A SENSEMAKING APPROACH TO
KNOWLEDGE MANAGEMENT IN ORGANISATIONS
FOR INFORMATION SYSTEMS CHANGE

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STATEMENT OF AUTHENTICATION

The work presented in this thesis is, to the best of my knowledge and belief, original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part, for a degree at this or any other institution.

Cate Jerram
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ABBREVIATIONS USED IN THIS THESIS

#A    Interviewed Academic
#A/E  Interviewed Academic in Executive position
#E    Interviewed Executive
#AO   Interviewed Administrative Officer
#KW   Interviewed Knowledge Worker
ABS   Australian Bureau of Statistics
CEO   Chief Executive Officer
CIO   Chief Information Officer
CSS   Central Student Services
FAO   Faculty Administrative Officer
ICT   Information and Communication Technologies
IM    Information Management
IMKM  Information Management Knowledge Management
IS    Information Systems
ISKM  Information Systems Knowledge Management
IT    Information Technology
ITD   Information Technology Directorate (UEA)
KM    Knowledge Management
KW    Knowledge Worker
OVC   Office of the Vice Chancellor
SSC   Student Service Centres
TSD   Technical Services Division
UEA   University of Eastern Australia¹
VC    Vice Chancellor

¹ Not the real name
LIST OF RELEVANT PUBLICATIONS BY AUTHOR


ABSTRACT

This dissertation focuses on conceptual frameworks from which to study information systems knowledge management (ISKM). Knowledge management (KM) is an emergent discipline arising from a breadth of fields with conflicting definitions and approaches to applying KM processes. The diversity of approaches is symptomatic of the need for development of theoretical foundations that provide a deeper understanding of the knowledge phenomena in organisations, and for KM methodologies grounded in such theoretical foundations.

This thesis addresses that need by drawing on sensemaking theory (Weick, 1995; Wiley, 1994) and Cecez-Kecmanovic’s (2000) “Sensemaking Framework of Knowledge Management in Organisations” as a conceptual and analytical framework for ISKM. The sensemaking framework is developed into a methodology for exploring knowledge phenomena and improving KM processes. The use of sensemaking methodology for KM is explored using comparative case studies of two knowledge-intensive organisations, the Australian Bureau of Statistics and the University of Eastern Australia, focusing on the manner in which they each engaged in a major change of their information systems and technology. Interpretive analysis is conducted on interview data, first coding to categorise the data then applying the sensemaking framework. In response to this empirical testing, the sensemaking framework is developed further as a methodology for knowledge management practice.

Application of the sensemaking framework demonstrates that KM methodology can contribute to understanding systems changes in organisations and their implications for knowledge creation, knowledge sharing and cultural development of an organisation. It indicates that using the sensemaking framework provides potential to more successfully manage the tensions within organisations, particularly during systems and technology change. The study highlights conflicting tensions on various sensemaking levels, such as that between individual need for creativity and flexibility against organisational need for regulatory standardisation, and demonstrates the need for organisations to seek answers to these challenges within their own cultural setting.
CHAPTER 1 INTRODUCTION

Knowledge management (KM) has become an arena of increasing interest in the Information Systems (IS) discipline and for many organisations since the 1990s. Organisations that invest in KM and approach KM practices strategically claim they derive significant benefits through improving their KM practices and employing information technology (IT) based systems that are designed to support knowledge management. This interest in improving organisational performance, increasing business profitability and competitive advantage through KM, is accompanied by a plethora of both scholarly and popular literature. These publications originate from many different disciplines such as Information Systems, Organisation Studies, Human Resource Management, Librarian Sciences, Psychology, and Computer Science, among others (Bahra, 2001), dealing with knowledge phenomena, knowledge management and information systems for knowledge management. Such publications are dedicated to defining, modelling or implementing KM as well as technological systems and support. Yet, particularly within the IS discipline, there is a dearth of significant literature that provides theoretical foundations or conceptual frameworks upon which to build this emergent discipline of Knowledge Management.

Concern to date, in business and academe, has primarily focused on information technology aspects of knowledge management support, or providing structure to the definitions, methods and models being developed. The disparity in various definitions and approaches within the literature (Mentzas, Aspostolou, Young & Abecke, 2001) and unfulfilled expectations from information systems and applied models in KM praxis in the business world (Storey & Barnett, 2000) indicate the need for further conceptual developments and theory-based approaches to both KM research and practice. Clearer theoretical foundations are needed for better comprehension of the knowledge creation, sharing and use in organisations and the ways in which knowledge management can be improved. This thesis explores the nature of knowledge, the dynamic of knowledge processes and the impacts of technology on these processes in organisations. This dissertation addresses two major research questions. One is the need for development of a theoretical foundation that provides a deeper conceptualisation of the knowledge phenomenon in organisations. The second question, or research objective, is the development of methodology that assists in exploring these phenomena in order to
improve KM processes. To approach these research questions an empirical study was required that focused on depth rather than breadth. Therefore the research undertaken for this dissertation included two in-depth interpretive case studies, one representative of successful KM practices and the other representative of failure to address KM issues. Both organisations were engaged in a major change in their information systems and technology processes which provided a sound basis for comparison of their practices. A theory of knowledge in organisations and of knowledge management was also required and this was developed founded upon works by Wiley (1994), Weick (1995), Ryle (1949), Cecez-Kecmanovic (2000) and Tsoukas (1996) and the case studies were analysed using the sensemaking theory arising from this theory development.

This dissertation consists of eight chapters, a reference list and appendices. Chapter 2 provides an overview of knowledge management literature. At the simplest level the chapter examines various definitions and conceptualisations of the concepts of data, information, knowledge and knowledge management found in the literature. At a deeper level the division of thinking between knowledge management that is focused on people, creativity and interrelationships against knowledge management that is focused on data and technology is discussed, as is the controversial question as to whether knowledge is an individual or social phenomenon or both. Re-examining the plethora of different possible definitions and approaches to knowledge and the nature of knowledge from these separate perspectives leads to the conclusion that, rather than discuss the concepts at a definitional level, there is a need to examine more deeply the conceptual theories and meta-theories that underlie, or are the origin of, the definitions proposed. The chapter addresses this gap in the literature and concludes that examining knowledge management at a definitional level is inadequate for both theoretical and practical purposes and that investigation into the conceptualisation of knowledge and of knowledge management requires a deeper probing into the nature of knowing and organising.

Therefore Chapter 3 studies a smaller, more selective collection of literature that draws on the works of Wiley, (1994), Weick (1995), and Cecez-Kecmanovic (2004, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002; Jerram, Cecez-Kecmanovic, Treleaven & Sykes, 2003), developing a theory of sensemaking as a means of analysing knowledge and knowledge processes and systems within an organisation, and also that of Tsoukas
(1996; Tsoukas & Vladimirou, 2000), exploring organisation as a distributed knowledge system. This chapter develops an appreciation that socially constructed views of knowledge, knowledge processes and knowledge management are a promising approach to knowledge management within organisations, and that these socially constructed views are highly compatible with one another. Drawing from some of these socially constructed views, a framework of understanding, sensemaking and knowledge in organisations is developed as a theoretical foundation of the thesis. The framework thus developed in this chapter is used to analyse empirical data gathered in the study of two knowledge- and information-intensive organisations. The development of the sensemaking framework addresses the first research question regarding the development of a theoretical foundation that provides a deeper appreciation of the knowledge phenomenon in organisations. This leads to more specific requirements for knowledge management methodology that needs to be developed to assist in exploring these phenomena and improving KM processes, which is the second research question addressed by this study.

In Chapter 4 the research methodology\(^1\) employed in the design, conduct and analysis of the research study is explained. The research questions are clarified and defined as “the development of a theoretical foundation that provides a deeper understanding of the knowledge phenomena in organisations and, based on that, development of methodology that assists in exploring these phenomena and improving KM processes”. As the research questions are both conceptual and pragmatic in nature, epistemology, ontology and method are all discussed. To address the research questions an interpretive approach is taken (Neuman, 2003; Patton, 2002; Klein & Myers, 1999; Schwandt, 1998), particularly using theory-based interpretation informed by the sensemaking approach developed in the previous chapter. The underlying epistemology is defined as one in which knowledge is perceived as something that is assumed, shared and created within and between people. Knowledge management from this perspective is therefore more about people and their work processes, creativity, synergy, social interaction and

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\(^1\) The focus of this thesis is methodology of knowledge management in organisations, yet research methodology is also an important approach discussed as part of this thesis. Accordingly, two uses of the term ‘methodology’ are distinguished here. When the word ‘methodology’ is used alone, it refers to the topic of the thesis – methodology as it relates to knowledge management. When the subject under discussion is the research methodology used to conduct this research study, it is specifically referred to as ‘research methodology’.
sensemaking than it is about data or information management although both data and information management become, within those parameters, necessary components and by-products of knowledge management (Cecez-Kecmanovic, 2004, 2001; Cecez-Kecmanovic & Jerram, 2002; Tsoukas, 1996).

The ontological approach of the thesis is described as an essentially modernist or “late modernist” perspective that borrows from postmodern thought regarding values and standards (Giddens, 1984; Neuman, 2003). Knowledge management as a discipline and as a social science (as approached in this thesis) focuses on human values in ways that information management and traditional positivist IS do not (Trompenaars & Hampden-Turner, 2004; Styhre, 2003). The approach taken in the study is also subjectivist, working from the assumption that reality is personally interpreted and socially constructed (Neuman, 2003; Berger & Luckman, 1966). This perception of reality leads to understanding the nature of reality as interpreted by the process of sensemaking and the nature of knowledge as embedded within and resulting from sensemaking in organisations (Weick, 1995; Boland et al., 1994; Daft & Weick, 1984; Cecez-Kecmanovic, 2004, 2001; Cecez-Kecmanovic & Jerram, 2002). The sensemaking perspective assumes a socially constructed world of which each person constructs their own understanding based on personal experience and social interactions. Individually created meanings are modified and developed through interaction with other individuals in a collectively or collaboratively shaped process of interactive meaning making. Such ontological conceptions necessitate research methodologies that make sense of empirical evidence through socially constructed and mediated meanings. Thus interviews with staff involved in the knowledge management processes of the organisations studied are the principal means of gathering empirical evidence for studying the nature of knowledge and knowledge management in the two case study organisations. Apart from in-depth semi-structured interviews each study involved time spent in the field observing work processes and collecting documents.

The analysis of empirical material is interpretive in nature informed by the sensemaking model and employing a hermeneutic circle, contextualisation, multiple interpretations, abstraction and generalisation (Klein & Myers, 1999). The principle of the hermeneutic circle is engaged with consideration of the individual interviews in the context of the larger story that can be pieced together from all the interviews combined, and in the
engagement of the sensemaking theory that looks at the organisation as a whole, then interprets it at four different levels of sensemaking then again places the understandings thus gained back into the context of the organisation as a whole. Each case study is contextualised, examining the current and historical organisational and social contexts in which the events examined took place. As a wide variety of individuals from different employment levels and organisational circumstances were interviewed multiple interpretations and disparate range of views on the cases studied were revealed and discussed. The principle of abstraction and generalisation is particularly important in this thesis with an equal focus on the methodological development based on sensemaking theory worked in tandem with the empirical testing of that theory in the analysis of the two case studies employed.

Furthermore, first order analysis (Patton, 2002) was adopted to develop perception of the events studied as viewed and articulated by the participants and second level analysis was employed to interpret these perceptions through the sensemaking lens using the sensemaking framework. Second level analysis and synthesis of understandings developed led to further development of theory and models, continuing from the original theory development expounded in Chapter 3. The chapter therefore outlines how the empirical studies were conducted and used to further develop the theory originally presented in chapter 3 and to develop sensemaking methodology for knowledge management.

Chapters 5 and 6 each present a case study. Chapter 5 examines the information systems and technology change of the Australian Bureau of Statistics – an organisation commonly recognised as employing best practice in knowledge management (Chatwin, 2003). In contrast, Chapter 6 presents the systems and technology change of the University of Eastern Australia2 – an organisation that did not employ knowledge management principles or practice. In Chapter 5, the sensemaking model of knowledge in organisations helps to identify sources and incidents of best practice in knowledge management, as well as frictions that arise in the employment of the ABS Knowledge Management Initiative (KMI). Analysis using the four sensemaking levels (cultural/extra-subjective, organisational/generic-subjective, collective/inter-subjective and individual/intra-subjective) highlights the importance of congruency between the

2 Not the real name
sensemaking levels. Typically there are tensions between sensemaking levels and knowledge produced at each level. However, the analysis of the ABS case revealed a harmonious interaction within the levels. Although tensions between the different levels of sensemaking are inevitable, the degree of harmony between the vision and strategic goals of the different levels of the organisation, the cultural or extra-subjective values, strategic policy setting that shapes the generic-subjective meanings and leadership that is accessible to, and understandable by intra- and inter-subjective meaning making within the organisation create an organisational workplace in which knowledge, knowledge workers and knowledge management are identified, encouraged and developed. Culture, strategy and leadership are, for the most part, harmoniously developed and implemented to support clearly identified core business processes and the generic-subjective meanings of the organisation identify and work effectively within that shared understanding.

The study in Chapter 5 draws out how technology is a key ingredient in the ABS KMI and is a pivotal issue for the inter-level tensions that develop within the organisation as well as for effective delivery and maintenance of the ABS’ KMI. It is a stated claim by the Technical Services Division (TSD) in the ABS that technology is always subservient to strategically determined needs and core business within the ABS. Technology is also recognised throughout the ABS as a key driver to the ABS KMI success. Nonetheless, interviews with ABS knowledge workers revealed that the technology was, despite unusually harmonious implementation, consequently also a source of tension and challenge. Analysis showed that the primary problems and sources of discontent that arise from the selection and use of technology originate between the organisational structures (that require consistency, standardisation and uniformity to provide stability for the organisation) and the individual intra-subjective and group inter-subjective understandings (that require freedom for customisation and autonomy in work processes). Individuals express these tensions as frustration, perceiving these generic-subjective standardisation issues as interference in their intra-subjective and sometimes inter-subjective ability to make sense of, and have control over, their own work environment. The ABS KMI team endeavours to minimise the negatives that arise in response to various initiatives instituted throughout the ABS for knowledge management purposes but had been unaware of these tensions. The chapter concludes by drawing attention to how this theory-based awareness of the tensions as elicited by
the sensemaking framework indicates the need for the ABS to recognise the potential detrimental impacts of these tensions and to search for means to resolve them.

In contrast, Chapter 6 provides a picture of knowledge management failure during a critical period of information systems and technology changes in the UEA. As part of the UEA restructure (creation of a unitary university out of three member universities) all information systems needed to merge and the three different cultures were also expected to merge but there was a failure to provide a successful generic-subjective understanding that could be uniformly grasped and engaged with across all sectors of the organisation. This is surprising, given that the three organisational entities that were to merge had a history of conflict and rivalry. Without generic-subjective understandings to reconcile three disparate sets of experience, perception and thought structures and to enable common meaning making in the new structure, employees were provided no means, opportunities or tools with which to engage intra-subjective or inter-subjective meaning-making to make sense of the restructure processes. This failure to provide a new generic-subjective structure of meanings for mutual understanding to underpin the newly forming organisation, coupled with a failure to provide means to develop a new and unified extra-subjective cultural sense, resulted in decisions that disrupted core business (education and research) processes and the supporting knowledge management processes within the organisation. A key aspect of this organisational ineffectiveness was the failure to provide a unified vocabulary or set of policies for unambiguous generic-subjective understandings and shared meanings throughout a disparate organisation in the process of merging and unifying three previously autonomous organisations.

The UEA case study highlights the power of unexamined assumptions to prevent clarity of understanding, communication, design or sensemaking. The study also demonstrates that presupposed negative expectations about systems and technology change became a self-fulfilling prophecy largely borne out through what the UEA leadership itself acknowledge to be the omission of knowledge management and knowledge management practices in the planning and implementation of change management. The study shows how, in the second phase of the study, new measures are taken by the UEA to identify past failure and started to implement new strategies and policies to deal with knowledge management issues, without explicitly recognizing it as a knowledge management approach. These new strategies include providing common foundations
for new generic-subjective understandings and purposeful development of extra-subjective values, and other strategic planning and knowledge management practices so conspicuously lacking in the first years of the systems and technology change discussed in the study.

Chapter 7 analyses the differences between the two case studies and the implications for knowledge management practice, theory and discipline. The use of the four levels of sensemaking contributes insights that offer potential development in knowledge management methodology and practice. Specific pragmatics that emerge within the chapter include the need to engage all levels of sensemaking to support and develop core business processes and strategic planning. The analysis of the two studies and their comparison highlight the importance of seeing the organisation as a distributed knowledge system within which knowledge is (re)created, shared and deployed simultaneously at all sensemaking levels and among them. The dynamics of knowledge sharing and transformative impact of knowledge from all four sensemaking levels is the key focus of this knowledge management methodology. The study highlights that a successful knowledge management methodology (to a large extent exemplified by the ABS) strives for a harmonious evolution of knowledge management processes and complex changes in the distributed knowledge system. The study also shows that when technology is used to significantly impact upon some domains of knowledge creation, sharing, reproduction and deployment (as was the case in both the ABS and the UEA), key aspects of success include sensitivity to culture, social structures and social interaction, as well as the role, place and position of individuals within these sensemaking processes. It goes on to show that because all four levels of sensemaking are simultaneously changed within any organisational or technology change, failure to address the dynamics of knowledge management processes within and between all four levels, inevitably increases tensions, and causes dysfunction, resistance, dissatisfaction, ultimately risking organisational failure (Cecez-Kecmanovic, 2004, 2001; Cecez-Kecmanovic & Jerram, 2002).

Analysis identifies that, particularly at the level of inter-subjective sensemaking, there is a need to foster collaborative and cooperative work practices in all aspects of information management, knowledge sharing and socialisation, giving people-centric initiatives priority over techno-centric drivers in developing knowledge management praxis and in
managing systems and technology changes. The systems and technology themselves need to support knowledge management and strategic planning goals that are focused on fostering knowledge work, knowledge workers, key business drivers and core processes.

Chapter 8 summarises the findings and outlines the contributions and implications of the research. There are two primary contributions of this thesis to the theoretical understanding of KM and to knowledge management praxis. The first offers a new theoretical foundation to knowledge management through the lens of sensemaking theory. The second is the knowledge management methodology developed from the sensemaking theory, which offers new insights into how to more effectively identify and manage tensions that arise between different sensemaking levels, and how to more effectively address the negative issues that can arise from even best practice knowledge management initiatives. Further contributions include discussing issues that precipitate many of the more problematic issues in KM praxis, such as unexpected consequences, unexamined assumptions and resistance to KM initiatives by knowledge workers.

Overall, the pragmatic implications arising from this study for knowledge management in organisations include a need to shift perception and methodology from technocentric to people-centric and from tactically-planned to strategically-planned initiatives that acknowledge and work with the different sensemaking levels from which an organisation’s people engage with KM. This shift in focus will result in considerable changes in pragmatic methods and designs for knowledge management initiatives and practices. Future research needs are raised to address the parallel need to resolve identified tensions between sensemaking levels to more effectively manage the dynamic of knowledge between the sensemaking levels. More importantly, the conceptual and methodological implications arising from the empirical testing of this study demonstrate the usefulness of sensemaking theory and a concept of the organisation as a distributed knowledge system for better discerning the needs of organisations in systems and technology changes. It also demonstrates the importance of knowledge management praxis at times of systems and technology change as it becomes evident that the management of knowledge, knowledge workers and knowledge processes occur whether knowledge management is or is not intentionally addressed. This has far-reaching consequences for knowledge management theory and praxis.
CHAPTER 2 AN OVERVIEW OF THE DEFINITIONAL FIELD

This thesis explores knowledge management within the information systems paradigm particularly focusing on the concepts and methodologies that underlie and support the discipline. This exploration is accomplished through literature review and empirical investigation. The review of the literature is conducted in two parts; firstly to explore definitions and secondly to explore concepts and theoretical foundations. This part, Chapter 2, undertakes an overview of the definitional field of knowledge management. This is necessary as knowledge management as an academic discipline and as a business practice, is still in considerable chaos “although knowledge management is popular among academics as well as among organisational practitioners, the concept is still surrounded by ambiguity” (Huysman & de Wit, 2003, p.27) with a diversity of approaches and few agreed-upon definitions to provide a common lexicon. Any discussion of knowledge management in the current state of the discipline usually requires a preliminary investigation of etymological issues to find a common core of definitions with which to discuss the subject, as “…definition is an important early step on the road to specifying one’s cognitive map of knowledge processing and KM and to ultimately developing quality models useful for developing KM solutions” (Firestone & McElroy, 2003, p.2).

This chapter explores that diversity of definitions. It begins with a quick review of the current state of the discipline, and then explores the problematic issue of defining the words knowledge, information and data, generally. To clarify the definitional arguments, specific approaches to the definition of knowledge, information and data are then examined. This begins with approaches that consider context, experience, and meaning, and then progresses to those that focus on knowledge as actionable know-how. Two divisive issues are looked at more particularly including the division between those who see knowledge as codifiable opposed to those who see it as a personalised internal property of the individual, often argued in terms of 'explicit' and 'tacit' knowledge, and secondly looking at the attempts to perceive individual knowledge as separate from social knowledge. As there are no key drivers explaining origins or reasons for any of the definitions explored the study then examines the reasons knowledge management is being explored and invested in by organisations and academics. Consequently, the next part of the chapter looks at definitions that reach toward core business goals and
purposes. Lastly the study looks at definitions in which information management and technology (knowledge management tools) are paramount. Finally some conclusions are drawn about the various definitions offered by the field of literature considered and the conclusion is drawn that, whilst the definitions offer important background knowledge to the field, state and aims of current knowledge management praxis it is necessary to explore more deeply for conceptual and theoretical foundations to determine selection of knowledge management definitions. These are then explored in Chapter 3.

**CURRENT STATE OF KNOWLEDGE MANAGEMENT PRAXIS AND LITERATURE**

Knowledge is that slippery and fragile thing or process we have a hard time defining. It has the curious characteristic of changing into something else when we talk about it (Spiegler, 2000).

As this thesis explores knowledge management, some preliminary definitional clarification is required, and this section of the study focuses on clarifying some basic definitions in knowledge management. What is knowledge management? A survey of the material and literature commonly regarded as seminal or core to knowledge management within the Information Systems discipline reveals a consistent pattern of basic disagreement and inability to concur on common definitions. There is concurrently a widespread agreement that knowledge management is not information management, and an almost equally widespread slippage into information management when discussing and developing the theme of knowledge management. This adds to the preliminary task of defining knowledge management the need to differentiate between information management and knowledge management.

Where the practice of knowledge management (indeed the very expression “knowledge management”) has most frequently gone awry is in failing to see the tremendous differences between (1) what is required to take a function that has involved human judgement and reducing it to a problem of information processing (for example, Amazon’s book recommendations) and (2) what is involved in supporting a function in which human judgement continues to play a central role (such as determining how to resolve a complex insurance claim) (Canner & Katzenbach, 2004, pp.27-28).

Theoretically, distinguishing between the two should be a simple task of turning to the literature, in which one would anticipate finding both clearly explicated dictionary-type definitions and expanded definitions-in-use created implicitly by discussion of the functions of and differences between knowledge management (KM) and information management (IM). But there is a lack of consistent definition and direction in knowledge
management. Neither clearly explicated nor functionally implicit definitions can be found in the literature – or, rather, so many diverse and contradictory definitions are found that one is inevitably lead to the uncomfortable conclusion that knowledge management has no coherent foundation of definition or direction. This can be viewed as a necessary stage of growth in the development of a new discipline, and it has been suggested (Firestone & McElroy, 2003, p.332) that it is still too early in the formation of a KM discipline to attempt to stabilise definitions and standards. Hoffmeister of the Knowledge Management Consortium International suggests that there are three basic stages of development of any new field of study or practice. The first is of relative chaos, the second reflects the current position of KM which “is the stage in which commonly held principles start to form” (Firestone & McElroy, 2003, p.332) and once the second stage is established with stability, “it will be time to proceed to the third stage and to consider the development and adoption of standards for KM. But not before!” (ibid) (italics in original).

It could be said that before defining knowledge management or information management, it is required that ‘organisation', 'knowledge' and ‘information’ be defined, and works attempting to do so abound. 'Organisation' has established and coherent definitions which will be dealt with in Chapter 3. 'Information' and 'knowledge' (along with 'data'), on the other hand, are as hotly debated as 'information management' and 'knowledge management' and are just as far from a coherent and widely accepted definition. Working definitions are rarely consistent with one another – often parallel, frequently contradictory or mutually exclusive. Nevertheless, despite lack of agreement on what, specifically is data, or information or knowledge, common practices in using any or all three, continue, as does agreement on some critical aspects of practice.

Users' contexts and the information manufacturing process make it difficult for users to determine precisely whether the piece is data, information, or even knowledge. Although it might take a decade just to define all three words, we all agree that the transformation of data for clearer and more meaningful information to users is important (Huang 1998, viewed Feb 2002).

