 2.0 tools such as blogs and RSS can be developed as value-adding processes to support the KM practices of knowledge workers and enhance the knowledge environment of the organisation. A KMS that develops organically from the bottom-up has a better chance to become self-sustaining over time and evolve a meaningful purpose for the activity of its use. Bottom-up adoption taps into social incentives for contribution and fosters a culture of working openly that has greater strategic benefits in the long run. Case organisations A and B's top-down approach may seem more appropriate in some environments, but may be ineffective in the long-term once the Project Manager stops actively making subordinates use the Wiki. A successful Wiki cannot be designed and mandated by the CEO and top managers, without prior commitment from other constituencies in the organisation. If something is imposed, then its purpose is perceived differently from something that is chosen.

Rather than proving itself to be a time-waster, the corporate Wiki is now showing itself to be a valid business tool in case organisations C - F. These organisations attach an importance to the value of team socialisation and of the contribution that employees have to make. The corporate Wiki is one of the few tools that allow employees to write as easily as they read. Because of this they are quick to embrace it and deployment within the right business processes will provide returns within their business. Flushed with the success of the corporate Wiki, case organisations C - F are keen to adopt other Enterprise 2.0 technologies to increase business value. The research findings indicate that the most likely driver of adoption is positive feedback from users. If decision-makers see high value from one tool, then they are more likely to take on a second, third or fourth.

Paradoxically however, while the implementation of the corporate Wiki is naturally more suited to a bottom-up grassroots approach, support from senior managers are

crucial because a Enterprise 2.0 KMS is a new phenomenon for most organisations and many managers are unable to foresee the benefits from such projects while they are still under development.

7.5 *Proposal for Future Research*

This research is driven from an informed, user-centric (knowledge workers') perspective where the goal is to determine what is the nature of knowledge in a corporate Wiki, how the corporate Wiki is being used, what kinds of knowledge activities knowledge workers are engaging in with the system and other factors such as organisational culture and leadership style that affects the adoption/implementation of Wiki outcomes. Answers to these questions will both inform future design as well as future evaluation plans.

The future KM landscape may seem like an ideal. Yet the future direction seems clear, when given the evolution of the growing demand of knowledge to accessing organisational knowledge, the opportunities presented by newly emergent Enterprise 2.0 technologies and applications; the global trends towards greater knowledge workers' engagement with the organisation and aligning it with emerging business priorities. New models of the next generation KMS are emerging as a response to growing business uncertainty. Instead of treating knowledge workers as passive consumers whose needs are anticipated and controlled by a centralised body of decision makers, these emerging models treat knowledge workers as knowledge creators.

Case organisations C – F (see sections 4.4.3 – 4.4.6) demonstrate that Enterprise 2.0 technologies like blogs, Wikis, and related social, emergent, freeform Enterprise 2.0-style applications will happen in organisations entirely by itself, whether managers encourage it, discourage it, or neglect it. Useful lessons from case organisations C – F can be learnt on how other Enterprise 2.0 technologies can enhance and leverage the corporate Wiki as a KMS. These emerging Enterprise 2.0 based models are designed to improve the knowledge creation processes, helping them learn as well as innovate.

More qualitative studies need to be done on long term use of the corporate Wiki and its impact on organisational culture and learning because in corporate settings "no one seems to own the problem of knowledge-worker performance" (Davenport, Thomas, & Cantrell, 2002), resulting in the lack of demand for the research in this area.

As organisations are beginning to find that corporate Wikis as a KMS are more difficult to sustain than originally thought, the proposed research will explore new paradigms such as the emerging Enterprise 2.0 framework for developing socio-technical systems that are open and extensible, permitting the inclusion of different content material and provide additional services to analyse and evolve content. Also, as the tools for building Enterprise 2.0 tools change, follow-up research will help identify which dimensions of knowledge work become more important or are affected as Enterprise 2.0 tools become more widely diffused, thereby enabling the understanding of corporate Wikis and KMS implementation, and the effects of culture and leadership, over time.