Despite that 'agreement' on the need for 'clearer and more meaningful information', commonality is, for the most part, restricted to agreement on what knowledge management is not. Knowledge management is not information management. Knowledge management is not data basing. Knowledge management is not something to be solved by leaping into a technical solution (Tissen, Andriessen & Deprez, 2000; Levy, 1998, 1999; Thierauf, 1999; Huang et al, 1999; Davenport & Prusak, 1997),
whereupon agreement ends. So what is knowledge management? To investigate knowledge management it is necessary to sort through all the competing definitions to clarify 'knowledge', 'information' and 'data' – all of which are constantly referred to or used in discussions of knowledge management.

**Knowledge, Information or Data**

In fact, it appears that knowledge workers in this post-industrial society are stuck somewhere between data and information, with a long way to go before they achieve full understanding and knowledge, and only a slight chance of attaining wisdom anytime in the near future (Park, 1998, p. 2).

What is knowledge? There seems to be universal acceptance that "knowledge itself is power" (Huang, 1998 viewed 11 February 2002) from Francis Bacon in 1597 *Ipsa Scientia Potestas Est* (Kiernan, 2000) to Robin Giang of International Data Corporation in 2004: “Knowledge is power, and to publish your knowledge is to relinquish it” (Effron, 2004, p.43). Some of the simpler defining statements seem to be acceptable to all theories of definition. Thierau's "...information is the raw material of knowledge" (1999, vii), for instance, fits most definition theories. But beyond that, consensus is partial and spasmodic. 'Knowledge' is almost always defined against the background or comparison of definitions of 'information' and 'data', or is confused with them. "In practice, the terms data, information, and knowledge are often used interchangeably" (Huang et al, 1999, p.146). "...but still definitions of KM are conspicuously similar to those given in the past for MIS, DSS, EIS and related systems" (Spiegler, 2000, p.4). This tells us that the problem does not originate with this one argument. Debate within the KM discipline about meanings for information and knowledge are simply continuations of older arguments in Information Systems about definitions for and parameters of information and knowledge, when considering management information systems, decision support systems, executive information systems and such like (Dervin & Nilan, 1986). Checkland comes to the same conclusion that Dervin and Nilan (1986) made that the rapidly growing IS literature... exhibits two characteristics which are disquieting. Firstly it reveals much confusion, even about such basic concepts as 'data', 'information', 'knowledge' and the relation between them. Secondly, conventional wisdom, as embodied in college textbooks for young students, is well out of touch with reality (Checkland, 2000, p. xii).

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The second of these disquieting characteristics will be discussed in Chapter 3. At this point we will look at the first – the confusion about basic concepts and relations.

By dictionary definition (Oxford English Dictionary, 2002), knowledge is personal to a human and involves personal awareness and or experience, and the act of informing others is the act of sharing knowledge by giving information that will become knowledge when taken on board, with understanding, by others. This definition is simple, clear, justifiable, sustainable, and resolves considerable confusion, allowing more coherent discussion of KM concepts than most of the myriad definitions that will be considered in this chapter. There are three primary difficulties against being satisfied with this otherwise sound definition. The first is that there is no sound theoretical base for the determining of the definitions and meanings. Dictionary definitions are a combination of common and historical usage (Miller, 2002, viewed 28 October 2004). Whilst the etymology of a word may give some grasp of theoretical bases, this is not a concern of the dictionary. For conceptual frameworks and theoretical foundations for the building of purposeful understanding, we need to look beyond the dictionary, although it remains a touchstone to keep theoretical flights of fancy grounded in common understanding. The second is that it does not allow for the complexity involved or take into consideration many of the issues that evolve when considering knowledge within the context of an organisation. The third is that the majority of organisations are locked into current non-dictionary common-usage misunderstanding of interchangeable information-as-knowledge, and a confusion of 'tacit/explicit' originating in Nonaka’s work (1995). Nonaka's work and definitions for tacit/explicit will be discussed later in this chapter and in Chapter 3.

Although the dictionary is not an adequate source for determining academic meanings and foundations for a discipline, it remains a touchstone and a benchmark against which academic definitions can be measured for realism and congruency with common perception. It is reasonable, therefore, to begin by looking at the dictionary definitions for data, information and knowledge, which are distinct, linked, and not interchangeable. Definitions in the Concise Oxford Dictionary (2002) are:

Datum (data pl): n 1. a piece of information. 2. an assumption or premise from which inferences may be drawn.

Data: n facts and statistics used for reference or analysis – philosophy things known or assumed as facts, making the basis of reasoning.
**Information:** n 1. facts or knowledge provided or learned as a result of research or study. 2. what is conveyed or represented by a particular sequence of symbols, impulses, etc.

**Know:** v 1. be aware of through observation, inquiry, or information. – have knowledge or information concerning. – be absolutely sure of something. 2. be familiar or friendly with. – have a good command of. – have personal experience of.

**Knowledge:** n information and skills acquired through experience or education. – the sum of what is known. – philosophy a true, justified belief, as opposed to opinion. 2. awareness or familiarity gained by experience. (Pearsall, Trumble, Soanes, *et al*, 2002).

The degree of interchangeability between the words is immediately apparent in the dictionary definitions, where both datum and knowledge refer to information, and information to knowledge. However datum is seen as only a ‘piece’ of information, rather than as ‘information’. Know and knowledge similarly refer to information as a ‘part’ or ‘contributor’ toward the whole. The first important clarification point to acknowledge in these definitions is the focus on ‘personal experience’ and ‘familiarity’ as a necessary component of knowledge that is not necessarily a component of information.

This makes it impossible to acquire “knowledge” without either experiencing something yourself or interacting with someone else who has… The fundamental, undeniable fact is that knowledge is intrinsic to human beings and is gained only by participating in an experience or having contextual understanding of that experience… Knowledge exists only in people (Effron, 2004, p.40).

This emphasis on personal experience adds a dimension to the argument that is not always considered in many of the debates, which is that of 'contextual understanding'. This is discussed later in Chapter 3 under the heading 'sensemaking'.

The dictionary definitions cast another interesting light on the arguments, as it reverses the normal perceived direction – according to the dictionary, information arises out of knowledge, is knowledge acquired and imparted. Normal perception of information is as Thieraut's (1999, vii), "...information is the raw material of knowledge" – that information feeds knowledge, rather than originates from. The dictionary clearly delineates data, information and knowledge as nouns (things) and 'knowing' or 'to know' as a verb (process or action). However in the literature, 'knowledge' is often used as an active extension of the verb 'to know'. ‘Borrowing from the epistemological perspective of the American Pragmatist philosophers, we call what is possessed ‘knowledge’ and
what is part of action ‘knowing’ (Cook & Brown, 2002, p.70). Spiegler touches on this pivotal area of difficulty – by common usage and perception, is knowledge a noun or a verb, a 'thing' or a 'process'?

The dimensions of knowledge show it to be a slippery concept that to some is a "thing", to others an expertise, still to others an ability to act, up to a process of knowing. We observe that knowledge is recursive and reflexive in nature, a process that generates new data and information, as well as new knowledge (Spiegler, 2000, p.4).

Spiegler proposes that part of the difficulty of pinpointing whether an item is knowledge, information, or data, lies in the cyclical nature of the three in use and practice: "Yesterday's data are today's information, and tomorrow's knowledge, which in turn recycles back through the value chain into information and then into data" (2000, p. 3) (italics in original). This aligns with the dictionary definition of information being imparted from knowledge. The dictionary doesn't identify it but it necessarily follows that information then feeds knowledge.

A similar image to Spiegler's recycling, refers to knowledge transfer as a 'circulatory system':

...knowledge subsumes information, which represents both the input to knowledge development and the form in which knowledge is transferred – its 'circulatory system'… Knowledge acquisition (learning) and creation (invention, innovation) can only occur to any significant degree in the human brain. On the other hand knowledge is clearly 'reflected' in other ways (Burton Jones, 1999, p.6).

Certainly the view that knowledge is a fluid, processual reality and that knowledge, information and data are in a constant state of flux, is almost universal. Davenport and Prusak describe it as a "flux mix" (1998 p. 5). Few references these days see knowledge as a static, fixed and unmoving 'thing' – it is rarely seen as only a noun but rather as simultaneously noun and verb, both a possessable thing or asset, and an actionable process. "As firms evolve from competition based on cost to value to core competency, knowledge is increasingly recognized as the most valuable asset of the firm" (Huang et al, 1999, p.97). Knowledge is frequently regarded as a saleable commodity, a possession to be protected, sold, capitalised, etc. "Knowledge is becoming a product. In some areas – accountancy, the law, and advertising – this has always been the case" (Tissen et al, 1998, p. 21).
Another area of semi-concurrence is the 'value-added' view in which data + something = information; information + something = knowledge. The primary difficulty with this concept lies in the basic disagreement on what is data, what is information, and what is knowledge... and what – or how much – value is added from one to achieve the other? "If data becomes information when they add value in some way, then information becomes knowledge when it adds insight, abstractive value, better understanding" (Spiegler 2000, p.8). References always include a process of some kind to generate the value-adding transformation but different authors point to different processes.

**CONTEXT, EXPERIENCE AND MEANING**

Context is frequently seen as adding sufficient value to upgrade 'data' to 'information' and 'information' to 'knowledge'.

Once the context of information and knowledge used to produce the information is divorced from the information, particularly transferred to another database or location, it becomes difficult to identify and reproduce the inherent knowledge from the information (Huang et al, 1999, p.93-94).

Context alone is insufficient to be the value-addition that transforms data or information, as it is unclear how much context promotes data to information and how much more is required for it to become knowledge. “The...problem is not so much about “managing knowledge” as it is about providing a context and a set of tools that enable human actors to maximize their effectiveness” (Canner & Katzenbach, 2004, p. 28). However context has a greater value and more important role in knowledge management than determining levels of definition of the individual components such as knowledge and information. When Huang et al wrote (1999, as quoted above) "Users' contexts and the information manufacturing process make it difficult for users to determine precisely..." they clarified a key issue that is central to much of the confusion of definition. Context is more than simply an 'added value' to upgrade data to information; it is the catalyst to meaning or sensemaking (Cecez-Kecmanovic &Jerram, 2002). This issue of meaning making or sensemaking is also dealt with in greater detail in Chapter 3.

Experience is often seen as either the context or the catalyst that transforms information to knowledge.

In the past, systems for business have focused on selected *data* within a certain *context* to produce *information*. A better approach is to take *information*
accompanied by experience over time to generate important knowledge (Thierauf, 1999, vii) [italics in original].

Mingers adds emphasis to the role of meaning in defining data, information and knowledge. "Information and meaning must be distinguished but rather than meaning creating information, meaning is generated from information." (Mingers 1995, p.303) [italics in original]. Huang et al, on the other hand, refer to processing as well as context and experience in a sense of building from data, through information, to knowledge: "When data are processed in this manner, they become information. Information contains substance and purpose. "Knowledge" is generated when information is combined with context and experience." (Huang et al, 1999, p.146).

Thierauf brings all these together and introduces the concept of understanding as a component of knowledge:

Basically, information can become knowledge in the hands of an expert. A body of information organized into a coherent framework forms the basis for the creation of knowledge… Knowledge comes from insight and understanding of the underlying structure… It requires expertise to interpret … in a creative way. Overall, while information is data about the data, knowledge is basically information about information. (Thierauf, 1999, p.7). [emphasis added].

While the addition of 'insight' and 'understanding' would seem to offer more depth to these translations, the final summation of knowledge as 'information about information' is an extremely mechanistic and limited view. Jarvis sums up definitions found quite widely in the literature, particularly those that include context, human processing, and meaning, with a little more depth and substance:

Information becomes 'knowledge' when it is understood and comprehended at a deeper level as a result of human mental activity involving perhaps the further analysis of the information including its association with other data, capta” and information. Such 'knowledge' can lead to purposeful activity, in particular decision-making (Jarvis, 2000, pp.1-2). [bold in original].

This definition emphasises the role of understanding and comprehension (or meaning making) and human mental activity, and again returns to the recurring concept of knowledge leading to activity and decision making.

2 capta: those pieces of available data that the human user chooses as relevant to the problem at hand
ACTIONABLE KNOW-HOW

As Jarvis (2000) points out, knowledge can lead to "purposeful activity, in particular decision-making". There is wide acceptance that knowledge leads to, precipitates or enables action. "Other connotations of knowledge, which tend to differentiate it from data and information, are that it represents 'truth' and therefore offers a reliable basis for action. To be knowable thus implies having capabilities or competencies likely to be valuable in the future as well as the present" (Burton Jones, 1999, p.5). Nonaka and Takeuchi were early promulgators of the concept that "knowledge is essentially related to human action" (1995, p. 5).

A popular form of breaking down knowledge into its component parts is the use of 'know-that', 'know-how' and 'know-why'. Of these, 'know-how' particularly relates to action. Using this format, Spiegler describes data and information as subsets of knowledge:

Philosophers demarcate two types of knowledge: knowing-that and knowing-how [Ryle, 1949]. These types basically correspond to the factual knowledge we call data and information and to skill and know-how, which normally resides in the person's mind (Spiegler, 2000, p.3).

Spiegler then extends the concept to include a step beyond 'understanding' to 'wisdom':

…reality is related to entities whereas data are the attributes of those entities. Data (bases) represent, record, store, and maintain those attributes. Information is knowing that and is the result of data processing operations such as organizing, sorting, etc. Knowledge is defined as knowing-how and is a consequence of information processing operations. Wisdom is knowing "when" and/or "if". Knowledge contributes to wisdom through activities such as discovery, inference, value, experience and more. All these quantities are transformations in the process of knowing (Spiegler 2000, p.14). [italics in original].

Huang et al also use this form of definition, though with a subtly different emphasis that changes the application and meaning somewhat.

We identify three modes of knowledge that are pertinent for shaping organizational capabilities [Lee, 1996]: Know-what pertains to factual knowledge. Know-how pertains to procedural knowledge. Know-why pertains to axiomatic knowledge. This aspect explicitly includes knowledge of the reasons and axiomatic assumptions underlying work practices in organizations (Huang et al, 1999, 95). (bold in original).
Again, in this definition, 'know-what' (usually 'know-that' or 'information') is a part of or a mode of 'knowledge', 'know-how' is processual, and 'know-why' is implicit, referring not only to a highly individual and personal knowledge but in the organisational context a culturally shaped and unconsciously owned organisational knowledge. Perhaps the greatest difficulty with the different definitions is that they attempt to pin-point a definition for a uniform or homogenous concept of knowledge, rather than a broader and more diverse conceptualisation.

knowledge is typically spoken of as though it were off of a piece, as though essentially it comes in only one kind. It is our contention that there are, in fact, a number of distinct forms of knowledge, and that their differences are relevant, both theoretically and practically, to an effective understanding of organizations (Cook & Brown, 2002, p.68).

Nevertheless, even a broad and eclectic concept of knowledge as having a ‘number of distinct forms’ requires clarity of definition to be able to recognise the distinctions between different types of knowledge, and a fundamental concept of what is meant by ‘knowledge’ in the first place.

In this section, the study focused on clarifying some basic definitions in knowledge management. To understand what is meant by knowledge management, the basic words knowledge, information and data have been examined. The dictionary definitions have been considered to provide a common understanding from which definitions begin, and the different approaches of context and actionable know-how have been considered. Although both approaches offer valuable insights into knowledge and therefore knowledge management, their definitions are inconclusive and both lead to further questions, particularly those pertaining to divisive issues of definition. The next section looks at two of the conflicting approaches that are taken to understanding and defining knowledge and knowledge management.

**CODIFIABLE KNOWLEDGE OR UNIQUELY PERSONAL**

There are a number of issues that raise conflicting viewpoints in approaches to conceptualising and defining knowledge and knowledge management. This section of the thesis examines two of the most prevalent conflicting approaches that need to be either reconciled or decided upon when selecting a conceptualisation for – and approach to – knowledge and knowledge management. The first of these issues is that of whether knowledge is uniquely personal to the individual knower in such a way that
the knowledge can never be fully explored, expressed or explicated, or whether it is rather something that can be observed, recognised and articulated, taking it from the tacit knowledge inside a person's head and 'captured' so that it can be communicated, stored or disseminated. The second issue explored immediately after is whether knowledge can be compartmentalised into individual knowledge and social knowledge or whether individual and social knowledge are inseparable elements of a single entity.

The critical split in thinking when it comes to defining 'knowledge' against 'information' is the school of thought that says that knowledge can only reside in a human brain. That essentially, once it is codified, shared, stored, formulated and made explicit and separate from the 'knower', then it ceases to be knowledge and becomes information. Conversely, when information is taken on board, personalised and internalised into a human mind, it becomes knowledge.

A key and essential difference exists between 'knowledge' and 'information': knowledge resides in the user of the information and not in the collection of information; it is how the user reacts to a collection of information that matters (Jarvis, 2000, p.2). [bold in original].

One of these opposing schools of thought is based upon Nonaka's use of Polanyi's (1962, 1962a, 1966) concept of tacit and explicit knowledge (Nonaka & Takeuchi, 1995). This school of thought sees tacit and explicit knowledge as separate entities. Based upon this concept, the view that knowledge can reside outside of human brains creates goals to make such knowledge 'explicit', transferable, and codifiable. Thus the main task in knowledge management, for persons with this view, is to make explicit the implicit, and codify, transfer and store knowledge from something that is internal to the individual to the same something made accessible by the organisation. Databases are seen as the core strategic method/tool for knowledge management with this view:

knowledge management is a discipline that promotes an integrated approach to the creation, capture, organization, access and use of an enterprise's information assets. These assets include structured databases, textual information... and most importantly, the tacit knowledge and expertise resident in the heads of individual employees (The Gartner Group in Hart 2000, p. 2) [underline in original].

The opposing view states that knowledge only resides in 'tacit' form and cannot be made 'explicit'. Therefore there is no point in 'trying to make the tacit explicit', as this cannot be done. The most that can happen is to develop information from the actions and expressions of internal knowledge, and apply information management techniques
to that. This view is a little closer to Polanyi's (1962, 1962a, 1966) original meaning that the two (tacit and explicit) are inextricably linked, two aspects of the same entity but it still misses his key point – that knowledge is always personal and idiosyncratic to the knower/s. This point will be taken up later in Chapter 3 under 'sense making'.

Burton Jones combines information, skills and mental processing (internal and individual) for a definition that exemplifies the 'internalisation of information into knowledge':

\[ \text{...data are defined as any signals which can be sent by an originator to a recipient – human or otherwise. Information is defined as data which are intelligible to the recipient. Finally, knowledge is defined as the cumulative stock of information and skills derived from use of information by the recipient. Where the recipient is a human being, knowledge thus reflects the processing (thinking or cognition) by the brain of the 'raw material' supplied in the form of information (Burton Jones, 1999, p.5).} \]

This can be seen as an awkward position to take as it leaves another 'how-much' or 'at-what-point' question begging: at what point does the knowledge expressed and codified from one individual to others or to a computerised form of 'knowledge-transfer' or 'information-transfer' cease to be knowledge and become information? On the other hand, it closely aligns with concepts that see knowledge as the internalised, personalised ownership and processing of information/knowledge in the brain, and information as the external, spoken, written, or transferred form of that knowledge once expressed and no longer internal to the human brain. This is important, as an attitude that considers information and knowledge interchangeable is not an attitude that can foster the differences required to develop, nurture, encourage and support information or knowledge in an organisation.

Similarly, a fixation on separating the 'explicit' part of knowledge 'out of' or 'away from' the 'tacit' does not allow an organisation to focus appropriately on the development of the synergistic, creative or innovative practices that will develop internalised personal or social knowledge.

\[ \text{...we should turn our concept of information on its head and acknowledge the following radical notion: information is meaningless and of low value... Currently, however, governments and many businesses alike act as if information is meaningful and has a high value... Yet the value does not lie in the information stored but in the knowledge creation (Sveiby, 1997, p 43).} \]
While information and knowledge are inextricably related (by definition and by practice) they are not strictly interchangeable. Equally, 'tacit' and 'explicit' are inseparably aspects of the same phenomenon. Certainly, too, the tasks, goals and objectives of knowledge management are not identical to – indeed are far more wide-ranging than – information management.

Although we live in a world completely revolutionized by information, it is important to remember that it is knowledge we are seeking, not information. Unlike information, knowledge involves us and our deeper motivations and dynamics as human beings. We interact with something or someone in our environment and then use who we are – our history, our identity, our values, habits, and beliefs – to decide what the information means. In this way, through our construction, information becomes knowledge. Knowledge is a reflection of who we are. It is impossible to disassociate the person who is creating the knowledge from the knowledge itself (Wheatley, 2004, pp. 62-63).

The goals and objectives of knowledge management are concerned with knowledge: what is in individual minds, how to develop it, express it, share it, create more… this includes but certainly is not limited to, information management. And, unlike information management, which focuses on handling 'explicit' and codifiable information, it must also develop holistic approaches to knowledge as a personal, creative, generative and potentially synergistic entity and process.

Between these two opposing views (that personal knowledge can be 'made explicit' and that knowledge can only be personal and internal) needs to be found a middle way. Polanyi’s original postulate that there are two inseparable sides (tacit and explicit) to a single entity called knowledge, allows such a middle ground (1962, 1962a, 1966). This allows that knowledge is essentially a human, internal and personal process in the mind but that it can be expressed, developed and shared (rather than 'captured'), without necessarily ceasing to be knowledge. The simple ability to express parts of knowledge as information means that to a degree it is something that can be externalised, shared and codified into information. However there is a dimension beyond the simple conversion of internal knowledge to external information that does not necessarily lose all the qualities unique to knowledge. As Polanyi stated it, (1962, p. 601) "there are things that we know but cannot tell". This is particularly apparent in the socialised context of knowledge, which will also be discussed in Chapter 3.
INDIVIDUAL OR SOCIAL KNOWLEDGE

If consideration goes beyond simple arguments regarding 'knowledge' as opposed to 'information', Kay and Cecez-Kecmanovic (2003, p.1) offer a framework for the development of conceptual understandings of knowledge management toward an autopoietic definition of knowledge management. (Their paper is based on Maturana and Varela's theory of Autopoiesis (1980), which is a biological systems theory in which organisations are seen as living systems. However, this thesis does not explore the autopoietic approach to KM). In a model they provide (see figure 2.1 below), Kay and Cecez-Kecmanovic illustrate what they perceive to be the status of current perceptions and assumptions in the knowledge management field. Using the model they show current assumptions that discuss the nature of knowledge from two intersecting continua. Knowledge as process is distinguished from knowledge as object (already discussed earlier in this chapter), and individual knowledge is differentiated from the concept of social knowledge. This is another approach that reflects a critical split in thinking about knowledge, and can be considered problematic. Although there is clearly a possibility to consider a binary concept of knowledge-as-process at the other end of a continuum from knowledge-as-object, the social and individual aspects of knowledge are not necessarily, or desirably, separable in either a binary opposition or at opposing ends of a continuum. Individual and social aspects of knowledge, like tacit and explicit, are inseparably intertwined. The individual does not cease to exist as an individual in a

![Knowledge as a Process](image)

**Figure 2.1 Kay and Cecez-Kecmanovic: assumptions underpinning knowledge management research**

social setting. A social context is, in fact, the gathering together of a number of individuals. Likewise, the social dimension cannot be removed from the individual. As John Donne wrote: "no man is an island" (1624, XVII), and all individual knowledge is
constructed in a socialised context. Nevertheless, there is a quality of synergistic corporate knowledge or collective mind (Brown & Duguid, 2002; Weick & Roberts, 1993) that goes beyond the individual and cannot be separated into its individual components. “…collective practice leads to forms of collective knowledge, shared sensemaking, and distributed understanding that can’t be reduced to the content of individual heads” (Brown & Duguid, 2002, p.25).

Thus we see that Kay and Cecez-Kecmanovic’s model (2003) identifying common assumptions that they have recognised as underpinning current knowledge management research also recognises an inappropriate polarisation of two critical and inseparable aspects of knowledge that is common in knowledge management today. Any theory of knowledge that seeks to be applicable in an organisational context needs to account for the inseparability of the individual and social aspects of knowledge as well as the intrinsic inseparability of the tacit and explicit dimensions of knowledge. These issues are explored further in Chapter 3. Furthermore, this model highlights the importance of the concept and perception of assumptions that underpin knowledge management research and, indeed, knowledge management itself.

an examination of their methods [traditional research on information seeking and use] suggest that the results are tautologically linked to implicit assumptions. One major point here is that metatheory can be used in such a way that it releases research in always partial but still significant ways from implicit assumptions and draws these assumptions out into the light of day where they can be examined, interrogated and tested (Dervin, 1999, p. 748).

Assumptions underpinning knowledge management research and practice are also explored in Chapter 3.

This section of the thesis explored two issues that each has proponents who take opposing approaches to knowledge and knowledge management. The first issue examined was whether knowledge was uniquely personal or whether tacit knowledge could be 'extracted' from the knower and made 'explicit'. The conclusion was reached that knowledge is uniquely personal and, while some parts of tacit knowledge can be focused upon and recognised, articulated and expressed as information, there is a core element of internalised tacit knowledge that can never be 'captured', 'codified' or 'made explicit'. The second issue addressed was whether knowledge could be separated into individual knowledge and social knowledge or whether these two aspects of knowledge are inextricably linked. The conclusion was reached that all social knowledge has
individual components and that all individual knowledge is socially constructed, so the
two are inseparable and cannot be reasonably discussed in a fractured manner but must
be considered as a cohesive whole.

**DEFINITIONS THAT REACH TOWARD CORE BUSINESS**

The last section determined that neither approaches that isolated social knowledge from
individual knowledge, nor those that try to extract tacit knowledge from explicit
knowledge were acceptable concepts for the development of this thesis on knowledge
management. In this section a different approach is taken to finding acceptable
definitions and approaches. In this case, recognising that the literature has started to
turn to knowledge management to solve core business problems, the question is asked
"what is wanted from knowledge management?" so that the answer to this question can
point toward a possible set of definitions for knowledge management praxis. The most
common answers to this question "what is wanted from knowledge management?"
focus on the ability of organisations to survive in a rapidly changing world.

“In this chaotic and complex twenty-first century, the pace of evolution has
entered warp speed, and those who can’t learn, adapt, and change from
moment to moment simply won’t survive. Many of these organizational
needs are bundled together today under the banner of “knowledge
management.” The organization that knows how to convert information
into knowledge, that knows what it knows, that can act with greater
intelligence and discernment – this is the organization that will make it into
the future” (Wheatley, 2004, p. 54).

Practitioners who find it profitless to follow the 'endless debate' about definitions that
cycle around the need to clarify and distinguish between knowledge, information and
data, are turning to concepts that go beyond these basic ideas. Such practitioners are
reaching for definitions that are broader and deeper – not in an abstract and theoretical
sense but in a manner that allows knowledge and knowledge management to be about
core business functions and processes. “Whenever possible, systems designed to access
knowledge should be integrated with systems designed to support business processes”
(Canner & Katzenbach, 2004, p. 34). Definitions that broaden knowledge to include
innovation, creativity, synergy, and expansion, as well as permitting focus to firmly
encompass the fundamental business processes unique to each business often originate
in creativity-focused organisations. Jack Welch, CEO of General Electric said, “We have
found what we believe to be the distilled essence of competitiveness, it is the reservoir of
talent, creativity and energy that can be found in each of our people” (Belasco, 1990, p.
6). When there is conviction that creativity and innovation lead to competitiveness and profit, knowledge management looks to create, develop and maintain the creative aspects of knowledge.

All firms are in essence knowledge organizations. Their ability to outperform the marketplace rests on the continuous generation and synthesis of collective, organizational knowledge. For all organizations, the cultivation of this knowledge – often an implicit, unreflecting cultivation – is the essence of developing a core competency to maintain the organization and resist its dissolution (Brown & Duguid, 2002, p.20).

Moving beyond the direct definitions of knowledge that seek to define with a pragmatic applicability, Housel and Bell (2001) offer a more abstract definition that at first seems too vague to meet these demands: "Knowledge is an ideational (i.e., conceptual rather than physical) construct generated through the agency of the human mind" (p. 2) [*parentheses in original*]. This indeterminate definition is then developed to broaden the concept of the term 'knowledge' to include:

- seemingly important and unimportant thoughts;
- "proven" as well as unproven or unprovable ideas;
- morally approved and morally disapproved ideas; individually or widely held ideas;
- beliefs, attitudes, speculations, predispositions, lifestyle choices, and habits of mind that are a composite of rational and irrational or emotional elements;
- ideas actively held within the human mind as well as ideas given tangible form through writing or electromechanical records outside the human mind;
- ideational constructs produced by agency of the human mind but now existing in a way that cannot be held in mind or manipulated by ordinary thought (Housel & Bell, 2001, p.2).

This breadth of definition gives a freedom to encompass a wide field of thought to be brought to bear in theorising knowledge and, therefore, knowledge management. Such a breadth of conceptualisation enables the ability to perceive, value and work with knowledge that is otherwise often lost to an organisation. However it does not necessarily contribute to a perception of knowledge and knowledge management as key business processes fundamental to the core business of the organisation.

One set of definitions that does permit both these approaches – the abstract theoretical and the fundamental core business to be valued and investigated in knowledge and knowledge management – is offered by Probst, Raub and Romhardt:

Knowledge is the whole body of cognitions and skills which individuals use to solve problems. It includes both theories and practical, everyday rules and instructions for action. Knowledge is based on data and information but
unlike these, it is always bound to persons. It is constructed by individuals, and represents their beliefs about causal relationships (2000, p. 24).

The organisational knowledge base is then defined as: "individual and collective knowledge assets that the organization can use to perform its tasks. The knowledge base also includes the data and information upon which individual and organizational knowledge are built" (ibid). To this they add that: "Organizational learning consists in changes in the organization's knowledge base, the creation of collective frames of reference, and growth in the organization's competence to act and to solve problems" (ibid). Thus they reach the final definitions that "knowledge management consists of an integrated set of interventions which take advantage of opportunities to shape the knowledge base" (ibid).

This set of definitions is reasonably comprehensive, has clarity and definition yet is not necessarily restrictive. One reason that Probst, Raub and Romhardt's definitions are workable is that it expresses a concept that includes a definition of organisational knowledge base and organisational learning in tandem with the definition for knowledge management. With a more holistic or global view, a broader and more widely applicable definition can be determined. Nevertheless, the definitions are still static and fixed, overlooking the social nature of knowledge synergy and continuity and, although adding clarity, do not necessarily add direction. These definitions do not necessarily contribute toward an understanding of how to practice knowledge management purposefully to accomplish specific goals. In fact the aims are not very specific. To "take advantage of opportunities to shape the knowledge base" has no clear or purposeful goal. Thus the definitions are clear enough to serve as a common lexicon but do not contribute a useable or functional set of prescriptive or purposeful definitions that help define a theory of knowledge or a path of knowledge management.

There are many other straightforward definitions of knowledge management available. Even when they don't necessarily conflict, they also do not necessarily agree in the sense of being a unified usable definition. Sometimes the conflict is caused by the difference generated when one definition is narrow, looking at knowledge management from the micro-perspective, and the other broad, contemplating a macro-view. Consider Kanter's micro-level view: "knowledge management (KM) can be viewed as turning data (raw
material) into information (finished goods) and from there into knowledge (actionable finished goods) [Kanter, 1999]" (Spiegler, 2000, p. 6), to Huang et al's macro-view:

what we mean by knowledge management in practice… We define knowledge management as organizing and structuring institutional processes, mechanisms, and infrastructures to create, store, and reuse organizational knowledge (Huang et al, 1999, 113).

Or Huysman and de Wit's less detailed but more goal-oriented macro-view: “knowledge management is perceived as structural management initiatives to support learning within and by the organization” (2003, p.29).

So is knowledge management best defined using a narrow (micro) or broad (macro) lens? Is it possible to do both, simultaneously? Furthermore, is knowledge management about the management (in the sense of codifying, filing, storing and accessing information and data) of static knowledge-as-information, or is it about creating, generating, sharing and using knowledge? Is it static or dynamic? Or would a blend of “the three essential dimensions of knowledge, namely, codification, diffusion and abstraction.” (Hasan & Al-hawari, 2003, p.17) be a better means of clarification? “The literature on knowledge management concentrates on managing knowledge retrieval or on managing knowledge exchange or on managing knowledge creation, and seldom on a combination of the three processes. All three perspectives are valuable and increase our understanding of managing knowledge processes” (Huysman & de Wit, 2003, pp. 27-28). Is knowledge management about managing 'knowledge' or about managing the people who generate, share and use that knowledge? How is knowledge management best conceptualised?

GOALS AND PURPOSE

One approach to answering the question of knowledge management definition is to ask a slightly different question: what are the goals and objectives of knowledge management? Fortune 500 companies are investing in knowledge management – why? What do they hope to achieve? (Adler, 1989). The basic goal is summed up by a myriad of books on the business market shelves (Sveiby, 2001; Allee, 2002; Boulton et al, 2000; Davis & Harrison, 2001; Reilly & Schweih, 1998) as "creating wealth" (or “achieving public good”) by “managing intangible assets". 'Creating wealth' is a clear end-result goal but 'managing intangible assets' is a less clear-cut process goal. The more specific aims and goals of these companies for the achievement of 'created wealth' provide, de facto, a
definition of what they want knowledge management to be and to accomplish for them. The answers to this question fall into five complementary streams: [1] concern with information; [2] people as a company's most valuable asset and resource; [3] knowledge sharing (including collective knowledge synergy) and creation (innovation); [4] decision-making and action; and [5] technology to assist in implementation.

The first of these stated groupings of goals and purposes for knowledge management is dealing with information. Consistent with the 'information era', a primary goal in knowledge management is frequently concerned with 'information' and 'information management' – quality information well handled, systematised and used.

And most importantly, there can be no knowledge management without an intelligent understanding of the value of information and the complex set of competencies required to retrieve and use it (Park, 1998, p. 4).

The critical factors most debated in this area are dealing with information overload or glut and concern with the emphasis sometimes given to information collection, storage and technology at the expense of its analysis and use. "Successful corporations excel by exploiting information, not computer systems. The key lies in managing quality information for productive knowledge creation and diffusion" (Huang et al, 1999, 5).

Despite definition debates that basically argue where information leaves off and knowledge begins, information as 'data plus meaning' or 'data in context'; information as a critical component of knowledge; and information management; are essential elements of knowledge management practice (Davenport, 1998; Seeman, 1998; Orna, 1990).

The second goal looked for in knowledge management is help on how to value and support knowledge workers. “One stated reason for developing KM is that the valuable knowledge stored in employees’ heads could walk out the door tomorrow and never return. Since that’s true, it seems like the most obvious solution is to retain that employee” (Effron, 2004, p. 46). After 20 years of a managerial era of downsizing, restructuring and economic rationalisation, a new attitude is shaping that regards people as a company's most valuable resource.

Downsizing, the scourge of the nineties, is a severe strain on organizational knowledge. By removing slack from a worker's day, it makes new knowledge generation or acquisition difficult. At worst, downsizing is the intellectual capital equivalent of strip-mining, since it usually begins by early-retiring a firm's most experienced people and driving away its most talented (Ruggles, 1998).
(See also Hunt & Buzan, 1999; Nonaka & Takeuchi, 1995). Therefore the second major objective in knowledge management today is attracting the 'right' people, keeping these people, and being able to retain as much as possible of their 'knowledge' when people do leave. Peter Neff, CEO of Rhone-Poulenc's US subsidiary says, "Our success in the future will depend on our ability to tap the collective wisdom that is the accumulated judgments, perceptions, experiences, intuition, and intelligence – of all our employees" (Tissen et al, 1998, p. 28). "Andrew Carnegie once said, "The only irreplaceable capital an organization possesses is the knowledge and ability of its people. The productivity of that capital depends on how effectively people share their competence with those who can use it" (Tissen, 1998, p 33; see also Leonard-Barton, 1995; Thierauf, 1999; Huang et al, 1999). It would appear, however, that this identification of the dangers of downsizing in organisations is limited to theory and to books, as no significant reduction in downsizing as a means of economic rationalisation is observably taking place in today's corporate or business environment. Ruggles's 'strip-mining' is still one of the most frequently employed methods of showing 'quick profits' despite the evident organisational losses (and, frequently, crashes) described by the theorists. There is a new movement toward perceiving knowledge management as “a reaction to the absence of certain values in our Western society” (Trompenaars & Hampden-Turner, 2004, p. 13) which reinforces the perception that knowledge management must focus on people as individuals.

Valuing one’s people is a necessary prerequisite for both knowledge sharing and knowledge generation, which leads us to the third aspect. The third goal commonly looked for from knowledge management is support for synergistic knowledge sharing, innovation and creativity in industry.

To spark innovative thinking, technology should focus on connecting people with people rather than on providing codified knowledge. Much professional problem solving and nearly all of the most innovative problem solving involves the perception of analogies rather than the straightforward application of a process or rule (Canner & Katzenbach, 2004, p. 34).

There is a prominent focus on the need for knowledge sharing and knowledge creation or innovation as becomes clear when reading references to the centrality of people in knowledge management.

Much of the momentum behind the knowledge management movement comes from the fact that we all believe that (1) people will perform better if they can learn things that other people in a company know and (2) the
incremental performance is potentially significant enough that companies should not leave this learning to chance (Canner & Katzenbach, 2004, p.31).

Although knowledge management is about people – particularly 'knowledge workers', it is not about individuals in isolation but about collective and synergistic knowledge (Brown & Duguid, 2002; Nonaka & Takeuchi, 1995; Huang, 1998; Leonard-Barton, 1995; Tissen et al, 1998). "[K]nowledge is fundamentally about people management – equipping and encouraging people to generate knowledge important to our future and share it with others in the organization" (Junnarkar 1998, viewed 14 March 2002). Innovation and creativity are perceived as critical skills without which organisations will not survive.

Knowledge is gained through experience or association, something no database can give you but your experienced peers, superiors and subordinates can. True knowledge management means acknowledging that increased person-to-person contact is the only sure way to improve the shared level of knowledge in an organization (Effron, 2004, p. 45).

Companies realise that not only do they need to attract and keep the best people in their fields; they also need to create an environment in which those people will generate new, creative and innovative solutions (Carlopio, 1998; Dougherty & Hardy, 1996; Huang, 1997).

Collective and synergistic knowledge are not necessarily the same thing as knowledge sharing. Knowledge sharing is required to create the environment in which collective knowledge develops and synergistic knowledge creation can happen (Cecez-Kecmanovic, 2001; 2004).

Continuous innovation must be at the center of knowledge management, for the optimum value of knowledge is realized when ideas are turned into innovative solutions. Companies are constantly searching for ways to effectively manage people and processes without the bureaucracy that stifles creativity and innovation. Accelerating the speed of innovation depends on how well the organization fosters collaboration (Huang et al, 1999, p.125).

This concept of collective knowledge (or "collective mind") is discussed extensively by Weick and Roberts' (1993), Brown and Duguid (2002), and by Cecez-Kecmanovic (2004). They take the concept of social and inter-relationship based knowledge to greater depths. This is discussed more extensively in Chapter 3.
Created and shared knowledge is frequently discussed in terms of teamwork and communications (Dervin, 1999; Meyer, 1998).

Today's collaboration by computer or groupware aids in the three C's - communication, collaboration, and coordination, and is therefore a popular tool in knowledge management. Groupware allows users to interact with both people and databases. It facilitates collaboration, lets users better manage workflow, and allows them to interact with stores of information, such as a calendar on an executive's desktop PC (Thierauf, 1999, p. 107).

Unfortunately, Groupware can frequently be perceived as knowledge management itself, confusing the tool with the process. However, the 'three C's' are progressively receiving more attention in the wake of the realisation that people are important and that knowledge sharing is vital to knowledge management and to the innovative developments required for companies to stay ahead of their field. Consequently Networks and Virtual Teams, such as those at BP (Cohen, 1998) receive a lot of attention.

Accordingly, much of our work has been directed at the creation, care, and feeding of networks, or "communities of practice." Networks of people are not only mechanisms for communicating; they help to advance collective understanding by providing a forum for "sense-making." In so doing, they create value for their individual members as well as the organization (Junnarkar 1998, viewed 14 March 2002).

Here Junnarkar highlights central knowledge management issues that are people focused, such as ‘communities of practice’, ‘collective understanding’ and ‘sensemaking’. ‘While knowledge is often thought to be the property of individuals, a great deal of knowledge is both produced and held collectively. Such knowledge is readily generated when people work together in the tightly knit groups known as ‘communities of practice’ (Brown & Duguid, 2002, p.19). These concepts of sensemaking and communities of practice again take the debate to deeper conceptualisations of both the individual and social nature of knowledge, and this, too, is discussed in Chapter 3.

The fourth purpose required of knowledge management is that it supports decision making that can lead to action. It is a common perception in industry circles, evidenced in business magazines as well as the more formal literature that knowledge must lead to action. There is an attitude that if it isn't able to lead to informed decision-making, or if it isn't actionable, it isn't (useful) knowledge (Jarvis, 2000; Tiwana, 2000; Park, 1998; Thierauf, 1999). "...but the focus of knowledge is more on using it than on moving it"
Ruggles expands the concept of knowledge to include the action based on the knowledge and the creation and innovation that stems from it: "a firm's competitive advantage depends more than anything on its knowledge. Or, to be slightly more specific, on what it knows – how it uses what it knows – and how fast it can know something new" (Ruggles, 1998). In industry even more than the literature, most discussions of definition in knowledge management include the statement "if it doesn't lead to action, it isn't knowledge management" (Hart, 2000, [Jerram, 2004, FN]). What actions and what decisions, based on what and towards what purpose, (other than increasing profits), are less clear but action or decision of some sort are perceived as an indispensable goal and objective of any true knowledge management activity, investment or goal. This is actually understood in a wider context than just knowledge management or corporate proceedings. As Buzan points out:

One of the foundation stones for memory, creativity and thinking is the process of association which is a facilitator, stimulator and prime motivator. When the brain can make the correct association it remembers. When the brain can make the appropriate association it understands. When the brain can make a new association it creates. Ownership is an important form of association. When someone claims 'ownership' of something, they follow up with action. They take up a hobby, buy a pet, establish a family or buy a product or service (Hunt & Buzan 1999, p.67) [bold in original].

Schwartz and Te'eni identify a common concomitant to that definition: "But tying knowledge to action can only occur if you are aware of the knowledge and can identify it at the time of action and if the system can deliver it to that point of action. For that, you need tools." (Schwartz & Te'eni, 2000, p. 33).

Tools are the fifth area of emphasis in knowledge management goals and objectives. There is a common perception that technological advances should assist the implementation of these goals and objectives (Junnarkar, 1999; Schwartz & Te'eni, 2000; Novins & Armstrong 1998). The strongest area of discussion in this issue is the role of tools and technology in knowledge management, with an emphasis on the necessity to see technology as a support to knowledge management answers but not the answer itself.

We emphasize that information and knowledge experienced by members of an organization should be the focus, not the system or technology per se. Technology and systems, however, are used as facilitators in the production, storage, and use of organizational knowledge (Huang et al, 1999, p. 4).
For years information technology has dominated the scene (and the budget) as the means to accomplish knowledge management (particularly when knowledge management is perceived as information management). It is now being understood to be a means of support to knowledge management rather than 'the ultimate answer': "Information technology may be a necessary but will never be a sufficient condition for knowledge creation and sharing" (Junnarkar, 1998, viewed 14 March 2002). But this is still a contested area.

In this last section of the chapter we considered the purposes or aims and goals that industry expects knowledge management to provide, working toward a definition based in praxis. Five specific focal points were described, including: [1] concern with information; [2] people as a company's most valuable asset and resource; [3] knowledge sharing and creation (innovation); [4] decision-making and action; and [5] technology to assist in implementation. The fifth goal/expectation of technology to assist in implementation of knowledge management is such a prevalent issue that dominates the field that it needs to be addressed specifically. The next section of this chapter focuses on the role of technology in knowledge management.

**KNOWLEDGE MANAGEMENT, INFORMATION MANAGEMENT AND TECHNOLOGY (TOOLS)**

![Dilbert Cartoon](image)

*Figure 2.2 Dilbert cartoon (Adams, S: 1999; p. 49).*
The first point of division falls neatly as a great divide between those who see technology as the answer to all problems (usually in the form of a new improved database), and those who do not. The Dilbert cartoon (above) by Scott Adams (1999) addresses this pointedly. Industry complaints are common regarding the frustrating habits of senior management and their IT Departments that spend lavish dollars on expensive new technology whilst still not knowing what that technology is actually to accomplish. These extravagant management habits fly in the face not only of commonsense money-management but also of the basic tenets of the true programmer – that one begins with protocols and that algorithms are created only after one has first defined the question and generated a real solution, rather than creating answers without knowing the question. This is similar to a basic tenet of research: don't define the solution; first define the problem … then the solution is generated by defining and working on the problem.

Those who do not see technology as the principal and immediate answer to knowledge management problems vary widely in their conviction about 'what is the answer' and of 'the role of technology in knowledge management'. Nevertheless, the current emphasis in literature (Brown & Duguid, 2002, 2000; Storey & Barnett, 2000) and discussion by knowledge management practitioners, although not yet often in practice by CEOs and CIOs (Jerram, 2004, FN KF) is that technological advances (including data bases) should facilitate the implementation of carefully derived solutions to the real challenges of knowledge management. This facilitation should only occur after those challenges have been carefully defined and analysed so that solutions are generated that are relevant to the specific fundamental issues of knowledge management for the core business processes in each case. Technology must facilitate and implement the solution – it is not and should not be, in itself, the solution (Davenport & Prusak, 1998).

The technological assistance available to aid and abet people in knowledge management is extensive and impressive. Databases for data warehousing and data mining, Executive Information Systems (EIS), Management Information Systems (MIS), and similar technological systems, are all powerful tools which can implement the information management aspect of knowledge management. Discussion now points to the greatest needs for tools to implement other key aspects of knowledge management as being those that aid Thierauf's (1999) 'three Cs' – communication, collaboration and
coordination. As George Bailey, PricewaterhouseCooper’s North American leader for innovation says of his organisation’s knowledge workers: “Everybody goes [to the database] sometimes but when they’re looking for expertise, most people go down the hall” (Effron, 2004). If technology is to assist knowledge management that meets the goals and objectives of the company, it must assist in the collaborative teamwork – both face-to-face and virtual – and communications that facilitate people and interpersonal relationships and creativity.

We have increasing numbers of problems, which we try to solve using technology. However, this reliance on technology actually only increases our problems. We don’t notice that the numeric information we enter into a computer cannot possibly describe the complexity of the experience or person we are trying to manage. By choosing computers (and numbers) as our primary management tool, we set ourselves up for guaranteed and repeated failures (Wheatley, 2004, p. 56).

Technology that brings people closer together, facilitates discussion and sharing, extends or supplements the 'water cooler' opportunities for networking, brainstorming and creative interplay – these technologies that are usually labelled "groupware" are potentially the technology tools that will meet corporate goals and objectives in knowledge management.

In this last section, the role of technology in knowledge management was examined. Technology is identified as a powerful and capacitous tool for implementing knowledge management tactics as defined by knowledge management strategy but a poor choice for knowledge management focus. A great deal of the focus in knowledge management research and investment to date has concentrated on technological tools that enable and support information and document management. There is now an emphasis on tools that will enable and support more people-centric knowledge management efforts centred on communication, collaboration and coordination. Nevertheless, despite the acknowledged value of such technological assistance, the conclusion is reached that technology must not become a focus of knowledge management that defines and determines knowledge management strategy but much rather always be recognised as the tool that implements strategy.

**CURRENT STATUS AND STANDARDS**

In this last section of Chapter 2, national and international standards for knowledge management are examined as reflective of the current status of knowledge management
nationally and internationally. As is seen throughout the review of the field conducted through this chapter, there is little order or discipline to knowledge management in its current state. Many are, however, addressing the need. Standards Australia and International Standards Organisation are already addressing this issue. Again, as with so many other works in the literature, theirs is a pragmatic approach considering KM as a current practice that needs definition and boundaries. Standards Australia have published the following summary or "Introduction to KM" on their KM website. It is lengthy but because it summarises clearly, and well, the current standing, status and practice of KM in Australia (with almost identical findings in the other countries following the same practice ready to merge them into a new ISO standard), and discusses definition, culture, knowledge acquisition and sharing, and technology, it is worth quoting the whole "Introduction to KM":

The term knowledge management (KM) refers to a multi-disciplined approach to achieving organizational objectives by making the best use of knowledge. KM focuses on processes such as acquiring, creating and sharing knowledge and the cultural and technical foundations that support them. The aim is to align knowledge processes with organizational objectives. The way in which knowledge management is approached varies from organization to organization. There is no limit on the number of knowledge processes that can be used including community-based collaboration, knowledge repositories, competitive intelligence, experiential learning and environmental considerations for encouraging sharing. The real challenge lies in choosing which processes will most effectively achieve organizational objectives and implementing them in a way that will work ensuring the foundations are right. Almost all information and communication technologies, ranging from pen and paper and personal organisers through to tele-conferencing and sophisticated intranet-based portals, can be considered knowledge management technologies. A general consensus is that technology needs to be chosen only after all the requirements of a knowledge management initiative have been established. The biggest enabler of successful knowledge-driven organizations is the establishment of a knowledge-focussed culture. Organizations need to consider how to motivate people to pro-actively use their knowledge. If successful the main challenge is how to harness the wealth of ideas and opportunities that are presented. A knowledge-based culture is premised on trust in the talent of people. It assumes that individuals have much more to offer than the traditional command and control cultures permit. A good question to ask is "how do you increase the ability of an individual in the organization to influence others with their knowledge". A commonly asked question is "how do you justify knowledge management?" The answer lies in your ability to demonstrate that knowledge management can help achieve organizational objectives in a manner that compares favourably with other approaches. Knowledge management should not be implemented because it is seen as a "good idea". Widespread support will only be garnered when KM projects have clear goals. The goals may have
measurable criteria such as financial or operational objectives or they may be more broadly focussed on the achievement of social, political, environmental or cultural outcomes (Standards Australia, 2003).