Greater research is required in the softer human aspects of network-centric environments to investigate the relationships that form the complex web of interactions and communications that pertains to knowledge work activities on an Enterprise 2.0 based KMS. Studying these factors will lend greater insight on how organisations learn through the accumulation of social capital. Trying to quantifying social capital is the problem: By itself the term is vague. How do you quantify social relationships and power gradients along those relationships? The application of Go*Team games has made tremendous inroads to study cooperative behaviours in self-directed, distributed teams where collective activity comprises communication and shared understanding, leading to innovative decisions and actions (Warne & Hasan, 2004). The application of Go*Team games will help us better understand the drivers of a network centric environment such as Enterprise 2.0 technologies, social changes, changing economic/business priorities and an architecture of participation culture.

An emerging model KM of context and connection has replaced the older model that merely relies on content and collection of organisational information. Incorporating Enterprise 2.0 technologies that support developing natural language understanding systems like the one used in MyCyberTwin, in particular, is therefore expected to be

especially important (see section 2.3.5.4). By mastering the techniques required to make these new emerging models of the next generation of KMS work, companies will be well-positioned to create substantial economic value. Those who adhere rigidly to the old models will likely destroy significant economic value.

7.6 Concluding Remarks

This research is an attempt to explore the adoption and implementation of the corporate Wiki as a KMS and its potential to support knowledge work. While the popular press has described Wiki implementation successes, few, if any, studies have empirically analysed Wiki failures and the link between understanding knowledge work activities and the effect of culture and leadership on organisational learning, as this study has. The failed projects of case organisations A and B are mined for information that is used for further advantage in this research. Even failures that are not considered successful in the conventional sense can be productive. Thus, this research is important, for many learning organisations that are now currently implementing corporate Wikis toward KM efforts. Such organisations can benefit from understanding organisational culture and leadership's role in Wiki implementation.

Qualitative research involves a thorough identification of disconfirming evidence and alternative explanations. One of the contributory causes for Wiki failure in case organisations A and B is because the Wiki did not meet individual/organisational needs. This study points the need for the consideration of organisational culture and leadership styles when a new technology is implemented that may be compatible with the existing culture (see sections 4.2.2 and 5.4.3). The research findings demonstrate that an organisation will not restructure itself for each new application the way it does around a major new system. An organisation may adapt to a large computer system because of the cost involved, but less expensive Enterprise 2.0 tools such as the Wiki must adapt to the organisation, fitting into existing work patterns and appeal to everyone who must support it. The Activity Theory analysis has revealed that people are motivated by their work dynamics. If these dynamics produce a need to contribute content to the corporate

Wiki, then they will do so. Otherwise, even the motivation of an emerging next generation Enterprise 2.0 based KMS will not suffice to ensure continuous contributions to the Wiki.

Case organisations C – F experience successful Wiki adoption/implementation outcomes because the corporate Wiki meet individual/organisational needs. Knowledge workers need to capture and share tacit knowledge: knowledge that is not documented, that their peers have never previously articulated, and what needs to be thought about. It is important that knowledge activities do not incur the perception of ‘additional work’ but integrated in the daily work routine so that knowledge activities can be motivated by established strategies instead of expecting material and/or immaterial incentives in return for doing knowledge activities (see section 5.4.6). The research findings have shown that knowledge workers are motivated by a reward system to introduce a culture of corporate openness, collaboration and trust (see section 5.2.3.1). Organisations may encourage knowledge sharing by measuring how much and how often employees contribute to the group’s knowledge base and these contributions will be factored into their formal performance evaluations. It can be a motivating factor if promotions and pay raises are tied to these evaluations.