Standards Australia have developed this concept of KM to the point that they have published (March, 2003) the "AS 5037 (Int) knowledge management", which will be superseded by a final standard in late 2004. This has been a three-year project by the KM Committee (MB-007). This committee is comprised of academics and practitioners from a range of interested disciplines and practices, all focussing on KM. To create the standard, the committee used surveys, debates and personal experience. Feedback was regularly sought from the KM practitioner community at various stages of the development of the standard. The committee have deliberately stated that they have not used or developed a theoretical framework but have endeavoured to create a fundamental base from which outsiders or new practitioners of KM can build a basic knowledge of the discipline and practice. As a result, the "Standards Australia KM Framework" is straightforward, clearly stated and provides what it is designed to do – a foundation overview of the practice and discipline, current status and direction for the future. The results of this committee's work of three years, despite their different methods and lack of theoretical framework, echoes many of the findings, particularly in pragmatic use, that were made in the course of this study in Chapter 2.

**CONCLUSION**

This chapter has ranged across a number of conceptual approaches to find definitions for organisational information systems knowledge management. Definitions for knowledge, information, data, information management and knowledge management were all examined from a number of approaches including those that consider context, experience, and meaning and those that focus on knowledge as actionable know-how. Two divisive issues were looked at more particularly, including the debate about the codifiability of, as opposed to the uniqueness and inherently human quality of, tacit knowledge; and whether knowledge can be considered to be separately an individual or social phenomenon, or is inseparably both at once. It was concluded that the tacit dimension of knowledge is uniquely personal and cannot be 'captured' or 'codified', and that all knowledge is both personal and socially constructed. The following section of the chapter looked at definitions of knowledge management based upon core business goals and purposes. Five specific business goals and purposes were described, including:
[1] concern with information; [2] people as a company's most valuable asset and resource; [3] collective knowledge, knowledge sharing, and creation (innovation); [4] decision-making and action; and [5] technology to assist in implementation. This led to the section of the chapter that studied the role of technology in knowledge management, and it was seen to be a supportive role. Technology is ideally an enabling tool rather than a focus point for knowledge management praxis. Finally, the current status of knowledge management and the national Australian framework were reviewed.

Overall the general conclusion drawn from the chapter is that knowledge management is about people more than data or information. Definitions to clarify 'knowledge', 'information' and 'data' (within the sphere of knowledge management) must not only be consistent with real-world or common-use understandings of those definitions to be coherent but also need to reflect this understanding. If the emphasis isn't on the people whose 'knowledge' requires 'management', the definition will be inappropriate. From a practitioner's point of view, the five major issues when considering goals and objectives for knowledge management are: quality information and information management; an emphasis and appreciation of people as a company's most valuable asset and resource; stimulating and aiding knowledge sharing and creation, collaboration and innovation; decision-making and action relevant to core business processes as end-results; and the design and use of technology to assist in implementation, particularly in the areas of communication and collaboration. These issues are addressed by the new Standards Australia "AS 5037 (Int) knowledge management" or "Standards Australia KM Framework" in a thorough and reasonably succinct and unambiguous manner.

Some conclusions are drawn about the various definitions offered by the field of literature considered. The final conclusion, however, is that whilst the definitions offer important background knowledge to the field, state and aims of current knowledge management praxis it is necessary to explore more deeply for conceptual and theoretical foundations to determine selection of knowledge management definitions. Critically, the definitions as reviewed thus far through a wide range of Information Systems literature, including the AS 5037 (Int), are primarily derived from tentative explorations of definitions-in-use. Few definitions are founded on a theoretical base or conceptual framework that provides a foundation for a theory of knowledge upon which to build consistent and substantial understanding of the field. Therefore, Chapter 3 examines
more substantive explorations of knowledge and knowledge management and reviews theories of knowledge that permit solid foundations upon which to build a theory of knowledge management.
CHAPTER 3 SENSEMAKING: NARROWING THE FOCUS TO LOCATE KM DEFINITIONS AND DEVELOP A THEORETICAL FRAMEWORK.

In the last chapter a broad overview of the KM literature considered many of the models and approaches taken to defining knowledge and knowledge management. The diverse backgrounds brought to KM practice and study has created a wide range of methodologies. “…the persisting heterogeneity of both KM discourse and practice suggesting that there is currently no generally accepted ‘hegemonic’ paradigm, model or concept of KM” (Perkmann & Robertson, 2003, pp. 3-4). As a result, “finding a reasonably comprehensive, empirically grounded, and practically applicable theoretical foundation for developing, exploring, and evaluating knowledge management processes, IT applications, and KMS persists as a challenging task” (Cecez-Kecmanovic, 2004, p. 2). This chapter examines a few of the key models, assumptions and underlying epistemologies that shape directions taken in knowledge management practices within the Information Systems discipline, and aligns several of these approaches to develop a reasonably comprehensive and empirically grounded framework for investigating knowledge management in organisations.

Throughout the literature and in practice a consistent assumption displayed is that knowledge management is inherently good, right and necessary, development of which will produce positive effects. These assumptions are rarely challenged. McAdam and McCready (1999) and Schultzze and Leidner (2002) are among the few to do so. Schultz and Leidner, particularly, call attention to the need to place such notions within a frame of the theoretical assumptions that underlie investigations into and understanding of knowledge management.

We argue that in order to understand the ways that information systems can support the management of knowledge in organisations, consideration must be given to not only the intended, positive consequences of knowledge and its management but also the negative, unintended ones. This requires that researchers have an awareness of the diversity of possible theoretical assumptions about knowledge and its management, and the extent to which the field of knowledge management research represents – or fails to represent – this potential theoretical diversity (Schultzze & Leidner, 2002, p. 214).

This call to examine assumptions underpinning knowledge management first requires epistemological examination before exploring the theoretical frameworks that can reasonably be offered as potential foundations for KM research. KM as an emerging
paradigm can develop into a philosophy or into a toolbox of techniques for problem-solving. In recent years the literature has begun to contend that KM is more than a toolbox, although IT focused KM still frequently uses the toolbox approach to KM. But to continue to develop as a paradigm KM must address the social side of knowledge construction as well as the more mechanistic technical side. If KM is an emerging paradigm, this will have important consequences in organisational learning and development (Adam & McCreedy, 1999; Schultze & Leidner, 2002; Tsoukas, 1996; Brown & Duguid, 2002, 2000).

Many and varied methodologies and approaches to KM are taken in the literature and by different companies. Models or frameworks to conceptualise the approaches graphically have illustrated many of these approaches. Few of these methodologies (and models) have epistemological depth or have explored conceptual issues underlying their development and consequential to their use. Or perhaps it is more accurate to say that they cannot genuinely be described as methodologies.

in the midst of the paradigm battles which mark today's study of humans and their conditions, methodology as a term is highly contested, much abused, and frequently ignored. It is referred to either as method, or as metatheoretical critique of the constructing of theory. It is, thus, either collapsed into method or collapsed into metatheory and in either locale it disappears. Rarely, however, is methodology attended to as that branch of metatheory which involves the reflexive analysis and development of methods – with methods defined broadly as methods of theorizing, observing, data collecting, analyzing, and interpreting. The result is that we lack a vocabulary for talking about methodology, a vocabulary which attends to the philosophic mandate in the term, the way in which it might build a bridge between metatheory and method, and, thus, make more obvious the impacts of these on research and its theory-constructings (Dervin, 1999 p. 728).

This chapter considers various current knowledge management methodologies and evaluates them as methodologies in the sense of potential conceptual frameworks from which to approach information systems knowledge management. Potential conceptual frameworks are those that involve analysis, synthesis, reflexivity and the development of methods consistent with and supportive of the theoretical concepts and constructs being developed.

The first part of the chapter examines some of these well known models for their epistemological substance and the results that flow from them. It first determines that
the issues against which the models will be evaluated include their conceptual foundations, hidden assumptions, and whether they address the social aspects of knowledge management. Having established these evaluative criteria, models of three major types are considered, as determined by McAdam and McCready (1999) – typological models, intellectual capital models, and finally, social capital models. Models considered include those by Nonaka (1995), Hedlund and Nonaka (1993), Boisot, (1987), Kay and Cecez-Kecmanovic (2003), Skandia (1997), Demerest (1997), Cook and Brown (2002), Burstein and Linger (2002, 2003), Hasan and Al-hawari, (2003), and McAdam and McCready (1999). The second part of the chapter engages with some of the conceptual issues that influence knowledge and knowledge processes. Principal among these are sensemaking, particularly Cecez-Kecmanovic’s sensemaking framework of knowledge in organisation (2004, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002; Jerram, Cecez-Kecmanovic et al, 2003), collective mind (Ryle, 1949; Brown & Duguid, 2002), heedful interrelating (Weick & Roberts, 1993), Lave and Wenger’s (1991) communities of practice, and the organisation as a distributed knowledge system (Tsoukas, 1996). Blackler’s typology of knowledge types (1995), and Butler’s model of knowledge and learning (1994), are also introduced as they relate to the concepts discussed. Consequently, in the third part of the chapter, these concepts are brought together to develop a theoretical framework of knowledge in organisations. The theoretical framework thus developed is the analytical base from which this thesis approaches empirical data in an investigative study on knowledge management in organisations.

MODELS, ASSUMPTIONS AND UNDERLYING EPISTEMOLOGIES IN KNOWLEDGE MANAGEMENT

In this first part of chapter 3, evaluative criteria are established to provide a common ground upon which some well known models of knowledge management can be discussed. A number of models are then analysed including models by Nonaka and Takeuchi (1995), Hedlund and Nonaka (1993), Boisot (1987), Kay and Cecez-Kecmanovic (2003), Skandia (1996), Demerest, (1997), Cook and Brown (2002), Burstein and Linger (2002, 2003), Hasan and Al-hawari, (2003), and McAdam and McCready, (1999).
PARADIGMS

There is an extensive range of models of knowledge and knowledge management available to examine, with a diversity of approaches. To reasonably evaluate a diversity of models requires a common point of reference. McAdam and McCready point out that:

If KM is to continue as an emerging paradigm, and not simply be a convenient mechanistic tool, then the field must address the social side of knowledge construction (mainly the left side of [table 3-1]). (1999, p. 95)

To this end, McAdam and McCready use of Clegg et al’s (Clegg, Barrett, Clarke, Dwyer, Gray, Kemp, & Marceau, 1996) delineation of old and new management paradigms (see table 3:1 below) as an appropriate means of evaluating knowledge management models.

<table>
<thead>
<tr>
<th>New paradigm</th>
<th>Old paradigm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational learning</td>
<td>Organizational discipline</td>
</tr>
<tr>
<td>Virtuous circles</td>
<td>Vicious circles</td>
</tr>
<tr>
<td>Flexible organizations</td>
<td>Inflexible organizations</td>
</tr>
<tr>
<td>Management leaders</td>
<td>Management administrators</td>
</tr>
<tr>
<td>Open communication</td>
<td>Distorted communication</td>
</tr>
<tr>
<td>Core competencies drive product development</td>
<td>Strategic business units drive product development</td>
</tr>
<tr>
<td>Strategic learning capacities are wide spread</td>
<td>Strategic learning occurs at the apex of the organization</td>
</tr>
<tr>
<td>Assumption that most organization members are trustworthy</td>
<td>Assumption that most organization members are untrustworthy</td>
</tr>
<tr>
<td>Most organization members are empowered</td>
<td>Most organization members are disempowered</td>
</tr>
<tr>
<td>Tacit and local knowledge of all members of the organization is the most important factor in success, and creativity creates its own prerogative</td>
<td>Tacit and local knowledge of most members of the organization must be disciplined by managerial prerogative</td>
</tr>
</tbody>
</table>

Source: Clegg et al. (1996)

Table 3-1  Clegg et al’s old and new management paradigms

As Clegg et al (1996) describe it, (see table 3:1 above), the old organisational management paradigm was a rigid inflexible structure that used employees as purchased labour. Employees and organisation members were neither trusted nor empowered but were required to submit to organisational discipline with little consideration or care given to the wellbeing or empowerment by the organisation to the employee, whilst the emerging modern paradigm attempts to emphasise the socialisation of the work place, empowerment, communication and flexibility. Clegg et al thus describe the "new" paradigm as one in which employees and organisational members are regarded as persons who are important, empowered, learning and able. In this new paradigm,
management cares for employees, assists them to grow and develop professionally, supports and develops communication and interpersonal skills and relationships, and values their knowledge and creativity as unique to the individual and valuable to the organisation.

The old and new paradigms, as described by Clegg et al (1996), are extreme examples, and the new paradigm is an idealistic rather than realistic depiction if it is to be ascribed to the current practices of modern organisations. However, on the whole, these may be seen as two opposite poles of the general trends and prevailing attitudes and values of the old management paradigm and the new. McAdam and McCready (1996) use these paradigms as their evaluative criteria, examining knowledge management models for a balance between old (scientific) and new (social) paradigms. These are useful concepts and this thesis uses these insights as a starting point but these criteria are not adequate to meet the specific goals of this thesis. Knowledge management “must address the social side of knowledge construction” (McAdam & McCready, 1996, p.95) if it is to develop and grow as an effective paradigm.

This thesis examines the conceptual foundations (and their hidden assumptions) that shape a KM approach and particularly investigates whether or not they address the people-centric or social issues of knowledge management in organisations. Clearly whether a KM approach stems from the scientific or social paradigm is a part of this question but not the whole. In this chapter some of the models which were examined by McAdam and McCready and other models taken from additional sources are evaluated for their conceptual foundations, hidden assumptions and whether or not they address the social aspects of knowledge management.

**Typological Models**

The preponderance of KM models are typological. Most typological models are specifically knowledge categories. These are exemplified by the very well known classic model by Nonaka and Takeuchi (1995) which claims to use Polanyi’s (1962, 1962a, 1966) concept of tacit and explicit knowledge (see below in figure 3:1). In the model shown here, Nonaka and Takeuchi depict knowledge as being either explicit (articulated and codifiable) or tacit (unarticulated and needing to be made explicit).
Nonaka and Takeuchi depict tacit as meaning not yet articulated, and as a form of knowledge that needs to be made explicit. Working from this assumption, they examine four kinds of knowledge process. The first is from tacit to tacit, resulting in socialisation; the second, from tacit to explicit, results in externalisation of the knowledge. From explicit to tacit has internalised results, and from explicit to explicit provides a combination of knowledge. These occur in an iterative or spiral form, constantly moving from one to another (as depicted graphically with a spiralling arrow running through the four boxes of the grid). This model has proven, to many organisations, to be a useful means of categorising knowledge and knowledge processes. Its principal contribution has been the focus placed on the value of employees' knowledge and thinking processes, and new inquiry into previously taken-for-granted background knowledge and knowledge processes. Despite the contribution it has made to knowledge management, however, (McAdam & McCreedy, 1999; Tsoukas, 1996, 2003) the model is severely limited and has some limitations. Principal among these limitations is the limited and partial application of Polanyi's (1962, 1962a, 1966) description of tacit knowledge. There is a reduction of tacit knowledge to only that which can be made articulate and codifiable: "it ignores the essential ineffability of tacit knowledge, thus reducing it to what can be articulated" (Tsoukas, 2003, p. 30).

The Nonaka and Takeuchi (1995) model has taken hold of the imaginations of many knowledge management researchers and practitioners, and where these ideas hold sway, there is little room for perceiving the depth, importance and value of tacit knowledge and how comprehensively it underlies all knowledge and everything we do. Consequently, much tacit knowledge is ignored and overlooked – a serious limitation in knowledge management practice. Thus, although this model has benefited the discipline by drawing the attention of knowledge managers to the value of a dimension of knowledge previously ignored and undervalued, it has potentially limited the discipline

Figure 3.1  Nonaka and Takeuchi's knowledge management model (1995)
by its misconceptions. Perhaps one of the more serious consequences of this failure to understand the "ineffability" of tacit knowledge is that tacit knowledge, and those who hold it, are once more reduced to assets – knowledge becomes something to be acquired, captured, converted and disseminated, and in consequence the person whose tacit knowledge has been 'captured' becomes no longer valuable, and is thus discardable. This precludes the ability to understand or implement some of the more important facets of knowledge management practice that focus on the inarticulable and the social / individual aspects of knowledge and knowledge processes. (These facets will be described in the second part of this chapter). More significantly, works founded upon this model tend to focus their knowledge management efforts on the task of 'converting tacit knowledge to explicit' with related emphasis on 'extracting knowledge' from employees rather than upon developing the employees (Canner & Katzenbach, 2004; Hart, 2000). The model itself does draw attention to social aspects of KM with ‘socialisation’ as one of the key components of the model but the KM approaches built upon the model tend to focus on the ‘tacit’ / ‘explicit’ divide, and the hidden assumptions that the ‘externalisation’ process from ‘tacit’ to ‘explicit’ requires the exploitation of employee knowledge, with little focus demonstrated in the literature or business seminars on the ‘internalisation’ process to assist employees in internalising knowledge or the ‘combination’ process that would foster collaborative efforts.

Developments from Nonaka and Takeuchi’s model have addressed some of these issues. Hasan and Al-hawari (2003) develop a broader concept stemming from Nonaka’s original work in which they add ‘semi-explicit’ and ‘semi-tacit’ to the categories created, doubling the numbers of knowledge processes able to be discerned and developed through KM when using the model. To Nonaka’s (1995) originally proposed four processes: socialisation; externalisation; combination; and internalisation; Hasan and Al-hawari add: articulation, a process taking explicit knowledge to semi-tacit forms; adoption, converting semi-tacit to tacit forms; standardisation, in which tacit knowledge is converted to semi-explicit forms, and systematisation, converting knowledge from semi-explicit to explicit forms. Despite the finer distinctions between the mediated steps from ‘fully’ to ‘semi’ tacit or explicit, this model still separates the tacit from the explicit, missing Polanyi’s original concept (1962, 1962a, 1966) in which tacit and explicit are inextricably bound. However, this layering of finer distinctions is the foundation for a
more complex typological model that Hasan & Al-hawari call a k-space (or three dimensional view of knowledge) framework:

In this study the k-space framework has proven to be a useful basis for identifying different KM styles depending on the activities, which convert knowledge between the types of tacit, semi-tacit, explicit and semi-explicit. Each style affects organizational knowledge in different ways, based on levels of the knowledge dimensions: codification, availability and applicability. The adoption and articulation styles are recognized as human-knowledge styles because the human is expected to gain knowledge. Standardization and systemization are recognized as technology styles because the system is expected to store knowledge. It seems likely that people with the capability to integrate different KM styles in a KM initiative will be most effective in producing the required improvement in organizational performance, against which the KM outcome should be evaluated (Hasan & Al-hawari, 2003, p. 27).

The k-space framework “has been found to provide a functional framework for categorizing organizational knowledge” (Hasan & Al-hawari, 2003, p. 15) as it considers organisational knowledge as having three dimensions: codification, availability and applicability as well as typifying knowledge as falling into either a human-knowledge style or a technology style. There is also a critical recognition of characteristics of knowledge including abstraction, diffusion and codification. With style, dimension and processes all considered in a three-dimensional approach this framework is quite comprehensive and complex and focuses on ‘improvement in organizational performance’. The goal of this typological model is to permit managers to “identify the most effective KM style, or combination of styles, to improve organisational performance, in their particular circumstances” (Hasan & Al-hawari, 2003, p. 27). This is a process-based typology that recognises both the human and the technological dimensions, reconciling many of the difficulties created by models that ignore one or other dimension and does address many of the social aspects of KM. As with most of the models discussed in this chapter, Hasan & Al-hawari’s framework (2003) is business application focused.

An earlier model than Nonaka and Takeuchi's (1995), is one that by Hedlund and Nonaka (1993) (table 3:2 below). Hedlund and Nonaka's model again starts from an
Table 3-2  Hedlund and Nonaka’s (1993) knowledge management model

The assumption that tacit knowledge can be distinguished from articulated or explicit knowledge, which again tends to miss many of the social aspects of KM and lead to the KM issue of extracting knowledge from employees rather than developing and supporting employees. This Hedlund and Nonaka (1993) model, which was the forerunner to the better-known tacit/explicit spiral, has a different focus as it considers the differences in knowledge processes between individuals, groups, organisations and inter-organisational processing of knowledge. This contributes valuably to a concept that knowledge, and the persons who hold and act upon knowledge, is a fluid form of interaction that differs circumstantially. Knowledge is understood, communicated and acted upon differently in different settings. Thus individual, group, organisational and inter-organisational knowledge processes are different. This is a valuable insight offered by this model. It actually exhibits less of the weakness of the later model in misunderstanding the depth and complexity of tacit knowledge. The examples of tacit knowledge given in the model (table 3:2 above) demonstrate a reasonable understanding of the personal and interpersonal dimensions of tacit knowledge as described by Polanyi (1962, 1962a, 1966), from whom the concept of tacit knowledge is derived. (Polanyi’s original description of tacit knowledge will be discussed in more depth in the second part of this chapter). This model’s weakness, like Nonaka’s later model with Takeuchi, is the limitation inherent in separating explicit (articulated) knowledge from its underlying tacit dimension, and the lack of understanding of tacit knowledge implicit in that failure. The recognition of the different social dimensions of individual, group, organisational and inter-organisational and the specific recognition of the differing roles of team coordination and culture give an emphasis on the need to support employees in their cultural setting and collaborative efforts and thus clearly recognises and addresses some
of the social aspects of KM in which KM efforts focus on developing communication, learning and collaboration among employees.

Another early model, Boisot's (1987) knowledge category model (table 3.3 below), uses diffused and undiffused knowledge as categories. This is a valuable insight also reflected in the k-space framework by Hasan and Al-hawari (2003). Knowledge is more often perceived in the literature as disseminated or distributed, with an implicit assumption of management-controlled allocation of who is or should be told what, by whom, when, and for what purposes. Boisot's use of the terms 'diffused' and 'undiffused' knowledge depicts a different awareness of the nature of knowledge, knowledge distribution and knowledge dissemination.

![Table 3.3 Boisot's (1987) knowledge category model](image)

As illustrated in his model, the use of proprietary and personal knowledge to represent undiffused knowledge (knowledge retained, not made public) and public knowledge and common sense to represent diffused knowledge (that is widely known) does not explicate a specific path or medium for spreading the knowledge. Although this can be perceived as a weakness, as a failure to recognise and articulate these important specifics, it can otherwise simply be applauded as recognition of the diffuse nature of knowledge with as yet largely unexplored paths, media and diffusion processes. Boisot also uses the terms codified and uncoded knowledge rather than the tacit / explicit descriptors. This use of codified and uncoded is more specific and more accurate than the use of tacit and explicit as a descriptor of the processes under consideration by the model. The recognition of codified knowledge as personal knowledge and common sense and as separate from proprietary and public knowledge is in keeping with Polanyi’s (1962) thesis that all knowledge is personal knowledge. As a model upon which to base knowledge management practice, it is very neutral as it simply indicates that there is codified proprietary knowledge and uncoded personal knowledge but gives no direction toward exploitation, development, collaboration or even codification.
Thus whether or not this model addresses social aspects of KM would be dictated primarily by the KM approach for which the model was used. Boisot’s model is clearly bounded in scope and does not attempt to delineate differences between or value of individual or group knowledge, which would make it an inappropriate model for most KM approaches in which communication and collaboration are important aspects.

More recent models focus on action and activity as key components. Cook and Brown (2002) offer a model founded on the two polarities tacit/explicit and individual/group, combined with the concept of ‘knowing as action’ (see figure 3.2 below). Cook and Brown label this model as one that ‘bridges epistemologies’ as the model draws together three different strands of KM literature and conceptual approaches. One major strand of KM thought is that of the tacit/explicit approach as has been discussed in this chapter. A second strand focuses on the difference between individual and group or social knowledge and knowledge management, which will be discussed more extensively below in the next part of this chapter. A third dimension is that of ‘knowing as action’ as was discussed in chapter 2 (Jarvis, 2000; Burton Jones, 1999; Nonaka & Takeuchi, 1995). This emphasis on knowledge as action gives a specific focus and direction to KM approaches that use this model as their foundation. In each quadrant of the model the response is geared to translating, for instance, the tacit/individual knowledge or explicit/group knowledge to action.

![Figure 3.2 Cook and Brown (2002) bridging epistemologies model](image)

This gives a core business and productivity focus. Much of the literature relating to action-focused knowledge concepts (Brown & Duguid, 2002; Cook & Brown, 2002; Jarvis, 2000; Hart, 2000) originates predominantly in the corporate and government sectors. Cook and Brown’s 2002 model is relatively neutral in terms of the social aspects of KM, as an action-based focus can lean toward either a techno-centric or a people-centric paradigm but as the model has a core component based on the tacit/explicit
divide, there is the potential for the perception of knowledge as an asset and an acquisition and employees as temporary assets to be exploited rather than a perception that honours employees' personal value and fosters interrelationships between employees.

Slightly more specific than Cook and Brown's (2002) action-based approach, however, is the task-based approach offered by Burstein and Linger (2002, 2003). This is offered in two phases: a task-based model of work (see figure 3:3 below) and a task-based knowledge management framework (Burstein & Linger, 2003, pp. 294-295).

The task-based model of work is explained emphasising the two layers: pragmatic and conceptual.

The inner layer, labelled Pragmatic, is associated with the performance of the task and is concerned with the efficient and effective execution of the task. It is representative of the work that needs to be done and the organisationally sanctioned procedures for doing the work.... The Conceptual layer views the task from a more generalised, abstract perspective expressed in terms of the overall goals and objectives of the task and its underlying concepts and structures.... The Conceptual level effectively provides the individual with a meta-level 'language' which is necessary to understand the Pragmatic task (Warne, Ali, Linger and Pascoe, 2003, pp. 301-302). [italics in original].

![Figure 3.3 Burstein and Linger: a task-based model of work (2002)](image)

This essentially depicts a single individual working from the tacit and explicit components of their own individual knowledge, separately and together. Warne, Ali, Linger and Pascoe (2003) then go on to explain that the model is static but needs to be read from a process perspective in which “the performance of the task is seen as an instantiation of the framework to reflect the specific situation... [which] implies a change in work practices in that the starting point for task performance is to judge the accuracy of the Conceptual level models to meet the needs...” (Warne, Ali, Linger &
Pascoe, 2003, p. 303). This model reflects a conceptualisation of tacit and implicit knowledge working together in a manner consonant with Polanyi’s original (1962, 1962a, 1966) depiction of the intertwined roles of tacit and explicit knowledge. The focus on the individual and the task makes it unclear whether or not the model addresses social aspects of KM as it has the individual as the focus rather than the organisation.

The more extensive task-based knowledge management framework (see figure 3:4 below) (Burstein & Linger, 2003, pp. 294-295) makes “work activity the primary focus of KM implementation” (Burstein & Linger, 2003, p. 302). The goal is to model the knowledge workers’ perception of their task and their performance. “These models document aspects of the body of knowledge that underpin the task and are included in an organizational memory” (ibid). This reverses the normal view taken for KM modelling as it is a “bottom-up” approach rather than “top-down” management focus. “Mainstream KM tends to focus on the “planning/design” function and views knowledge work as predominantly the domain of “managers”… Our position, however, is that KM supports all activities that constitute a task within post-Fordist work organization” (idem p. 290).

![Figure 3.4: Burstein and Linger: a task-based knowledge management framework (2003)](image)

Figure 3.4  Burstein and Linger: a task-based knowledge management framework (2003)

However, the framework goal “to acquire, represent, preserve and distribute knowledge, created as a result of performing a specific task, at both individual and organizational levels” (Burstein & Linger, 2003) exhibits a focus on being able to capture knowledge...
from an individual and store and redistribute it for organisational purposes. Nevertheless it is an approach that “represents a dynamic process that implements organizational learning by establishing and supporting systematic communication between individuals performing tasks within the organization” (Burstein & Linger, 2003, p. 290) as a communication focus is more new paradigm than old paradigm in management approach. The framework also contributes a broader conceptualisation of KM in its recognition of individuals, organisation, and the overlapping nature of individual and social knowledge and the unique perspective of collective and shared knowledge, and could equally be considered a socially constructed model as a typological model.

The model offered by Kay and Cecez-Kecmanovic (2003) (see figure 3:5 below) was briefly mentioned in the last chapter (figure 2:4, p. 24.). It identifies that current knowledge management views polarise two dimensions of knowledge. Knowledge as object is distinguished from knowledge as process, and this is a valuable contribution to current knowledge management practice as there has been difficulty within the field in reconciling the differences between these two perceptions, and having a single model recognising each of these aspects at different ends of a continuum will be useful. However, on the other axis, individual knowledge is distinguished from social knowledge, echoing Spender’s division of the social from the individual (1995, 1996). Within the constraints of the model for given purposes this could be a useful division and certainly reflects current thinking.

![Diagram](image)

**Figure 3-5** Kay and Cecez-Kecmanovic (2003): Assumptions underpinning KM research.
On the whole, however, this model identifies an inappropriate division current in KM literature and practice that perpetuates more misperceptions than insights as the inability to recognise the nature of knowledge as equally and simultaneously individual and social is a significant failure that can have important ramifications, particularly as it overlooks critical issues pertaining to sensemaking, collaboration, collective mind. This will be discussed in greater depth in the latter half of this chapter. Spender (1996) uses a two dimensional classification of knowledge in which one dimension of knowledge is either individual or collective and the other dimension is either explicitly articulated or implicitly manifested. Cecez-Kecmanovic (2004) and Tsoukas (1996) both identify that Spender has made a clear distinction between individual and collective knowledge but that he does so rigidly, “without recognising how mutually constituted they are” (Cecez-Kecmanovic, 2004, p.3). This rigidity of definition when delineating between social and individual knowledge and knowledge as process or object is a key factor in Kay and Cecez-Kecmanovic’s (2003) identification of assumptions underpinning knowledge management research. This recognition that there are assumptions underpinning knowledge management research and practice, both recognised and unrecognised, and that many of these assumptions need to be explored is a valuable insight offered by this model in which Kay and Cecez-Kecmanovic summarise common approaches to knowledge management (Cecez-Kecmanovic, 2004; Dervin, 1999).

On the whole, many 'categorisation of knowledge' models have contributed valuable insights but most tend to be somewhat mechanistic and more consistent with old paradigms than newer emerging organisational and management theory (McAdam & McCreedy, 1999). Broadly speaking, typological approaches have to ignore particularities and specifics, and focus only on selected and bounded commonalities. Although they may assist in producing useful insights these approaches are not particularly helpful in understanding life as-it-is-lived with the irregularities and unpredictability which organisations face on a daily basis (Tsoukas, 1996). The greatest difficulty with typological models is the commonality of conceptually separating intrinsically inseparable aspects of knowledge. Specifically, as discussed previously, tacit and explicit aspects of knowledge are distinguishable but inseparable as are individual and social aspects of knowledge. Tacit knowledge can (to a degree) be expressed, when focused upon and made focal knowledge (the focus of concentration) instead of subsidiary knowledge (background knowledge used but not focused upon). There are, however,
necessarily aspects of tacit knowledge that can never be 'captured', expressed or codified (made explicit) or, as Polanyi expresses it, "There are things that we know but cannot tell" (1962a, p. 601), and explicit knowledge cannot be divorced from the tacit dimension that underlies all knowledge. Similarly, individual knowledge cannot be isolated from social knowledge, as all knowledge is created within a social context that in turn shapes individual understanding.

Considered in this way, models which attempt to separate the inseparable can be accused of limitations and inaccuracies, and can be regarded as unreliable means of studying knowledge, knowledge processes or knowledge management. Yet in one sense this is an unfair criticism, failing to recognise the nature and purpose of models. The criticism is fair regarding the use made of the majority of typology or knowledge categorisation models but may not necessarily be true of the original intent of the models and the models' authors. It is not so much the model at fault as the mistaken use made of models and their application.

Models are not meant explicitly to depict real life. They simply encapsulate and make graphic a single idea or process for easier communication and conceptualisation. Models will always have limitations and, indeed, are usually designed specifically to impose limitations so as to give definition and boundaries to an idea. Within those boundaries the idea can be discussed and explored thoroughly. Without the boundedness or limitation of a model, it is easy to lose track of the central theme of the ideas to be discussed. The principal problem with this is when readers mistake the bounded ideas represented by a model for an unbounded application. When this occurs, problems arise such as those created by Nonaka's works using bounded models of tacit and explicit knowledge. Within the boundaries of the models, Nonaka's limited definition of tacit knowledge (which is not necessarily inaccurate of itself so much as that it is a tiny portion of the whole dimension of tacit knowledge) and its relationship with explicit knowledge has proven to be a useful model that has encouraged some effective processes in various organisations that have developed ideas from this model. When these perceptions are taken outside the boundaries of the model and consequently false conclusions are drawn then the limitedness of the model becomes a severe drawback to understanding and misunderstandings and misconceptions become commonplace. For instance, Nonaka's various models that separate explicit knowledge from tacit
knowledge and only refer to the articulable dimension of tacit knowledge are not necessarily wrong within the models created or specified uses of the models. For bounded purposes such models can isolate and articulate certain elements to deepen perceptions in those isolated areas. When readers take those instances from the model and apply them to their understanding of all knowledge and knowledge processes is when misperceptions, misconceptions and misapplication of knowledge and knowledge processes come into being. This makes it possible to create a generation of knowledge management practitioners who, for instance, commonly misunderstand and misapply Nonaka's extremely limited description of tacit knowledge and mistakenly ascribe their inaccurate views to Polanyi (1962).

**INTELLECTUAL CAPITAL MODELS**

Another popular range of models in current knowledge management literature are the intellectual capital models typified by the famous Skandia model (see figure 3:6 overpage). The Skandia model (McAdam & McCreedy, 1999) is particularly well-known as the model introducing metrics to KM, and has been replicated in organisations around the world. The preponderance of models published by knowledge management consultancy groups, such as KPMG and Delphi Group Consulting, tend to fall into this range of model. The majority of these, however, are exclusively copyrighted and prohibited from further publication. The companies generating these models tend to consider them to be valid only within a very short time frame, as currency (or newness) is a critical issue for these companies, and knowledge management is a core business with such models core products. The Skandia model has been found very valuable in modern knowledge management practices, as it addresses a key need in business circles. Given that knowledge managers usually have to justify their expenses to senior executives who tend to be unsympathetic to intangible or qualitative gains and demand accountancy-styled procedures that demonstrate tangibly (preferably in dollar figures) the value-added benefit of investing in knowledge management. Intellectual Capital models provided a means – a new form of metrics – that can be applied to previously intangible and insubstantial values and place a dollar value on them. Knowledge management initiatives can now be accounted for – in gains as well as expenses – on the balance sheet. This has been of inestimable value to knowledge management practitioners around the world, an entire subsidiary discipline (intellectual capital) has developed as a specialised field of KM, and many metrical models have been developed
since. They all aim to quantify the qualitative and place a dollar value on the gains received from knowledge management.

In Intellectual Capital models, as in typological models, knowledge necessarily therefore is commodified as an asset. The Skandia model has been strongly critiqued for assuming that objective measures can be applied to subjective phenomena (McAdam & McC Creedy, 1999). Certainly the Skandia model exhibits a mechanistic approach to knowledge management more suited to old management paradigms than emerging new paradigms. Possibly what causes the Skandia model to appear shallow and mechanistic is the tagging of every dimension listed in the model (including people-centric dimensions) with the label "capital". The implication, as seen in the diagram (figure 3:6 below) is that everything has a monetary value and should be related to as a fiscal asset. The 'everything' in the Skandia model includes human, intellectual, customer, innovation… each aspect (other than equity, which is another dimension of 'money') is labelled 'capital'. This is the function the model was designed to fulfil but it is also, consequently, severely limited. While it can contribute useful views for certain approaches to making money through a capital based approach to 'knowledge management' it can also contribute detrimental short-sightedness and inability to see necessary depth, range or complexity of knowledge management phenomena.

![Skandia Knowledge Management Approach](image)

**Figure 3-6 Skandia knowledge management approach**

Consequently, this is an issue that needs to be confronted. Modern day organisations strongly influenced by economic rationalism demand an ability to put an objective fiscal
value on anything that is to be perceived as 'valuable'. An inability to measure or place an economic value on any object or process is to render it unimportant and relegate it to obscurity without a budget. If knowledge, knowledge processes and/or knowledge management are to be given any currency or value in modern organisations influenced by economic rationalism, organisational executives are going to demand metrics whereby the value of the knowledge and knowledge processes can be determined. This attitude may be unrealistic and damaging but it is necessary to perceive that the attitude exists, and researchers and practitioners are required to find metrics, means or models that can depict or allocate, to some degree, an objective economic measure to the subjective and intangible processes of knowledge and knowledge management. Thus far the Intellectual Capital models have provided the fiscally determined means of satisfying budget-conscious executives with justification for expenditure but have not been able to also provide a balanced view of the qualitative and subjective issues in knowledge management.

**Socially constructed models of KM**

Socially constructed models of knowledge management tend to have wide definitions of knowledge and to intrinsically link knowledge with organisational social and learning processes (McAdam & McCreedy, 1999; Tsoukas & Vladimirov, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002). Socially constructed models often draw from organisational learning, and share much in common with organisational learning models. Two such models are Demerest's (1997) and McAdam and McCreedy's, which is developed from Demerest's model. Demerest's model (see below in figure 3:7) emphasises construction of knowledge, including social constructions. Constructed

![Figure 3-7 Demerest's (1997) model of KM](image)

![Figure 3-8 McAdam and McCreedy's KM model](image)

knowledge is then embodied in both organisational practice and social interchange. Following the arrows (solid black arrows show the primary flow direction and the
hollow light arrows indicate more recursive flows) it is seen that embodiment is then followed by dissemination and finally put to economic use. This model takes a holistic view of knowledge construction rather than a rigid definition of knowledge, although it has been criticised as echoing a simplistic attitude with a somewhat mechanistic approach to the flow and use of knowledge (McAdam & McCready, 1999). McAdam and McCready's modification of Demerest's (1997) model (figure 3:8), acknowledges input from the scientific and social paradigms by which they are referring respectively to Clegg et al's (1996) old and new paradigms and addressing a necessary balance between techno-centric and people-centric approaches to KM. Their model also addresses critical social aspects of KM with the addition of emancipatory uses for knowledge, more recursive flows of knowledge and knowledge processes and with the specific inclusion of ‘employee emancipation’.

McAdam and McCready consider this upgraded model of the Demerest model to offer a useful foundation upon which to discuss and build KM and KM theory, as it is intelligible in both techno-centric and people-centric KM domains, yet allows KM to contribute to the new emerging paradigm for knowledge management (Clegg et al, 1996, McAdam & McCready, 1999). Whilst McAdam and McCready's additions certainly supplement and extend Demerest's model and make it a significantly more usable one, there are some limitations. McAdam and McCready show a definite bias towards socially constructed understandings of KM in their critiques, which this thesis adopts. They operate from a largely unexplored assumption that Clegg et al's division of management paradigms into [a] old, mechanistic and positivist and [b] new, flexible and people-centric, is both adequate and useful, and that it is an appropriate point of reference when discussing knowledge management. The division of knowledge management models into the three types of [1] knowledge categories, [2] intellectual capital, and [3] socially constructed models, originated with McAdam and McCready and is both useful and logical. The categories are not necessarily as discrete, however, as McAdam and McCready would have them appear. Some activity-based models (Burstein and Linger, 2003, 2002; Cook and Brown, 2002) merge [1] knowledge categories with [3] socially constructed models as do useful typologies such as Blackler (1995), Cecez-Kecmanovic, (2000); and Tsoukas (1996), all of which will be described and discussed in detail in the second half of this chapter.
McAdam and McCready's use of Clegg et al's (1996) old and new management paradigms as a point of reference from which to discuss the models is appropriate and usefully leads to a fuller examination of conceptual approaches to KM. Their main contribution, however, is their offering of an adapted model that includes recognition of theoretical assumptions that build understanding of knowledge, and knowledge management. Interestingly, they limit this to knowledge construction, not attempting to recognise or address theoretical assumptions as underpinning other aspects of the knowledge and knowledge management cycle. Nevertheless, McAdam and McCready's model (1997) does meet their own criteria of aligning more with new management paradigm than old and balancing both. Focus is placed on social interrelationships and a freedom of movement for knowledge and knowledge processes, and they clearly identify that both social and scientific paradigms have an influence in knowledge management processes.

In this first part of chapter 3, evaluative criteria were established, against which some common models of knowledge management were then evaluated. These were conceptual foundations, hidden assumptions and whether or not they address the social aspects of KM. The models that have been discussed include those by Nonaka and Takeuchi (1995), Hasan and Al-hawari (2003), Hedlund and Nonaka (1993), Boisot (1987), Cook and Brown (2002), Burstein and Linger (2002, 2003), Kay and Cecez-Kecmanovic (2003), Skandia (1996), Demerest, (1997) and McAdam and McCready, (1999). McAdam and McCready state of their model that it "is a slightly modified version of Demerest's model which seeks to address these limitations by explicitly showing the influence of both social and scientific paradigms of knowledge construction". It is on their addition of 'the social paradigm of knowledge construction' and the evaluative criteria of conceptual foundations, hidden assumptions and social aspects of knowledge management that this study now focuses.

THE NATURE OF KNOWLEDGE IN ORGANISATIONS: INDIVIDUAL, SOCIAL AND ORGANISATIONAL SENSEMAKING

In this second part of chapter 3, the nature of knowledge is considered, drawing particularly on the works of Ryle (1949) and the concept of collective mind, of Weick and Roberts (1993) and their concept of heedful interrelating, and on Cecez-Kecmanovic's sensemaking framework for knowledge in organisations (2004, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002; Jerram, Cecez-Kecmanovic et al, 2003), and

THE NATURE OF KNOWLEDGE

Chapter 2 intimated the possibility of greater depth to the arguments regarding definition of knowledge and knowledge management, particularly when considering deeper aspects raised when referring to 'understanding'. 'Understanding' is a fundamental concept behind that which the literature refers to as 'sensemaking'. This concept of sensemaking is developed in both the individual and the organisational / social sense. Sensemaking looks at the process individuals go through to create a socially negotiated conceptualisation of the world – making sense of the world around them and the events in which they participate (Weick, 1995; Tsoukas & Vladimirou, 2000; Cecez-Kecmanovic, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002; Dervin, 1999). However sensemaking is a variable approach, and the way an individual makes sense of his or her personal or individual world will usually be consistent with but not necessarily identical to, how that same individual will make sense of the organisational or social world in which they participate. Yet how the individual makes sense of the world will inevitably affect and be affected by the social sensemaking around him or her. "Sensemaking is grounded in both individual and social activity, and whether the two are even separable will be a recurrent issue" (Weick, 1995, p. 6). If the concept of the inseparability of individual and social activity is accepted, then approaches to knowledge management will be significantly affected and sensemaking is an approach particularly pertinent to this concept. Checkland and Holman claim "the managing process... ought to concern itself with organizational learning, with the way in which people in organizations continually construct the meanings which for them make sense of themselves and their world" (1998, p. 7). They are not the only ones to see the role of knowledge management and sensemaking as linked to organisational learning (Tsoukas, 1996; Probst, Raub & Romhardt, 2000; Schultz & Leidner, 2002; Dervin, 2003; Warne, Ali, Linger & Pascoe, 2003). Because of its multi-disciplinary origins, knowledge management links with many other disciplines and approaches, of which organisational
learning is only one but similarly amenable to a sensemaking approach that includes collective mind and heedful interrelating. Sensemaking will be explored in greater depth later in this chapter. The next part of this chapter will explore collective mind and heedful interrelating, particularly drawing from the works of Ryle (1949), Weick and Roberts (1993), and Brown and Duguid (2002).

**COLLECTIVE MIND AND HEEDFUL INTERRELATING**

Collective mind is a concept that permits us to understand how humans can interrelate in such a fashion that a group that has developed a collective mind can perform complexly interrelated tasks beyond the sum of the knowledge of the individuals in the group.

Experience at work creates its own knowledge. And as most work is a collective, co-operative venture, so most dispositional knowledge is intriguingly collective – less held by individuals than shared by work groups. This view of knowledge as a social property stands at odds with the pervasive ideas of knowledge as individual. Yet the synergistic potential of certain people working in unison – a Gilbert and Sullivan, a Merchant and Ivory, a Young and Rice, or a Pippin and Jordan – is widely acknowledged. In less exalted workplaces, too, the ability of certain groups to outstrip their individual potential when working together is a common feature (Brown & Duguid, 2002, p.24).

Here Brown and Duguid refer to dispositional knowledge, a term used by Ryle (1949, p. 42) which refers to “intelligent practice” where “the agent is still learning” so the focus is on knowledge in action and ongoing learning processes embedded in knowledge but the emphasis is on the collective nature of that knowledge. Collective mind is achieved through a process of heedful interrelating (Weick & Roberts, 1993). It is not demonstrated through collections of knowledge or information held in the minds of individual people operating in a group. It is demonstrated in the actions that occur when a group of individuals act together in trust and awareness to accomplish something which, working alone, they would not be able to accomplish.

Heedful interrelating is most commonly found in high-reliability organisations (Weick & Roberts, 1993) where reliability and human safety are paramount considerations in the conduct of all operations. In high-reliability organisations, individuals focus on their performance of complex tasks that are highly dependent upon other individuals. This pattern of behaviour is evidenced in actions and becomes collective mind. In collective mind, individuals contribute actions (Weick & Roberts call these ‘contributions’) while
aware that they are representative parts of a whole (‘representation’) and subordinate their individualism to interrelate their actions as needed within the system (‘subordination’). Whilst doing so, they are heedful – pay careful attention to, are intently watchful – of their interrelationships and interrelated actions. Heedfulness is the key to error-free interrelations, and both heedfulness and interrelations are necessarily simultaneous.

In heedful relating and collective mind, therefore, there is co-equal attention given to the individual and to the group. Yet the focus is not the group itself but the collection of actions that occur between the contributions of the individuals heedfully relating. The collective actions are the collective mind. Collective mind is not a singular entity but is a process or event that occurs in and through interrelationship. Such coordinated actions (coordinated through heedful interrelating rather than strategic planning, although careful strategic planning is also necessary) create a comprehension in the collective mind that enables the individuals involved to carry out complex tasks that could not be comprehended or carried out by a single individual. When individuals within a collective mind cease to interrelate heedfully, comprehension is weakened, events become incomprehensible and incoherent and errors occur. As all participants give heed whilst interrelating, complexity is reduced to a coherent pattern made manageable by the heedfully coordinated actions of otherwise independent individuals. When individuality comes to the fore, and either interrelationship or heedfulness is weakened, the comprehensibility of the task overall is weakened, as is the collective mind. Errors will not only creep in, they will build rapidly to potential failure (Weick, 2001, pp.100-124).

To maintain heedful interrelationship and collective mind requires that the individuals know themselves to be a part of a system, and believe in and respond or act within the system of which they are a part. Without that subordination to the represented system, individual contributions remain only actions, not contributions to a greater, holistically understood, system. The collective mind resides not in the individuals who are the components of the system or mind but in the mutual understandings and interrelationships (visible in actions) that take place amongst them.

To maintain collective mind when some individuals leave or new individuals join the various groups and teams that develop the collective mind, requires socialisation. Narrative and storytelling (Denning, 2000; Brown, 2001) are important elements that
provide capacity for insiders to revisit their knowledge and awareness and resocialise themselves as they initiate newcomers. Storytelling also allows newcomers to be brought into the socialised circle with an awareness of the need for, and situational circumstances requiring, heedful interrelating. If the socialisation process is stunted by lack of communicative narrative by insiders to newcomers, the newcomers will not be able to participate as needed with the necessary heed that makes collective mind possible. Eventually as more of the insiders leave and the inadequately socialised newcomers become the staple complement of the operating crew, collective mind will be severely weakened and disintegrate. Errors will follow and may rapidly escalate to disaster (Weick & Roberts, 1993).

Lack of socialisation by insider participation is not the only debilitating factor that can destroy collective mind. Anything that affects the ongoing interaction negatively (such as personality clashes or interpersonal conflicts) or debilitates heedfulness (such as distraction or operating habitually with the mind in 'autopilot') can damage the collective mind. Nevertheless, development of group and development of collective mind are not the same thing. Developing Eisenberg’s (1990) undeveloped group-developed mind concept, Weick and Roberts (2001) make it clear that undeveloped groups can outperform developed groups. Frequently heedful interrelating is able to occur in abbreviated circumstances of group development, allowing only such social interaction and intimacy to arise (Weick & Roberts refer to “nondisclosive intimacy”, 2001, p. 276) as is required to develop the critical social factors to permit heedful interrelating and collective mind which

...is characterized by heedful contributing (e.g., loose coupling, diversity, strategic communication), heedful representing (e.g., mutual respect, coordination of action), and heedful subordinating (e.g., trust) (Weick & Roberts, 2001, p. 276).