While leadership from senior management is important, it is essential that lower level managers demonstrate leadership attributes to develop and support knowledge culture throughout the organisation. This study revealed that it was the junior managers that spearheaded the KM programs and development of knowledge culture in their teams or divisions. The findings correlate with the view that effective management and leadership are integral to each other and leadership at all managerial levels is required to develop a knowledge culture.

The notion of ‘collective efficiency’ needs to be impressed upon organisations considering the implementation of corporate Wikis. The calculated and secondary effects are combined in collective efficiency where competitive advantage can be gained by attracting a cluster of knowledge workers who can co-create a specialised pool of tacit and explicit knowledge, and diffuse this knowledge among knowledge workers in this cluster. Efficiency gains from the corporate Wiki can be static, such as

the easy access to information and knowledge, or dynamic, such as the timely and reliable dissemination of new ideas. However, collective efficiency is not adequate to develop and sustain the success of the corporate Wiki. This implies a role for management as catalysts or mediators.

What emerges from the findings on innovative countries, is a complex innovation 'ecology' of networks of people and organisations of different natures (government, academia, industry, enterprises, schools etc.) which enhance innovation and make countries flourish and globally competitive. Likewise for case organisations C – F, different interests are represented for the environment to work as an ecosystem. It is noted that case organisations C – E have formal KM departments that demonstrates their genuine intentions to strengthen their businesses through better KM, promote the principles and practice of KM including changes in organisational culture and leadership styles, as fundamental aspects of research and practice, so that they can become better learning and knowledge sharing organisations. More importantly, these organisations have developed networks to encourage cooperation with other organisations and universities. Even smaller organisations such as case organisation F, which do not have a formal structure for KM has participated in social networking to enhance and nurture innovative skills that are critical in engaging knowledge activities.

The first decade of the 21st century is characterised by its fast-evolving, knowledge intensive, and Internet-enabled environment, corporate openness and transparency, the free flow of knowledge, and the concept of anywhere anytime information. These characteristics have become realities rather than empty rhetoric. The aging workforce, increasing competition and the need for organisations to deliver higher levels of customer service to compete successfully have created a need which makes businesses more open to Enterprise 2.0 tools that provide forums and other tools for exchange in which knowledge workers can participate.

The research demonstrates that for those business leaders who choose to resist the encroachment of Enterprise 2.0 technologies, whether they will be successful in silencing dissent without losing the very potencies and creativity that is evident in the fresh, user generated innovative content is an open question. The research lends strong

support to the argument that a corporate Wiki in its pure form will likely not provide the ideal results without harnessing other effective Enterprise 2.0 tools to leverage KM. Enterprise 2.0 technologies will provide many useful extensions to the corporate Wiki rather than fully replacing it. It has the ability to reach out to niche markets while having mainstream possibilities. Combining Enterprise 2.0 technologies with the corporate Wiki to produce a novel KMS is an emerging approach for providing a single point of access to various information sources and applications. For conservative organisations which are struggling to reconcile the need to greatly improve the capture and sharing of organisational knowledge while at the same time are not ready to introduce the vast changes that accompanies an open source environment, a viable hybrid such as MS Sharepoint is the likely compromise.

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Appendix 1: Email Questionnaire

Questionnaire Introductory Statement

Dear Wiki User,

My name is Charmaine Pfaff and I am a PhD student at the University of Wollongong, Australia. I am conducting this very short survey to improve and redesign the use of corporate Wikis in organisations as part of my PhD research. You can help me by taking 10-15 minutes to complete this survey.