In the literature to date, heedful interrelating has been discussed and demonstrated only in high-risk circumstances where error-free or minimal-error operations are necessary. Weick and Roberts (2001, 1993) illustrate these concepts with their research on incidents from flight deck operations from Nimitz class aircraft carriers – an environment which requires error-free handling of complex and challenging tasks. Errors, in such an organisation, cost lives and limbs, and financial losses cost millions of dollars at a time (for instance, a $38 million aircraft). Perhaps a simpler, more recognisable illustration can be seen in medical surgery. Errors in an operating theatre
also cost lives and limbs. In an operating theatre, a highly interdependent team of specialists work together trusting each other's knowledgeable actions while 'contributing' their own actions. The surgeon relies upon the anaesthetist and the surgical assistant and nurses to know and accomplish their own tasks in their own specialties. The anaesthetist does not have a surgeon's knowledge or skills, just as the surgeon does not have an anaesthetist's knowledge or skills. Yet each acts as part of an interdependent team, able to use their own skills and knowledge in trust that the other will contribute their own needed actions as required. If any member of such a team does not act upon their own knowledge in trust that the other members of the team will also act correctly with their own knowledge, the work will be incapacitated, and patients' lives can be lost. Necessarily, although each member of the team contributes unique skills and no member of the team knows everything known by other members of the team there is an area of overlap and shared knowledge to facilitate the ability to heedfully interrelate (Hutchins, 1990). One critical area of overlapping knowledge would commonly be lexicon – without a shared lexicon, particularly a finely detailed shared vocabulary of operational language germane to the joint operations and heedful interrelating, these would be extremely difficult. In a high risk, minimal-error or no-error organisation such as a surgical team, it would also be extremely dangerous.

As mentioned above, Weick and Roberts call such a field of operations a "high reliability" organisation. Both illustrations so far – flight deck operations and medical surgery – fall into this category. Because of the critical safety factor, high reliability is prized above high efficiency or any other quality. Yet because such organisations and operations focus on high reliability, their efficiency and effectiveness tend to be exceptionally high. Most organisations (and organisation theory) are concentrated upon high efficiency operations where errors cost money rather than lives or limbs. This is a significantly different focus. The consequence of high efficiency operations not having a focus on high reliability is that reliability is often neglected and usually suffers badly as a result. It is interesting to note that “high efficiency” organisations, with their focus on efficiency rather than reliability, tend not only to therefore be less reliable and have more errors but also tend to be less efficient.

...organizations preoccupied with reliability may spend more time and effort organizing for controlled information processing... mindful attention... and heedful action. These intensified efforts enable people to understand more of the complexity they face, which then enables them to
respond with fewer errors. Reliable systems are smart systems (Weick & Roberts, 2001, pp.259-260).

There would seem to be some justification to consider reliability a necessary or qualitative precursor to efficiency, as high reliability operations like flight deck operations and medical surgery tend to exhibit exceptional efficiency as a beneficial consequence of their reliability and heedful interrelating.

The concept of heedful (and heedless) interrelating allows a new avenue of exploration when investigating success and failure in organisations – but more importantly defines new areas of success and failure (Lyytinen & Hirschheim, 1987; Weick & Roberts, 2001). The concepts raised replace the notions of 'productive' and 'unproductive' or 'profitable' and 'unprofitable' with 'reliable' and 'unreliable' and, by extension, 'adaptable' and 'inflexible'. Taken further in a society where so many companies are suffering spectacular failures, this concept can be used to explore new ideas of what constitutes success and failure as well as how and why companies fail to either avoid or resolve new crises.

Similarly, the concept of collective mind offers potential as an exploratory means of investigating knowledge creation and sharing, knowledge transfer and knowledge management. Analysis by Weick and Roberts (1993) of a failure on a flight deck which led to a petty officer being disabled traced causes through a chain of incidents originating in a fundamental failure to relate heedfully within one part of the system of operations. The final accident was caused by lack of mindfulness of system awareness – a core element of heedful interrelating – causing a critical debilitation of collective mind. Likewise, the loss of a $38million aircraft was traced to similar origins by analysis that redefines understanding of organisational communication, crisis management and teamwork.

Perceptions and understanding of groups, teams, group work, groupthink, team work, and social systems can be significantly enhanced when informed by the theory of collective mind and heedful interrelating. There is potential for new conceptualisations of organisations through a sensemaking approach that includes the theory of collective mind and heedful interrelating, added to the appreciation of an organisation as a distributed knowledge system and the concept of communities of practice to provide a
multi-dimensional approach to organisations and organisational knowledge that challenges conventional thinking and technical approaches to knowledge management. Investigation of this potential could considerably enhance theory of knowledge in organisations.

**THE ORGANISATION AS A DISTRIBUTED KNOWLEDGE SYSTEM**

As a key theme of this thesis is how an organisation approaches knowledge management, and the role of knowledge management within the organisation, it is important, as Tsoukas and Vladimirou (2001, p.4) state, to define what is meant by “the organisation” and actually have a "theory of organization". This study builds upon the specific definition for organisation provided by Tsoukas (1996), in which he builds the picture of an organisation as a “distributed knowledge system” through a series of developed understandings. A more common view of organisations sees them as having fixed behaviours and bounded knowledge, which can be known and acted upon by a single decision maker, whereas in Tsoukas' theory (1996), knowledge is necessarily dispersed throughout any organisation. Moreover, knowledge is never fixed but is fluid and conditional, and needs to be seen as action-oriented rather than static-information (more concerned with the services that can be performed through the resource than merely with the resource). The concept and practice of “heedful interrelating” is important in a situation of distributed knowledge if that distributed knowledge is to work effectively and cohesively toward organisational goals. In the description of collective mind through heedful interrelating, as discussed above, we see distributed knowledge in action – distributed knowledge working together imaginatively and interrelatedly – to accomplish together what no one part of the team can do alone. Weick and Roberts (1993) do not explore the origins of the individual actions that comprise, (together through heedful interrelating), the coordinated activities that demonstrate collective knowledge but Tsoukas’ (1996) concept of distributed knowledge enables a broader concept and application of how heedful interrelating and collective mind can benefit organisations and consequently be a valuable focus for knowledge management initiatives.

In individual actions within an organisational context there is a tension that is implicit between the three aspects of knowledge as exhibited by an individual in an organisational setting. The first of these aspects in tension, as described by Tsoukas
(1996), are the “normative expectations” created for the role, function or position by the organisation (through routines, explicit rules, previous training, how the role was learned...) and the disposition of the person in the role. Second, ‘disposition’ (habitus) refers to the personalised systematic thinking patterns of the person which arise from their history of their previous socialisations. It is this dispositional element that immediately makes it likely that two people, each trained in the same role by the same person within the same organisation will approach the same task in a dissimilar manner. The third aspect adding another element of tension is the “situational-specific context”. It involves the exact situation and circumstances arising at any given moment, particularly as it relates to interrelationships with other persons involved (Tsoukas, 1996). Finally, against this daily flux that stimulates differences, there is “an unarticulated background knowledge” that introduces an element of commonality and an ability to relate, understand and share knowledge. This is seen in industry-specific lexicons and understandings. It is the background knowledge that is taken for granted but which gives a common ground for shared understandings and meaningful interrelationships. Consequently, an organisation is not a single fixed entity with a propositional resource called 'knowledge' that resides in a single person's head. Knowledge is decentralised and distributed throughout the organisation in both explicitly understood and acknowledged routines, habits and actions, and in unarticulated tacit and heuristic knowledge that is highly personal to the workers, often unrecognised, and frequently improvisational as no one knows at any one time what knowledge will be needed when or by whom. Thus a firm can be seen to be a distributed knowledge system (Tsoukas, 1996).

Such a view presents a valuable description of an organisation that addresses the difficulties inherent in the view of an organisation as a fixed and unchanging set of routines, knowledge or actions. It takes into account the changeability and variability of daily or unexpected events, and the individuality of the persons who comprise an organisation. A balance is struck between the normalisation of behaviour to meet organisational expectations and to fit with standardised norms and routines, with the versatility that comes with human personality and experience and the added variability or interrelationships and improvisational responses to a continually changing human and situational environment.
The view of the organisation as a distributed knowledge system acknowledges that no one person can know all that an organisation needs to know, and furthermore recognises the unpredictability of knowledge and organisational need. Thus there is always a creative or improvisational element required of knowledge and the persons who exercise it. There is also a relational or inter-relational dimension as humans interact with humans, each bringing their own personal history and habitus to knowledge, actions and relationships. To this is added the dimension of heuristic or improvisational knowledge, which is highly individual and critical to the organisation's ability to function with flexibility and spontaneity to meet new challenges such as occur daily in any organisation.

The concept of the organisation as a distributed knowledge system permits a new approach to knowledge management analysis and planning. Views of the organisation usually centre on core business processes and corporate strategies, assuming a central core of knowledge within a bounded field.

Some knowledge moves quite easily. People assume that it is explicit knowledge that moves easily and tacit knowledge that moves with difficulty. It is, rather, socially embedded knowledge that 'sticks', because it is deeply rooted in practice. Within communities, practice helps to generate knowledge and evince collective know-how (Brown & Duguid, 2002, p.29).

A new approach is called for to deal with an organisation as a distributed knowledge system, requiring new analytical approaches, as this concept raises different questions than those asked from a perspective of knowledge which is centrally located or owned. Where there is a view of organisational knowledge belonging to a central core, questions such as "how can we extract knowledge from our employees?" will be asked but where it is seen as distributed, personal and tacit, the question will change to "how can I encourage trust and facilitate knowledge sharing between the team members?" Such a change in questions and focus will inevitably lead to new perceptions and directions in knowledge management in response to this different view of the nature of knowledge. This understanding of the nature of knowledge also explains the unexpected organisational memory loss which occurs as the unintentional consequence of change during organisational restructures and retrenchments. Such organisational memory loss is unexpected when the organisation views knowledge as a centralised item which can be captured, stored and held by management and by databases but is an inevitable
consequence of losing the persons who hold the knowledge, particularly the tacit knowledge, in a distributed knowledge system (Treleaven & Sykes, forthcoming).

The view taken in this thesis, in response to these developed concepts of knowledge as distributed, personal and tacit, is founded on Polanyi's thesis (1962) that all knowledge is personal knowledge and the definition developed by Tsoukas and Vladimirou, (2000) who define knowledge as "the individual ability to draws distinctions within a collective domain of action, based on an appreciation of context or theory, or both" (2000, p.8). The critical points in this definition are: individual, draw distinctions, collective domain of action, context, and theory. [1] Knowledge is personal or individual, even in an organisational context. [2] The ability to draw distinctions and make judgements is a sophisticated level of skill or knowledge-in-use that separates, as few definitions do, the difference between information and knowledge. [3] Although individual, knowledge is acquired socially and operates within a collective domain of communally created understandings and definitions and domain-specific actions. [4] Knowledge is acquired in context as a socially mediated and situationally located interaction. [5] Knowledge, as described in [2], is exhibited by the ability to generalise theory from one context to another appropriately.

In a simplistic sense, knowledge becomes organisational knowledge in the common sense way of knowledge working within an organisational context but this is an inadequate view with which to work (Tsoukas, 1996). More meaningfully, knowledge becomes organisational knowledge when individuals are drawing upon a body of generalised facts and rules that are produced by the organisation in which they are working. To organise is to order, regulate, generalise and typify. Typologies of knowledge are created within organisations, creating formalised structures and typical general ways of doing things, specific to that organisation. These provide guidelines by which all organisational members can themselves generalise across contexts within the organisation. However rules and structures exist for purposes, and no set of formalised rules or structures is ever specific, comprehensive and adequate enough to meet all situations. Nor can rules apply themselves and universally state, with accuracy, when, where and how they should be deployed. All application of rules and structures depend on human judgement to determine use and applicability beyond the simplest if-then-then-that situations, using the knowledgeable ability to draw distinctions (Tsoukas &
Vladimirou, 2000). This human judgement is usually developed from the collective understanding created by the community of practice (Wenger, 1998; Wenger, McDermott & Snyder, 2002; Brown & Duguid, 2002) in which they participate.

Such knowing is a skilful art that has three dimensions. According to Tsoukas and Vladimirou (2000) the first is the focal point of concentration, the second is the subsidiary particulars, and the third is the person who links the two. Knowledge is not only personal it needs to be instrumentalised to be used as a tool – so assimilated that attention can be diverted from the tool or subsidiary particular, to the object of its use. Thus “organisational knowledge is the ability of organisational members to draw distinctions” in the process of their work in specific contexts by applying generalised rules and actions understood by collective understanding and experience (Tsoukas & Vladimirou, 2000, p.8). The more such rules and actions are instrumentalised and experiences are reflected upon and assimilated, the more organisational members will be able to concentrate on the focal point of the tasks at hand (Tsoukas & Vladimirou, 2000). KM has a double role in this respect, to allow individual's knowledge to become instrumentalised and assimilated for their own use and purpose, and also to be able to understand and communicate such instrumentalised knowledge to facilitate learning by others.

The challenge for KM is to articulate and inscribe explicitly some aspects of the mental model of the task. The role of the inscription [actor's conceptualization of the task] in this context is to reveal more of the knowledge implicit in work practices. Such an inscription can be considered organizational knowledge as it encodes facts about the activity and articulates aspects of the implicit understanding of the task (Burstein & Linger, 2003, p. 298-299).

The nature of instrumentalised knowledge was demonstrated by Tsoukas and Vladimirou, (2000) in a case study of the Panafon telecommunications call centre in Athens. In this study, call centre operators relied heavily upon collectively created informal knowledge that filled the gaps between the formal knowledge supplied in manuals. Such collective knowledge was discursively developed even during breaks, and this community of practice enabled operators to assimilate knowledge to empower rapid and extensive diagnostic skills not delivered in manuals or through formal training. Similarly communicative and interpretive skills were developed through personal experience and shared storytelling. The degree of instrumentalisation was revealed by the operators' inability to articulate how they knew their tacit knowledge. The depth of
the instrumentalisation empowered a degree of improvisational skill that exhibited finely honed knowledge-in-action. It is important to note that the persons studied, who exhibited such practical and skilled use of diagnostic, heuristic and applied knowledge would normally be categorised as 'unskilled labour' rather than 'knowledge workers'. Yet the case study undisputedly highlights skilled development and use of knowledge in action by these workers. In fact, the greater degree of knowledge exercised by the call centre operators was heuristic knowledge, informally and collectively developed in a community of practice.

The phrase 'communities of practice' has become commonplace since its introduction by Lave and Wenger in 1991, to the degree that it is often used as a descriptive phrase without due consideration of the significance of its meaning. Wenger, one of the co-authors of the phrase and theory 'community of practice', emphasises that participation in a community of practice "refers not just to local events of engagement in certain activities with certain people but to a more encompassing process of being active participants in the practices of social communities and constructing identities in relation to these communities" (Wenger 1999, p. 4) [italics in original]. It is this joint reality of actively participating in practices and jointly constructed identities developed within the Panafon community that Tsoukas and Vladimirou describe. Thus the term 'community of practice' is an important one in the conceptualisation of organisational knowledge, knowledge processes and – particularly – heuristic knowledge.

Knowledge management is a four-fold practice as described by Tsoukas and Vladimirou (2000). It is an iterative process involving [1] application, [2] improvisation, [3] formalisation and [4] codification. This is the core of organisational knowledge yet is not what is usually considered in KM practice. KM practice frequently focuses on the ability to manage codified formal knowledge through ICT. Organisational knowledge as exhibited by the Panafon staff requires a different kind of management – one that is focused on developing social networks, trust, and a collaborative and communicative environment that will foster a community of practice. Whatever the core business processes of an organisation the personnel on the ground floor who deal with the product and the client are critical components of the organisation’s success and hold much of the crucial knowledge of the organisation developed through engagement, experience and social networking. The role of KM is to:
...produce true, coherent organizational knowledge (which is quite
distinct from an organization’s knowledge – the scattered, unco-
ordinated insights of each individual in its community of practice)
(Brown & Duguid, 2002, p.27).

From this perspective KM needs to recognise that each member of the organisation is an
individual who is a contributing member of the community of practice that generates
‘coherent organizational knowledge’. But what is meant by ‘organisational knowledge’?

A new theory of organisational knowledge is offered by Tsoukas and Vladimirou (2000).
Starting from Polanyi’s seminal work (1962) they demonstrate that, even in an
organisational setting with formalised rules and structures, knowledge is and must be
inherently personal. Personal knowledge is, however, socially mediated and collectively
developed in communities of practice that mediate understandings through domains of
action and storytelling. Knowledge is a skilful application of personally and collectively
acquired understanding. This emphasis on both dimensions of knowledge as individual
and social is a unique perspective in the literature. Too often IS literature portrays the
social and individual aspects of knowledge as a binary concept, with each being at
Tsoukas and Vladimirou offer a more comprehensive picture of knowledge as
individually personalised but socially constructed and mediated.

To be skilful, knowledge must also become instrumentalised (Polanyi, 1962, 1962a,
1966). This refers to the internalisation and assimilation of knowledge to the point that
the individual does not need to focus on the knowledge but can use it as a tool to focus
on the object of attention. A novice driver needs to focus on clutch and accelerator to
be able to change gears, whereas a skilful or knowledgeable driver has assimilated such
skills so they can concentrate on the road, the traffic and where they are going. Such
assimilated knowledge permits heuristic knowledge (learning through self-discovery) and
improvisational application as the individual applies understanding and judgement, with
discretion, to situations not addressed by formal rules and structures. Collective
understanding developed within the community of practice generates improvisational
knowledge, and this heuristic knowledge then adds to the body of informal knowledge
created and maintained by that community. Instrumentalised and improvisational
knowledge are new concepts in the ISKM field of literature, adding opportunity for new
insights and depths of analysis when observing knowledge workers and examining
knowledge management practices. 'Communities of practice' which are “groups of people who share a passion for something that they know how to do and to interact regularly to learn how to do it better” (Wenger, 2004, viewed 28 October 2004) have become an area of significant interest in the ISKM community of late, and the ability to discuss communities of practice in terms of improvisational knowledge and degrees of instrumentalisation observable, is a valuable contribution to ongoing KM research.

The field of knowledge management has gone through a first wave of focus on technology. A second wave dealt with issues of behaviour, culture, and tacit knowledge but mostly in the abstract. A third wave now is discovering that communities of practice are a practical way to frame the task of managing knowledge (Wenger, McDermott & Snyder, 2002, p. x).

As with collective mind and heedful interrelating, the concepts of communities of practice and highly personal heuristic and instrumentalised knowledge are all people-centric approaches concerned with valuing people, interrelationships and communication with empowerment and employee discretion critical to successful operations. In each of these aspects these concepts are constructively different than the 'old paradigm' knowledge management concepts that are concerned with issues such as regulation and control.

Finally, applying concepts of collective mind, heedful interrelating, personal and heuristic knowledge, and communities of practice, it is appropriate to re-examine Tsoukas and Vladimirou's iterative four-fold process for knowledge management involving application, improvisation, formalisation and codification. This also is a departure from the typical focus of knowledge management through ICT based systems to codify organisational knowledge. With ‘application’ of formal and informal knowledge, ‘improvisation’ creating new knowledge where the formal knowledge is inadequate, ‘formalisation’ through storytelling and collection of case-based best and worst practice, then ‘codification’ of newly created knowledge, new forms of 'management' are required. Such knowledge management needs to focus more on creating appropriate climates of trust, socialising and networking to establish and maintain communities of practice, rather than building more databases. Given the current obsession with metrics within the KM industry (and much of the Academe), this simple model offers an evaluative tool that begins to address the need for evaluative measures in the "soft" skills of knowledge management. It also provides some direction
to knowledge managers looking for the "missing pieces" in current ICT-based knowledge management initiatives.

One of the key themes in these socially constructed concepts of knowledge and knowledge processes is the centrality of action as a necessary component of knowledge, particularly when considering experiential knowledge. There has been a growing awareness of action-centred knowledge in the KM literature, evidenced particularly in those works that concern themselves with knowledge as ‘know-how’. Few of these knowledge theories, however, consider a theory of action, and most such theory considers action as based in thought and knowledge, rather than action leading to thought and knowledge. One of the few theorists to propose this 'opposite' way of looking at things is Butler:

Experiential knowledge is a form of rationality that offers an alternative pathway to the comprehension of the social world, and to the design of effective social action. Such knowledge is constructivist and dynamic (Butler in Edwards, 1994, p. 17).

Butler develops this notion of experiential knowledge to a model of human action, illustrated in figure 3:9 below.

Figure 3-9  Butler's model of knowledge and learning (Edwards, 1994)

Personal knowledge, as described by Butler, relates particularly to personal practical knowledge (PPK), and is closely affiliated with Blackler's concept of embodied knowledge (see below) and Tsoukas' instrumentalised knowledge, encapsulated in habitus. Edwards (1994), describes PPK as “unique to the individual”, “largely implicit and difficult to articulate”, and “very resistant to change”. The personal practical knowledge of the individual worker is that aspect most sought after in knowledge creating companies, and where knowledge management strategies that centre on 'capturing tacit knowledge' most focus. The most significant offerings in Butler's model,
however, are the deeper layers of worldview and reflection. Individuals' worldviews are shaped by tradition and experiences, and "contain a mixture of rational and irrational beliefs, contradictory assumptions, and a tablet of values and rules that the self holds as true at this stage of its development" (Butler, 1994, p. 20). This equates closely with Tsoukas and Vladimirou's 'habitus'. World view is the aspect of individual knowledge that can most hamper growth, change and development (and desired knowledge management strategy implementations) but is – like personal practical knowledge – often unrecognised, unarticulated and very resistant to change. The ability to recognise, articulate and / or change either personal practical knowledge or worldview, hinges on the individual's (and the group's) ability to reflect. Reflective thinking or reflexivity is therefore, according to Butler's model, a key component in the ability to enable knowledge management strategies in an organisational setting to be effective and acted upon by the individuals in the organisation.

Blackler (1995) also offers a typology to summarise contemporary literature. He balances conceptions of knowledge in individual, social and cultural contexts, describing knowledge as messy and hard to manage: "multifaceted and complex, being both situated and abstract, implicit and explicit, distributed and individual, physical and mental, developing and static, verbal and encoded" (1995, p.1030). Blackler’s typology therefore bridges the gap between many of the more mechanistic typological approaches examined in Chapter 2 with the more socially mediated approaches examined in this chapter. He summarises literature as depicting five types of knowledge: [1] Embrained knowledge, which is abstract knowledge, often referred to as 'knowledge-that' or 'knowledge-about'. [2] Embodied knowledge is frequently called 'know-how', and is action-oriented, context specific and instrumentalised, as described by Tsoukas (1996) and Polanyi (1962a, 1966). [3] Encultured knowledge is knowledge developed in a communicative and socialised process, often by storytelling (Denning, 2000) and is central to development in knowledge creating companies. This is further broken down into 'component knowledge' (specialist or specialised knowledge) and 'architectural knowledge' (the interaction of knowledge in context). [4] Embedded knowledge refers specifically to knowledge embedded in routines – individual, social or organisational routines. These might be explicitly codified routines or implicitly created habits. [5] Encoded knowledge is encoded most commonly in signs and symbols and in knowledge management usually through instrumentalisation by a technology.
It is this fifth type – encoded knowledge – which equates to the external or explicit view of knowledge that is so commonly used as a principal approach to knowledge and knowledge management as was explored extensively in Chapter 2. It is significant that four out of the five approaches summarised by Blackler look rather to the internal, implicit or tacit aspects of knowledge that are essentially personal and individual, although encultured, embedded and encoded knowledge can all be considered shared, collective, or organisational forms of knowledge as well. Blacker's (1995) typology butler's perspective of knowledge affected by personal world view and modified by reflection, and Tsoukas and Vladimirov's description of knowledge are all socially constructed and mediated views of knowledge, knowledge processes and knowledge management particularly with both. All of these works depict a concept of knowledge that is consistent with the sensemaking approach to understanding knowledge and knowledge management.

A SENSEMAKING MODEL OF KNOWLEDGE IN ORGANISATIONS

At its simplest, sensemaking recognises that as human beings we make sense of the world around us, all day, every day, in every situation. Thomas, Clark and Gioia describe this as "the reciprocal interaction of information seeking, meaning ascription, and action" (1993, p. 240). More specifically, it recognises that the ways in which we make sense of the world around us change and are shaped not only by our individual personalities and perceptions but also by social interaction, our cultural perceptions and norms, and our mutually shared and differently understood perceptions of the same experiences. Taking this tangle of affecters and shapers, Cecez-Kecmanovic (forthcoming, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002) offers a sensemaking model of knowledge in organisations that clarifies and makes sense of our sensemaking in organisational contexts.

culture as an extra-subjective level. Each of these four levels of sensemaking are the sources of specific types of knowledge: individual, collective, organisational and cultural, respectively. Knowledge is continuously created and recreated within each level of sensemaking and also through the simultaneous interplay between all levels.

At the intra-subjective level, the individual's person, personality, character, values, beliefs, experience, education, etc are what shapes that individual's perceptions and interpretations by which they make sense of their world, themselves, other people and events. It is the individual person who knows, learns, remembers, forgets, acquires new skills, and becomes rusty in others. "Sensemaking in organizations begins with the personal perspectives individuals use to understand and interpret events that occur around them" (Tan & Hunter, 2002, p. 40). It is the individual intra-subjective level that makes all the other 'supra individual' levels, possible.

Once individuals come together to communicate, to engage in socialisation and develop mutual understanding of a situation their sensemaking becomes inter-subjective. Through the social interaction and communicative practice newly-created shared understandings emerge, often leading to innovation and knowledge co-creation. The inter-subjectively created understanding, knowledge and energy in turn shape and change individual sensemaking. Such collectively shared knowledge, 'owned' by a group, cannot be equated with the sum of its parts (that is the sum of knowledge by individuals). Ryle's concept of 'collective mind' (1949; Weick & Roberts, 1993; Brown & Duguid, 2002) explains the inter-subjective sensemaking that does not happen in isolated instances within individuals who are together but rather develops within the group, between, among and with individuals who comprise a group. Collective mind emerges when group members interact with each other with heed, paying attention to each others' views, perceptions, feelings, needs and actions. Both the concepts of collective mind and heedful interrelating (insightfully used by Weick & Roberts, 1993, as described earlier in this chapter) are essential for conceptualising the phenomenon of inter-subjective sensemaking and knowledge co-creation in groups. In its ideal state this can be recognised as ‘collective mind creating collective knowledge’ but where knowledge is inter-subjectively created and held without the quality of ‘heedfulness’ or the focused intensity of collective mind, it is frequently depicted as ‘social interaction’ and ‘inter-subjective creation of collective knowledge’.
Within an organisational setting, however, there are structures, roles, norms, rules, policies and hierarchies that have generic meaning for the members of an organisation. Organisational members, irrespective of their participation in their creation, share these generic meanings. At this level of sensemaking, called generic-subjective (Weick, 1995), there are prescribed and expected 'scripts' and 'plots' (Barley, 1986) and normalised behaviours that are looked for and expected. Knowledge created and maintained at this generic-subjective level characterises an organisation, distinguishes it from other organisations and enables it to develop a range of responses to changes in its environment. Therefore, it is called 'organisational knowledge' (Cecez-Kecmanovic, 2002). As such it is a key source of stability and continuity for an organisation. However, turbulence and unexpected changes in the environment cause organisations to change. As this is first experienced at the social interaction level, new ideas and innovative responses are created inter-subjectively; typically, contradicting established organisational knowledge (for instance, emerging new relationships with clients via the Internet, that are not in accord with existing policy). As often happens, such innovations and new knowledge at the inter-subjective level cause tensions with organisational knowledge (policies, norms, rules etc.) at the social structure level. “...organizational knowledge is inevitably heavily social in character. Because of its social origin, this sort of knowledge is not frictionless” (Brown & Duguid, 2002, p.19). Resolution of these tensions is among the key issues of 'organising' and defining features of organisations. Certainly recognising, dealing with, and resolving such tensions are key factors in successful implementation of any knowledge management initiative.

Culture, as a symbolic reality present in customs, stories, myths, metaphors, values and language of an organisation represents the extra-subjective level of sensemaking. Organisational culture provides a reservoir of background knowledge that makes understanding at all other sensemaking levels possible. Unlike organisational knowledge and social structure at the generic-subjective level, knowledge embedded in organisational culture is usually implicit, assumed and taken-for-granted. It is most evident in the stories people tell (Denning, 2000; Brown & Duguid, 2000; Brown, 2001). Consequently, it is also usually unrecognised and unchallenged unless identified and addressed.
The sensemaking framework for knowledge in organisations is most easily seen in a simple textual model as shown in Table 3.4 below but the essential interrelationships

<table>
<thead>
<tr>
<th>Sensemaking Level</th>
<th>Nature of Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra-subjective sensemaking or culture level</td>
<td>Knowledge embedded in organisational culture</td>
</tr>
<tr>
<td>Generic-subjective Sensemaking or organisation structure level</td>
<td>Organisational knowledge – generic meanings and social structures</td>
</tr>
<tr>
<td>Inter-subjective sensemaking or social interaction level</td>
<td>Collective knowledge residing among individuals in social interaction</td>
</tr>
<tr>
<td>Intra-subjective or individual sensemaking level</td>
<td>Individual knowledge – resides in individual person</td>
</tr>
</tbody>
</table>

Table 3.4 Ceez-Kecmanovic’s (2004 forthcoming) sensemaking model of knowledge in organisations

between the four levels of sensemaking are better grasped in the more graphically depicted figure 3.10 below. In figure 3.10, the graphical illustration demonstrates that different types of knowledge at different sensemaking levels are not isolated from each other but interact mutually impacting on and constituting (reconstituting) each other.

![Figure 3.10 Ceez-Kecmanovic's sensemaking model of knowledge in organisations (2004 forthcoming) (graphic depiction) ](image)

The four levels of sensemaking and respective types of knowledge thus referred to as "the sensemaking framework of knowledge in organisations", describe different forms
of social reality that are continuously created and recreated by individuals in an organisational setting. These forms of reality are simultaneously present for all individuals, albeit perceived differently by each and therefore requiring negotiation of meaning. Messages, whether they are verbal or nonverbal, don’t have meanings in themselves. Rather, meanings reside in the people who express and interpret them: “The possibility of multiple interpretations means that it is often necessary to negotiate a shared meaning in order for satisfying communication to occur” (Adler, Rosenfeld & Proctor, 2004, p.7).

As individuals engage in the ongoing sensemaking processes in their work environment and decision-making, they draw from knowledge at each level and, in turn, transform knowledge at these levels. Individuals make sense of events in different ways, depending upon their perception of their self and place in the organisational structure, and how closely they are aligned with the generic-subjective norms and policies that govern the setting and events perceived. Someone who participates in or is responsible for upholding the formulation of company policy will interpret and understand events from the perspective of the generic-subjective level. The same person, in another organisational setting in which they have no responsibility for upholding social structure or policy is more likely to make sense of events from their personal intra-subjective standpoint, and share sensemaking and co-create meaning with their co-workers and peers in an inter-subjective fashion. Thus an event in a single organisation can be described by the group of persons responsible for maintaining social structure and organisational stability as "reasonable, fair and the best possible solution", while the same event can be denounced by another group who have to work within the framework of the policy as "unfair, unreasonable, and the worst possible solution", to take an extreme example. It is possible that neither is lying nor exaggerating but that each makes sense of the event from a different perspective.

A primary strength of Cecez-Kecmanovic’s sensemaking framework is that it addresses the critique by McAdam and McCreedy that most typologies are too simplistic and bounded, as it does not assume discrete "types" of knowledge or process, with clear boundaries and separations. Cecez-Kecmanovic makes it clear that each level of the sensemaking framework is embedded (see figure 3:10) in the other levels, and there is a
fluid interrelationship between levels, even at the same time as tensions are raised due to the differences between levels.

**UNLEARNING AND ASSUMPTIONS**

Another key factor that can easily be overlooked is the role of assumptions that underlie the conscious and unconscious processes of sensemaking. Assumptions are specifically identified as a factor in the cultural level of the sensemaking framework, and are recognised by Tsoukas (1996) in discussion on habitus. However, unrecognised and unchallenged assumptions are rife throughout all human thinking and consequently underlie all thought and action that happens at all levels of sensemaking and human interrelationship (Dervin, 1999). Even generic-subjective knowledge is not immune to this weakness. Despite the mechanistic, impersonal and often inhuman-seeming quality of organisational structure, organisations are comprised of people, and the norms, rules, policies and structure laid down for organisational purposes are created, determined and maintained by people who are reluctant to unlearn attitudes and assumptions that have been successful in the past.

Unlearning is a critical skill largely ignored in the knowledge management literature. Its strongest proponent is Gardner (1991) whose diverse experiments have demonstrated that no matter how well a person 'officially' acquires 'new correct' knowledge, until and unless they have unlearned the 'old, incorrect', they will continue to believe and act upon the old, habitual knowledge, even when it contradicts 'new' knowledge that is cognitively understood to the point that examinations can be passed with it. This issue has been identified by Brown (2001) who writes that the "hardest task is to get the corporate mind to start to unlearn some of the gospels that have made them successful in the past and that no longer will actually work in the future" (Brown, viewed 28 October 2004). Brown makes the point that in a rapidly changing world, "so much of what we currently know is just getting to be wrong. So many of our assumptions are getting to be wrong. And so, as we move forward, not only is it going to be a question of learning but it is also going to be a question of unlearning" (*ibid*). Brown enlarges upon this theme that unlearning assumptions is even more challenging than it first appears, as assumptions fall into the tacit domain that is described by Polanyi (1962a, 1966) and Tsoukas (1995). Both authors describe the unrecognised nature of the deepest tacit knowledge that is not only unarticulated but of which the holder is completely unaware. Brown takes this
further (2001), in a manner parallel to Gardner's (1991) theory, and demonstrates that an individual is frequently found to have tacit knowledge that is in direct contradiction to that individual's conscious knowledge, where the tacit knowledge (which holds sway and affects thought, behaviour and actions) belies what the individual thinks they know. The challenging nature of assumptions that can cripple knowledge management initiatives and systems and technology change is not that individuals are unwilling to change them but that individuals are unaware of their deepest assumptions held in tacit knowledge, and therefore unable to challenge, question or change them. This is exemplified by (and explains) the 'unreasonable' behaviour of persons who state they are committed to change certain behavioural patterns but do not change. It is not a lack of commitment or understanding of the 'new' behaviour required but inability to recognise and, therefore, to challenge or change the old behaviour and thinking patterns or belief structure that support the old behaviour. No structured knowledge management initiative thus far arrived at is able to deal with this challenging issue, yet this inability to identify (and thus inability to change) tacit knowledge may be one of the principal causes of failure in knowledge management and systems and technology change. Argyris (1991) addresses this issue, describing his concept of “defensive reasoning”, in which individuals (and organisations) employ “theories-in-use” or really behave differently than their “espoused theory” or “theories of action” to avoid embarrassment or threat. Argyris (1991) states that until organisations recognise and break down the ways people reason defensively and teach people how to reason about their behaviour, change will be obstructed and failure probable. Brown agrees with this diagnosis and identifies “storytelling” (Brown & Duguid, 2000; Brown, 2001; Denning, 2000) as the best practice currently known in corporate circles that is able to address this issue effectively. Gardner, who also recommends storytelling methodology, identifies the use of the theory of multiple intelligences, and the approaches variable and specific to multiple intelligences, as the best means of addressing such challenges (1983, 1991; Gursky, 1991).

COMMUNITIES OF PRACTICE

Another key concept in effective knowledge management is the concept of communities of practice (Lave & Wenger, 1991; Wenger, 1999; Wenger, McDermott & Snyder, 2002; Brown, 2001; Tsoukas & Vladimirou, 2000). Communities of Practice (COP) have three key elements (Wenger, 2004). The first element is the focus of the community –
the joint enterprise that is understood and communally and continuously renegotiated by its members. The second element is how the community functions – members are bound together in a social entity created by mutual engagement. The third element is that of the capability that the community has produced – the shared repertoire of communal resources (routines, sensibilities, artefacts, vocabulary, styles, etc.) that members have developed over time. (Wenger, 1999). Communities of practice are nodes for the exchange and interpretation of information; they can retain knowledge in “living” ways that provide spontaneity and flexibility, as databases and manuals do not; they steward competencies, developing and nurturing and creating new knowledge; and they provide a sense of identity for their members, creating a sense of belonging in a way that a uniform or badge cannot. The key elements of COP are practice and identity achieved through negotiation of meaning. “Practice” in the context of communities of practice is a social practice that includes the explicit and the tacit. Practice is “doing” within a historical and social context that creates meaning and structure to the ‘doing’, and the shared historical and social context creates a sense of identity and belonging to those who “practice” together (Wenger, 1998). In communities of practice, when individuals and groups are forced to align or conform themselves with organisational objectives there is often a consequent loss of responsiveness, adaptability and initiative (Wenger, 1998; Tsoukas, 1996; Brown, 2001) to the detriment of the community’s ability to serve the organisation effectively. Thus a COP perspective depicts the principle role of knowledge management as facilitating learning in and between communities of practice, rather than enforcing an organisational perspective upon the individuals and groups within the organisation.

Although approaching the issues from slightly different angles, the same central themes are seen here in Wenger and Lave's COP as are discussed in heedful interrelating, collective mind, and the social interaction level of the sensemaking framework. Thus we see converging overlapping concepts that approach knowledge, knowledge processes, and knowledge management with a fundamental attitude that these are about mind (awareness in action, usually socially and collectively), rather than brain (abstract thinking). To date, most knowledge management initiatives (KMI) address the more mechanistic, technically reachable, abstract forms of information, thought, and abstract knowledge that is codified or codifiable in organisations and enbrowned in human beings (Blackler, 1995). These foci primarily require technical solutions, particularly
computerisation and databases, and accountancy metrics and measurements. They place emphasis on the collection, codification and dissemination of formal knowledge or information and means of measuring the fiscal gains directly associated with the results of the KMI. The authors examined in Chapter 3 place an entirely different emphasis on knowledge management requiring support, encouragement and development of social interaction, communities of practice, heedful interrelating, collective mind and other such socially based forms of knowledge embodied and enculturated in mind rather than brain. Whether or not these can be supported, encouraged and supplemented by various technological means or directly measurable in fiscal terms, they will inevitably affect culture, environment, innovation, creativity, reliability, sustainability and empowerment of the workplace and the core business processes of the organisation. An entirely new way of looking at, examining, developing and measuring KM and KMI is required when this socially-focused approach is taken.

In this second part of chapter 3, the works of Ryle (1949) and the concept of collective mind, of Weick and Roberts (1993) and their concept of heedful interrelating were used to describe the nature of knowledge. Cecez-Kecmanovic's sensemaking framework for knowledge in organisations (2000; Cecez-Kecmanovic & Jerram, 2001, 2002) was examined and found to be an appropriate framework for developing a theory of knowledge in organisations. The concept of communities of practice (Wenger, 2004) aligns with the theories of collective mind, heedful interrelating, and sensemaking and consequently also fits comfortably within the social interaction level of the sensemaking framework. Organisations were described using Tsoukas' (1996) depiction of the organisation as a distributed knowledge system and Lave and Wenger's (1991) theory of communities of practice. Unintended consequences of change such as loss of organisational memory were identified as predictable outcomes in restructuring an organisation is a distributed knowledge system (Treleaven & Sykes, forthcoming). Tsoukas and Vladimirou's (2000) work on heuristic and instrumentalised knowledge, Blackler's knowledge typology (1995) butler's concept of knowledge and learning (1994), Argyris' defensive reasoning (1991) and Brown's (1991, 2000, 2001) discussion of assumptions and unlearning (Gardner, 1991) developed a fuller appreciation of the nature of knowledge in both an individual and social context.
At this point it is appropriate to examine how these concepts, theories and frameworks can fit together and contribute, in a cohesive way, to a coherent framework for understanding knowledge, knowledge processes and knowledge management.

**DEVELOPING A THEORETICAL FRAMEWORK**

In this final part of Chapter 3, the frameworks, theories and concepts examined to this point will be pieced together to form a coherent and cohesive framework from which the thesis will move forward. “As in any scientific pursuit, the purpose of theory is to devise simplified explanations of reality. Theory may be more generally defined as the *knowledge of principles*” (Truch, 2004, p. 66) [*italics in original*]. Using the principles explored and defined, the framework developed in the remaining part of this chapter will be used to analyse empirical data gathered in the study of two knowledge- and information-intensive organisations in the later part of this thesis. Starting with Cecez-Kecmanovic’s sensemaking framework for knowledge in organisations (2004, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002) Ryle (1949), Weick and Roberts (1993) and Tsoukas (1996) as a foundation, the works of Lave and Wenger (1991), Tsoukas and Vladimirou (2000), Blackler (1995) butler (1994) and Brown (1991, 2000, 2001) are added to create a comprehensive theoretical framework of sensemaking and knowledge in organisations.

**KEY ISSUES IN KNOWLEDGE MANAGEMENT APPROACHES**

It is apparent that, when considering knowledge management in the social paradigm discussed throughout this chapter, rather than a technical or mechanistic paradigm, iterating themes arise as key issues. The first is that the approach considers mind rather than brain. Brain, intellect and abstract knowledge are an important component of knowledge, knowledge processes and knowledge management as a whole but must be understood to be only a component, not the entire process. Mind is an attitude, a propensity for a certain kind of action (heedful or heedless, for example), and deals in relationships rather than abstracts. Consequently knowledge, knowledge processes and knowledge management will be handled very differently when knowledge management initiatives in organisations are undertaken from this social and people-centric approach. Among other changes, knowledge will be seen as equally input and product. It will cease to be simply a commodity to be manipulated but will become an iterative process of meaning making.
Secondly, the consequence of perceiving the key issues to be about mind and social relationships is that emphasis will be placed on communities of practice and the collective mind that develops within and between them through heedful interrelating. To develop communities of practice, collective mind and heedful interrelating, trust becomes a critical factor in an era when trust has been severely eroded, particularly in the workplace. It entails organisations becoming trustworthy and being perceived by its members as trustworthy. This requires that organisations change (modern) historical perceptions and become people-centric, seeing people as valuable contributors and members of the organisation, rather than assets and liabilities with price tags attached.

We must recognize that knowledge is everywhere in the organization but we won’t have access to it until, and only when, we create work that is meaningful, leaders that are trustworthy, and organizations that foster everyone's contribution and support by giving staff time to think and reflect together (Wheatley, 2004, p.63).

Developing, building and maintaining trust is essential for any KMI to succeed in any sense in a people-centric organisation. The trust needs to be built within and between groups in spheres of social interaction, and it needs to be built within the organisation at generic-subjective level, to be able to develop and engender an organisational culture of trust.

A frequently overlooked component that enables (or disables) such trust, is dealing with assumptions (personal, social, organisational and cultural). Assumptions are hidden away in tacit knowledge; they are found in and condition people, groups, organisations and culture. In other words, they are a foundation upon which all sensemaking takes place at all levels – intra subjective, inter-subjective, generic-subjective and extra-subjective – within an organisation. Knowledge management literature is starting to focus on this and is labelling it a culture issue. "Getting employees to share what they know is no longer a technology challenge – it's a corporate culture challenge" (Hibbard & Carillo, 1998, p. 49). "In our research, users clearly identify cultural issues as the largest obstacles to implementing knowledge management" (Storey & Barnett, 2000, p. 147). Yet culture is only part of the story. This is a human issue, which will, in an iterative process, be found in individuals, groups and organisational culture as cultures engender trust or distrust, and as the individuals within the organisation respond, in a socially mediated manner with their trust or distrust, and as tacit assumptions are able to be identified and unlearned where necessary.

<table>
<thead>
<tr>
<th>Cecez-Kecmanovic (Wiley, Weick and Ryle)</th>
<th>Tsoukas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra-subjective (Culture)</td>
<td>Unarticulated background knowledge of commonality and assumptions</td>
</tr>
<tr>
<td>Generic-subjective (Organisational Structure)</td>
<td>Normative expectations</td>
</tr>
<tr>
<td>Inter-subjective (Social Interaction / collective knowledge)</td>
<td>Situational-specific context</td>
</tr>
<tr>
<td>Intra-subjective (Individual)</td>
<td>Disposition / habitus</td>
</tr>
</tbody>
</table>

*Table 3.5 Combined sensemaking framework of knowledge in organisations and 3 aspects of knowledge*

Separate than their three aspects of knowledge, Tsoukas and Vladimirov's (2002, p. 8) definition of knowledge as "the individual ability to draws distinctions within a collective domain of action, based on an appreciation of context or theory, or both" raises five major points, discussed earlier in this chapter, that also relate closely to the sensemaking framework. The first key point raised is that knowledge is personal or individual, even in an organisational context. This directly relates to the first intra-subjective or individual level of sensemaking. The second, the ability to draw distinctions, clearly delineates some of the tensions inherent between levels one and two (the highly people-centric levels) and level three (the more mechanistic, routinised generic-subjective level). In fact, it is only this heuristic ability to draw distinctions that permits individuals or groups to translate routine rules and policies into applicable realities on a context-specific case-by-case basis. The third point that knowledge is acquired socially and operates within a collective domain of communally created understandings and definitions and domain-specific actions relates equally, although in different ways, to the extra-subjective or cultural level and the inter-subjective social interaction level. It is in the inter-subjective level that the cultural will be created and / or lived out. 'Domain-specific actions' also belongs equally, and perhaps more specifically, to the third level of generic-subjective although with an entirely different character or nature than that found in cultural or social interaction. The fourth point, that knowledge is acquired in context as a socially mediated and situationally located interaction is true of the inter-subjective level of social interaction. The fifth point is that knowledge is exhibited by the ability to
generalise theory from one context to another appropriately. This refers again to the general nature and process of knowledge, and echoes the ability of individuals and groups (intra- and inter-subjective levels) to make the norms established at the generic-subjective functional on a daily application level. Both the ability to draw distinctions and make judgements and this ability to generalise theory from one context to another demonstrate a sophisticated level of skill or knowledge-in-use. This sophisticated but taken-for-granted skill separates, as few definitions do, the difference between information and knowledge, and is essentially a capacity of the human individual in both the personal and social arena.

When the key points from Tsoukas and Vladimirou's (2001, p. 8) definition of knowledge are added to the sensemaking framework and Tsoukas' three aspects of knowledge (see table 3:6 below), the results align closely and are seen to contain very similar concepts of knowledge in organisations.

Cecez-Kecmanovic's sensemaking framework has been used on a number of occasions to analyse organisational events, (Cecez-Kecmanovic, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002), and application of the framework clarified a need for an expansion in level [2] social interaction. Whilst the framework provides a clear and useful method for analysing events in an organisational setting, particularly examining the tensions between level [3] generic-subjective and level [2] social interaction, the framework did not originally provide an avenue of exploration of tensions between different groups within level [2] inter-subjective social interaction.

The key elements of communities of practice are practice and identity which are achieved through negotiation of meaning. Wenger (1998) describes an organisation as a "constellation of communities" that spans a variety of internal and external boundaries. This view of an organisation also highlights the need for intra-group and inter-group subsets for social interaction, as there are not one but several groups or communities within any organisation, and consequently not one set of boundaries but many. This lack has been covered as seen below in table 3:6 by adding the subsets [2a] intra-group social interaction and [2b] inter-group social interaction. The addition of these two subsets of level [2] social interaction means that the sensemaking framework now provides ample scope for analysis of events in organisations in all settings and levels.
<table>
<thead>
<tr>
<th>Cecez-Kecmanovic (Wiley, Weick and Ryle)</th>
<th>Tsoukas (and Vladimirou)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Extra-subjective (Culture)</td>
</tr>
<tr>
<td>3</td>
<td>Generic-subjective (Organisational Structure)</td>
</tr>
<tr>
<td>2</td>
<td>Inter-subjective (Social Interaction)</td>
</tr>
<tr>
<td>2B</td>
<td>inter-group</td>
</tr>
<tr>
<td>2A</td>
<td>intra-group</td>
</tr>
<tr>
<td>1</td>
<td>Intra-subjective (Individual)</td>
</tr>
</tbody>
</table>

Table 3.6 Combined sensemaking model of knowledge in organisations and 3 aspects of knowledge and Tsoukas and Vladimirou's definition of knowledge and addition of subsets to level 2

The addition of the subsets inter-group and intra-group within level 2: inter-subjective / social interaction extends the applicability of the framework as an analytical tool for many organisational issues that take place within the social interaction level of the organisation. Whilst most knowledge management initiatives focus on level 3, the generic-subjective or social structure level and consequently work toward exploiting and standardising information as a primary goal of knowledge management, most of the relationships and practices explored in this chapter take place in level 2, social interaction, with a focus on facilitation of communications and creativity. It is within the social interaction level of an organisation that communities of practice are primarily engaged. However the recognition, legitimation or empowering of the various COP within an organisation differ considerably through a variety of responses which Wenger (1998) describes variously as unrecognised, bootlegged, legitimised, strategic and transformative. These are noted in the following grid in table 3.7 below.