All answers provided will be kept strictly confidential. If you choose to provide your name and contact information at the end of the survey, you may be selected for a follow-up interview.

| | |
|--|--------------------------------|
| Name: _____ | Job Title: _____ |
| Phone number: _____ | Email: _____ |
| Age Group : 18 – 24 25 – 34 35 – 44 45 – 54 55 – 64 65+ _____ | |
| Number of years in the organisation: _____ | |
| Name of Organisation: _____ | Type of Organisation: _____ |
| 1. Does your organisation/department/unit have an intranet or Wiki or Knowledge Management Systems (KMS)? Answer type: Intranet Wiki KMS Other IF ONE OF THE ANSWERS TO QUESTION 1 ABOVE IS WIKI, PLEASE ANSWER THE QUESTIONS BELOW: | |
| 2. How many years has your organisation/department/unit been using a Wiki? _____ | |

| |
|--|
| <p>3. How often have you used the Wiki?</p> <p>Answer type: Often Sometimes Rarely Never</p> <p>_____</p> |
| <p>4. What do you use the Wiki for?</p> <p>_____</p> <p>_____</p> |
| <p>5. What kind of features would you like the Wiki to have?</p> <p>_____</p> <p>_____</p> |
| <p>6. What did you not like about the previous intranet or KMS?</p> <p>_____</p> <p>_____</p> |
| <p>What kind of organisational culture does your organisation have?</p> <p>Answer type: * Openness to change/innovation culture Task-oriented Bureaucratic Competition/Confrontation</p> |
| <p>What kind of leadership style does your manager have?</p> <p>Answer type: ** Participative Consultative Autocratic Authoritative</p> |

Notes to Participants:

* **Openness to change/innovation** culture adopts a humanistic orientation, affiliation, achievement, self-actualisation, task support, task innovation, and hands-on management (Xenikou & Furnham, 1996). Such an organisation is considered friendly and open to change (Ladd & Herminger, 2003). In this culture, the leader is continuously managing conflict, seeks consensus and actively pursues participation, commitment, openness and morale (Cameron & Quinn, 1999).

Task-oriented organisational culture adheres to being the best, innovative, attentive to detail, quality and profit oriented, and having a shared philosophy (Xenikou & Furnham, 1996).

Bureaucratic organisational culture is based on centralised decision making. It adopts the following concepts: approval, conventionality, dependence, avoidance, and a lack of personal freedom (Xenikou & Furnham, 1996).

Competition/Confrontation organisational culture typifies oppositional orientation, power, competition, and perfectionism (Xenikou & Furnham, 1996). Since perfection is the main objective of the firm, then individuals may react negatively towards the ideas of others or resist new ideas.

****Participative leadership style** (Likert, 1967) is democratic and existential team-builder (Quinn & McGrath, 1958). The manager is continuously managing conflict, seeks consensus and actively pursues participation, commitment, openness and morale.

Consultative leadership style sees managers constantly give direction and encourage participation of employees.

Autocratic leadership style means that the manager's power is based on information control, and as a result, documentation and information management are actively pursued.

Authoritative leadership style is adopted when it is common in the work environment for the managers to tell subordinates what to do. Motivation is through fear of punishment, or reward or personal loyalty to an individual (Handy, 1985).

Appendix 2: Interview Questions for Case Organisations A & B

1. What kind of Intranet software does your organisation use?
2. What was the main purpose for implementing an Intranet?
3. What is the Intranet used for?
4. How long has the Intranet been used?
5. How many people use the Intranet and to what age group do they belong?
6. What is the main purpose for implementing a Wiki?
7. What kind of organisational culture and management type does your organisation have?
8. What are the social, legal, management, and technological challenges/barriers to implementation, and how do you intend to resolve them?
9. From your experience, what recommendations can you make for the Wiki to be more utilised to support user interactivity, collaboration, communication, and knowledge creation in a way that engages and motivates the user?

Appendix 3: Interview Questions for Case Organisations C - F

1. What is/are the Wiki(s) used for?
2. What was the main purpose for implementing a Wiki?
3. What kind of organisational culture and management type does your organisation have?
4. What are the social, legal, management, and technological challenges/barriers to implementation, and how do you intend to resolve them?
5. How many people use the Wiki and to what age group do they belong?
6. From your experience, what recommendations can you make for Wikis to be more utilised to support user interactivity, collaboration, communication, and knowledge creation in a way that engages and motivates the user?