Communities of practice may be completely unrecognised by the organisation and, sometimes, even by the participants. This can be a social or both an individual and social unawareness. An unrecognised COP will contribute the consequences of a functioning, interrelating body who work cohesively with some degree or other of
<table>
<thead>
<tr>
<th>Relationship</th>
<th>Definition</th>
<th>Challenges typical of the relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrecognised</td>
<td>Invisible to the organisation and sometimes even to members themselves</td>
<td>Lack of reflexivity, awareness of value and of limitation</td>
</tr>
<tr>
<td>Bootlegged</td>
<td>Only visible informally to a circle of people in the know</td>
<td>Getting resources, having an impact, keeping hidden</td>
</tr>
<tr>
<td>Legitimised</td>
<td>Officially sanctioned as a valuable entity</td>
<td>Scrutiny, over-management, new demands</td>
</tr>
<tr>
<td>Strategic</td>
<td>Widely recognised as central to the organisation’s success</td>
<td>Short-term pressures, blindness of success, smugness, elitism, exclusion</td>
</tr>
<tr>
<td>Transformative</td>
<td>Capable of redefining its environment and the direction of the organisation</td>
<td>Relating to the rest of the organisation, acceptance, managing boundaries</td>
</tr>
</tbody>
</table>

Table 3.7  Relationships of COP to official organisation (Wenger, 1998).

collective mind but has less power to develop to its full capacity as long as it is unrecognised by the individuals within it. A bootlegged COP resides exclusively within the social interaction level, although individuals within the COP are aware of, and protective of it. A bootlegged COP is vulnerable in that, whilst striving to remain invisible to the organisation and immune from managerial interference, it will be under-resourced and frequently disempowered. A legitimised COP still resides at the social interaction level but has been legitimatated at the organisation structure level. At this point resources are more likely to be made available, and there is potential to have specific impact upon the organisation. The primary vulnerability becomes the dangers of over-scrutiny and over-management from the generic-subjective level, with new demands likely to be asked of the community that are not compatible with the identity, culture, or ethos of the community. A strategic COP is in the enviable position of being widely recognised as central to the organisation’s success. Therefore a strategic community is unlikely to have difficulties with resourcing or empowerment from the organisation, other than the possibility of short-term pressures. It is also likely to be able to defend itself against oversight and poor management from that level. Vulnerability at this level tends to be more internal and therefore refocuses back into the social interaction level where it resides. Such weaknesses likely to be found here include smugness that leads to the blindness of success, which will endanger practice and heedful interrelating, and elitism and exclusion that will damage community. A transformative COP is described as capable of redefining its environment and the direction of the organisation. This means that a transformative COP, whilst working on a social interaction level, is securely ensconced in the generic-subjective level and able to affect and work upon the cultural level.
Again, at this level of development of the COP, dangers are less likely to be externally imposed, and are more likely to arise within the social interaction and individual levels. Principal risks to a transformative COP involved at this level include relating to the rest of the organisation, which would be extremely dangerous, at the cultural level, with risks of transforming culture in unplanned ways; acceptance, which would be felt most severely at the inter-group social interaction level and the individual level; and managing boundaries which would affect the community at all levels from individual to cultural.

These aspects or types of communities of practice as described by Wenger (1998) are compatible with and can be added to the combined framework of Cecez-Kecmanovic's framework (2002) and Tsoukas' (1996, 2002) concepts (see table 3:8, p. 97). To this can also be added the concept of collective mind by Ryle (1949) and heedful interrelating (Weick & Roberts, 1993). A conspicuous result of adding the concepts of collective mind and heedful interrelating is that the first two levels, individual and social interaction, are now seen (table 3:8) to have many complex concepts relating to them and informing these aspects of knowledge management. As culture is consequential to the hidden assumptions and background thinking, knowledge and relationships within an organisation the added complexity to individual and social understandings at the intra-subjective and inter-subjective level will inevitably have subsequent effects upon the extra-subjective level. However, in the table the generic-subjective level remains unaffected with little additional insight or complexity. This is significant when compared with the ratio of knowledge management initiatives that concentrate specifically on efforts that affect and work through the organisational structure. If the preponderance of significant knowledge processes and actions occur in social interaction and individual levels, as is depicted by the framework developed in table 3:9 (p. 100) with the addition of collective mind and heedful interrelating to combined sensemaking model of knowledge in organisations, yet the majority of knowledge processes support is aimed at the organisational structure, there will be considerable discrepancies between investment in knowledge management initiatives and results that can pertain from them.

Also compatible with this framework that combines sensemaking, the organisation as a distributed knowledge system, collective mind, and heedful interrelating are Blackler's typology (1995) and Butler's knowledge and learning (1994). Butler's public knowledge identifies that there is a common pool of knowledge that is shared at almost any level in
most social settings including organisations. Further to this there is public knowledge specific to the organisation. Much of this public knowledge will be enculturated and organisational structure, social interaction and individual knowledge all sit within and are a part of the enculturated aspects of an organisation. This highlights the importance of the cultural level and the value that can be provided by a culture that is complementary to the direction, goals and drive of an organisation. As well as public knowledge there are the specific types of knowledge described by Blacker (1995). Whilst some of these are more relevantly placed within one or other of the different organisational levels they do overlap and carry over from level to level and this is the principal means by which organisations can function despite the tensions between levels.

Encoded knowledge is a key focus to most knowledge management initiatives currently operating in modern organisations, as is embedded knowledge, and these are the most readily assimilated and dealt with at the organisational structure. Encoded knowledge, while subject to human error, is supposedly clear, unambiguous and can be expressed, articulated and manipulated by humans and computers in written, oral and computerised forms. It can be expressed in signs and symbols that are recognised company-wide and, usually, nationally or even internationally. Embedded knowledge also has the hallmark of simplicity. It is typified in routines and routines are a stated and unstated goal in most organisational initiatives. Routines save time, money and effort. Once 'knowledge' (or information) has been reduced to a routine unskilled persons or computers can replace more expensive skilled personnel. Time taken to develop knowledge is no longer required as the knowledge has been developed, practiced and made routine.

For these reasons embedded knowledge is highly prized and sought after in organisations. As less effort, concentration and energy need be directed toward routine work than toward creative or challenging work routine is also highly desirable to the persons and groups who work within an organisation (Brown & Duguid, 1991, 2000; Little et al, 2002). Even personnel who have specialised in knowledge work so that they can undertake challenging, stimulating, creative and innovative work still need and appreciate a degree of the effortless simplicity of routine in their daily work (Tissen et al, 1998). Except when carried to excess work that is embedded in routines is less
<table>
<thead>
<tr>
<th>Cecez-Kecmanovic</th>
<th>Lave &amp; Wenger</th>
<th>Tsoukas (&amp; Vladimirou)</th>
<th>Ryle / Wiley / Weick &amp; Roberts /</th>
<th>Blackler / Butler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra-subjective (Culture)</td>
<td>Communities of Practice: Transformative</td>
<td>Unarticulated background knowledge of commonality and assumptions (collective domain of communally created understandings...)</td>
<td>Culture of heedful or heedless interrelating. High reliability or high efficiency oriented culture.</td>
<td>Encultured</td>
</tr>
<tr>
<td>Generic-subjective (Organisational Structure)</td>
<td>Communities of Practice: Legitimised Strategic</td>
<td>Normative expectations (domain specific actions) concrete settings sets of abstract rules historical community</td>
<td>Normative expectations (domain specific actions) concrete settings sets of abstract rules historical community</td>
<td>Encoded Embedded (routines) Embrained Public knowledge</td>
</tr>
<tr>
<td>Inter-subjective (Social Interaction)</td>
<td>Communities of Practice: Unrecognised Bootlegged Legitimised Strategic Transformative</td>
<td>Situational-specific context (socially mediated and situationally located interaction)</td>
<td>(subsidiary knowledge / instrumentalised knowledge) Mind Collective Mind developed through heedful interrelating</td>
<td>Public knowledge Reflection Current Practice (Encoded and embedded) Embrained Embodied (subsidiary / instrumentalised)</td>
</tr>
<tr>
<td>Intra-subjective (Individual)</td>
<td>(identity developed through Communities of Practice awareness &amp; recognition of COP/ acceptance issues)</td>
<td>Disposition / habitus (individual)</td>
<td>(subsidiary knowledge / instrumentalised knowledge) Mind Heedful interrelating: Contribution Representation in heedful interrelating Subordination in heedful interrelating</td>
<td>(Encoded and embedded) Embrained Embodied (subsidiary knowledge /instrumentalised knowledge) Personal PK / Worldview Reflection Current Practice</td>
</tr>
</tbody>
</table>

Table 3.8  Knowledge and sensemaking in organisations: aligning different models and understandings of knowledge with sensemaking framework
negatively stressful than work that requires a high degree of concentration (Brown & Duguid, 1991, 2000; Boud & Garrick, 1999).

Embedded knowledge also equates to Polanyi's (1962a, 1966) and Tsoukas' (1996) instrumentalised knowledge. Development of skill and expertise in any field requires that the basics of the skill become so embedded in the action-oriented application of knowledge that the person or team exercising those skills is unaware of their means of expertise. This frees them to be able to concentrate on the task at hand with instrumentalised skills enabled by embedded subsidiary knowledge.

Collective mind is essentially an attribute of the social interaction level. It is an organic, living function of interrelationships which occurs as people pay heedful attention to one another while they participate in knowledge processes and actions. To a degree what seems to be a form of collective mind can be seen in the generic-subjective level where embedded knowledge is so routine and instrumentalised that organisational members are able to function in relationship with one another contributing knowledge work that depends on others' knowledge work even without heedful interrelating. This is not collective mind but quite the opposite, as the very concept of routine or habitual behaviours is to eliminate the necessity for 'mind'. In such cases large interpersonal or inter-group routines and embedded knowledge of this type tend to be mindless and performed with heedless interrelating or no true interrelating at all. This is therefore not depicted as collective mind but can only be recognised as embedded, or possibly instrumentalised, knowledge. Blackler's broad-concept typology can be seen to contribute a common pool of types of knowledge (encoded, embedded and embrained) to be found in and valued by, albeit in different degrees, generic-subjective and social interaction.

Perhaps the most significant factor visible in the framework of table 3:8 is how much overlap there is between levels as well as simultaneously strong contrasts that will, necessarily, cause tensions between levels. The level that is conspicuously likely to cause and be subject to the greatest amount of tension is the organisational structure level. Individual level, social interaction level, and even cultural level all tend to be people-centric and are focused primarily on socially mediated individuality and small groups and interrelationships as they are socially negotiated. Organisational structure level tends to
be in direct conflict with individuality and with socially negotiated understandings, meanings and relationships and decidedly lacks a people-centric focus. Indeed the purpose of the generic-subjective is to ameliorate the individuality that is involved in individuals and smaller groups and to create a functional environment of commonalities, rules, principles and protocols that structure common languages, work and practices toward common goals in methodical and regulated ways. This will, almost of necessity, create tensions between the rigidity and formalisation of generic-subjective against the preferred flexibility, fluidity and spontaneity of the social interaction level and individual level. Brown (2001, 28 October 2004) depicts generic-subjective as "the authorized part which are the formal business processes" and the social interaction level as "the place where the work actually gets done". This highlights another factor of organisational life that can be a source of much of the tension between the two levels. “…organizational knowledge is inevitably heavily social in character. Because of its social origin, this sort of knowledge is not frictionless” (Brown & Duguid, 2002, p.19). It is necessary to find areas of overlap and commonality between these levels to be able to resolve some of the tensions and permit a negotiation of meanings, shared lexicon and commonality of goals and purposes. Blackler's (1995) typology assists somewhat with this as does Butler's (1994) theory of learning and knowledge.

Returning to the building framework of types of knowledge and knowledge processes within a sensemaking framework, table 3:10 (below) is a simple rearrangement of table 3:9 relocating the various concepts of Cecez-Kecmanovic (2002), Lave and Wenger (1991), Ryle (1949), Wiley (1988, 1994), Weick (1996), Weick and Roberts (1995), Tsoukas (1996), Tsoukas and Validmirou (2002), Blackler (1995) and Butler (1994) in a more coherent form. This framework represents the nature of sensemaking within an organisation; types of knowledge located, generated and shared within the sensemaking levels; and types of knowledge processes and relationships generated within sensemaking levels. Note that this framework does not automatically assume an idealistic or cynical judgement upon any level but allows positive and negative aspects and ramifications to be examined. Thus within the cultural level it is possible to have a culture of heedful or heedless interrelating or interrelationships that fall somewhere in a continuum between these two extremes. Likewise an organisation is likely to be focused on being a high reliability or a high efficiency culture. This refers to the cultural and
<table>
<thead>
<tr>
<th>Nature of Sensemaking within organisation</th>
<th>Types of knowledge located, generated and shared within sensemaking levels</th>
<th>Types of knowledge processes and relationships generated within sensemaking levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extra-subjective (Culture)</strong></td>
<td>Unarticulated background knowledge of commonality and assumptions (collective domain of communally created understandings…) Public knowledge</td>
<td>Culture of heedful or heedless interrelating High reliability or high efficiency oriented culture Culture of trust or distrust Transformative Communities of Practice Enculturated knowledge</td>
</tr>
<tr>
<td><strong>Generic-subjective</strong> (Organisational Structure) concrete settings sets of abstract rules historical community</td>
<td>Normative expectations (domain specific actions) Public knowledge Encoded Embedded (routines) Embrained Habitual knowledge</td>
<td>Legitimised Communities of Practice Strategic Communities of Practice Collective ability to make distinctions Organisational trust or distrust of its members Trust/distrust in and of the organisation by members</td>
</tr>
<tr>
<td><strong>Inter-subjective (Social Interaction)</strong></td>
<td>Situational-specific context (socially mediated and situationally located interaction) (subsidiary knowledge / instrumentalised knowledge) Mind Reflection Embrained</td>
<td>Collective ability to make distinctions Collectively heuristic/improvisational Collective Mind developed through heedful interrelating Unrecognised and Bootlegged Communities of Practice (Also: Legitimised; Strategic; Transformative COP take place here). Inter-group trust / distrust and acceptance issues Intra-group trust / distrust and acceptance issues Current Practice</td>
</tr>
<tr>
<td>Inter-group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intra-group</td>
<td>Embodied (subsidiary / instrumentalised) (Embedded and Encoded) Public knowledge</td>
<td></td>
</tr>
<tr>
<td><strong>Intra-subjective (Individual)</strong></td>
<td>Disposition / habitus (individual) Ability to make distinctions Heuristic/Improvisational (subsidiary knowledge /instrumentalised knowledge) Mind Reflection Personal Practical Knowledge / Worldview Embrained and Embodied (Also: embedded and encoded)</td>
<td>(identity developed through Communities of Practice awareness and recognition of COP/acceptance issues) Contribution in heedful interrelating Representation in heedful interrelating Subordination in heedful interrelating Current Practice Trust or distrust as an habitual attitude, and in response to socialisation and organisational treatment and culture.</td>
</tr>
</tbody>
</table>

Table 3.9 Nature and types of knowledge and knowledge processes within a sensemaking framework
organisational focus of the organisation not the effectiveness of its results as for instance, as has been noted above, high reliability focused organisations tend to be highly efficient as well.

**Trust**

Trust has been identified in the framework (table 3:9) as an important issue within several levels. The notion of trust is a critical aspect of communities of practice and/or social interaction (Lave & Wenger, 1991; Wenger, 1999; Brown, 2001). This echoes the underlying foundation critical to the heedful interrelating described by Weick and Roberts (1995) on aircraft carriers or that discussed earlier in a surgical team. While trust is necessary in high-risk / high-reliability organisations and operations it is also important, although less conspicuously so, in all organisational situations requiring effective social interaction, communities of practice or interrelationships.

But I think it comes back to something incredibly simple having to do with trust. It has an awful lot to do with why communities of practice are so good on one hand and yet, problematic on another. That is, that when you share a practice, when you have evolved a practice together in a community of practice, you have learnt to read each other, and basically because of that shared practice, there is a kind of trust that is built up, such that basically knowledge circulates amazingly well within a community of practice (Brown, 2001, viewed 28 October 2004).

It is this highly valuable trust that enables communities of practice at the social interaction level within groups and is the missing factor that often causes failure when trying to merge separate communities of practice or to incorporate different groups into established communities of practice. Within the sensemaking framework this means that intra-group relations on the social interaction level can hold tensions and similar barriers to relationship when including an inter-group factor within the social interaction level as those that exist between social interaction and organisational structures. Trust is also a critical factor in the organisational structure. Clegg et al (1996) contrast the new social management paradigm in which trust is important with the old scientific management paradigm in which organisations exhibit lack of trust of members and employees. Reciprocally, members will tend to trust or distrust the organisation for which they work and their employers and managers. Fifty years ago it was common for
employees to trust the company they worked for and to know that they 'belonged' and that the company would 'look after them'. Now, after a long era of restructuring and downsizing, employee trust in the organisation is uncommon, and cynicism has replaced trust in many organisations (Tissen et al, 1998, Sveiby, 2001). Together, these factors of the degree of trust by the organisation in its members, the trust the members have for the organisation and the trust between members and groups at the social interaction level create a culture of trust or distrust. As knowledge sharing is dependent upon trust this in turn will affect the ability of an organisation to change, grow and develop.

**CONCLUSION**

When brought together in a common framework it is clear that the socially constructed views of knowledge, knowledge processes and knowledge management are highly compatible with one another, layer and overlap and together form a comprehensive theory of knowledge, knowledge processes and potential knowledge management in organisations. In this final part of Chapter 3, the frameworks, theories and concepts examined throughout the chapter were integrated in a reasonably comprehensive and coherent theoretical framework which forms a foundation for the empirical study. The concepts of a sensemaking framework for knowledge in organisations (Wiley, 1988, 1994; Weick, 1995; Cecez-Kecmanovic, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002) blended with the concepts of Ryle (1949), Weick and Roberts (1993) and Tsoukas (1996) as a foundation, with the works of Lave and Wenger (1991), Tsoukas and Vladimirou (2000), Blackler (1995) butler (1994) and Brown (1991, 2000, 2001) have developed a comprehensive framework of sensemaking and knowledge in organisations from which to work. The framework thus developed in this chapter informed the empirical study of two knowledge- and information-intensive organisations and will be used to analyse the empirical data in the later part of this thesis. The next chapter considers the methodology employed in the development of this thesis then the following two chapters employ the developed sensemaking framework of the nature and types of knowledge and knowledge processes within an organisation to re-examine the two organisations, the Australian Bureau of Statistics and the University of Eastern Australia.
CHAPTER 4 RESEARCH METHODOLOGY

This chapter explains the research methodology used to investigate knowledge management methodology in organisations. The research methodology is interpretive in stance, hermeneutical in approach, and uses comparative case studies for method. At the same time, the thesis focuses on developing a methodology in knowledge management. Most central to the work of the thesis is the sensemaking framework for knowledge in organisations that is adopted and developed in this thesis based upon a sensemaking view of organisations Weick (1995), the semiotic theory of self (Wiley, 1994), and the sensemaking theory of knowledge (Cecez-Kecmanovic forthcoming, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002). As this thesis is a research study that explores aspects of the epistemological issue of the nature of knowledge and methodological approaches to knowledge management, to prevent confusion, use of the word ‘methodology’ will refer to the subject matter of knowledge management methodology, and ‘research methodology’ will be used when referring to the approach to this study.

The field is first refined to a focused research objective. The researcher’s personal ontology and epistemology are then identified and guide the choice of the approach to the research. From these foundations, the research design is then described. This follows two paths – selection of an empirical method, and the selection and design of the theoretical model that will inform the interpretation of the empirical data. The first element of the empirical path is the selection of an appropriate method. Once method is chosen, selection criteria and analytical techniques used and procedures followed are discussed, taking particular note of issues of ethics, rigour, credibility and relevance. Analysis is primarily conducted using the sensemaking framework developed, and from analysis the design moves to meta-analysis for further theory-building. At this point the theory and framework are expanded as a result of the empirical testing in second order and comparative analysis, and conclusions are drawn and recommendations made. A graphical overview is depicted in figure 4.1 (overpage) that forms the basis for elaboration in the chapter which deals with each aspect of the methodological and research design in order.


**Refining the Research Question**

The research methodology began with focusing the research field to a clearly defined objective. This is stated in two parts: to develop a theoretical foundation that provides a deeper understanding of the knowledge phenomenon in organisations then based on that to develop a methodology that assists in exploring these phenomena and improving KM processes.

The original field of study for this thesis was stated as an investigation into methodology in knowledge management (KM). There was also an intention that this study ‘lead to a new methodology to facilitate knowledge management for organizations’ as the thesis formed part of an ARC SPIRT grant directed to that purpose. Such a goal presupposed certain givens. It assumed that there were already methodologies for facilitating knowledge management within organisations. It further assumed that these methodologies were inadequate or lacking in some fashion and therefore needed to be replaced or improved with newer better methodologies. It also implied, to a degree, that the creation of a new methodology could address the lack and provide a coherent means of managing KM in
organisations. (Certainly it is a constantly expressed wish in KM literature and professional circles that a coherent methodology be created to unify, simplify and direct the discipline). Underlying these assumptions were even more fundamental presuppositions; that there was an agreed-upon definition for and understanding of what knowledge management is and of what it could or should achieve for an organisation.

These presuppositions dictated that the study deal with several issues. Accordingly, it was necessary first to consider the range of definitions of knowledge management current in the field, and determine the set of understandings of knowledge management from which this study would proceed. Another requirement was to determine what, if any, current methodologies were in use for knowledge management and in what way they were inadequate (if, indeed, they were inadequate). This goal assumed explicit definitions of what knowledge management is, and what it is required to achieve thereby determining the shape and direction of new methodologies.

Consequently, it was necessary that this thesis clarify definitions or establish a set of understandings for what is meant by ‘knowledge’ and ‘knowledge management’ in this thesis; identify current KM methodologies and analyse their value or ‘inadequacy’ or identify the area in which such methodologies fail to meet KM needs; and determine the direction, goal and purpose of KM and KM methodologies to meet organisational purposes. Each of these three goals needed to be met to enable the original purpose of the study which was to lead to a new methodology in KM. More importantly, for such a broad-ranging study to have coherence and focus it was necessary that the research itself be clearly defined and bounded. Thus the focus of the thesis was refined and clarified to the two closely related research goals stated above: to develop a theoretical foundation that provides a deeper understanding of the knowledge phenomenon in organisations and then develop a KM methodology that assists in exploring these phenomena and improving KM processes. Both of these major research objectives are developed through the course of this thesis.
After examining various definitions and KM methodologies current in the literature and in practice, a new theoretical foundation is offered using sensemaking theory as an approach to these central KM issues. A sensemaking framework is identified for theorising knowledge and knowledge processes in organisations. This framework is then developed as a methodological approach to KM that opens up other new approaches in examining current knowledge management methodologies and praxis and for developing, evaluating and applying other new knowledge management methodologies.

**Research Methodology within Information Systems Discipline**

Information Systems (IS) research has been, until recently, an essentially positivist and quantitative research field and in Australia still is very strongly so today, as is evidenced by the themes and streams apparent in Australasia's pre-eminent national gathering of IS scholars at ACIS, the Australasian Conference on Information Systems. This stance is reinforced at the international level at ICIS, the International Conference on Information Systems. The presentations given at these conferences and their proceedings weigh heavily toward the positivist tradition. However, in recent years there has been a broadening attitude, open to new approaches and concepts. One of the most prominent of the newer approaches is interpretive research (Walsham, 1993). In recent years more IS conference streams and IS publications are seeing a growing body of work in both the interpretive and critical traditions. The most highly regarded journal in IS, the MIS Quarterly, also exhibits an increasing receptivity to research by interpretive researchers as evidenced by Klein and Myers' benchmarking 1999 publication in MIS Quarterly, "A Set of Principles for Conducting and Evaluating Interpretive Field Studies in Information Systems". This is a work that considers, evaluates and debates the grounding of interpretive research methodology and provides a background against which to investigate an interpretive IS research philosophy and approach. In the section, "The Nature of Interpretive Research", Klein and Myers (1999) specifically address three main research approaches within the specific context of IS research: positivist, critical research and then interpretive. This indicates that, although still a relatively new approach to IS research, interpretive work can now be considered one of the main research approaches within the discipline.
Knowledge management, even more than other streams commonly found in IS literature and research, is heavily influenced by disciplines other than IS and its usual partner Information Technology (IT). Most knowledge management conferences are sponsored by disciplines other than IS. Although the IS discipline is discovering a wider span of interests and admitting a more eclectic range of research methodologies, it is still necessary to span a wide range of trans-disciplinary literature beyond the IS field to gain a clear view of the state of KM as a practice or as a discipline. Thus, whilst this study is located within the Information Systems discipline, it also draws on concepts from other disciplines, most notably from sensemaking and from organisational learning and organisation studies. The definition of the conceptual framework for this study can thus be extended to state that this work is embedded predominantly in a conceptual framework that is essentially interpretive, within IS, sensemaking and organisational traditions, with an essentially pragmatist purpose and goal. From this foundation, the research design was developed.

**EPISTEMOLOGY AND ONTOLOGY**

In this thesis, methodology is understood to include the ontological and epistemological assumptions that provide the underlying foundations upon which theory and method are built. As **epistemology** refers specifically to the theory of knowledge (the origin, nature, methods and limits of knowledge), it could be argued that any thesis that focuses on knowledge management is itself a work on epistemology.

the management of knowledge is the totality of activities aimed at dealing with resources whose fundaments are ontologically and epistemologically complex and whose boundaries (bordering on what is “non-knowledge”) are fluid and evolving. In brief, knowledge management is aimed at dealing with the most complicated of matters: the human faculty of knowing (Styhre, 2003, p. 157).

Certainly to study knowledge and knowledge management requires a basic epistemology that identifies knowledge as a separate, investigable, knowable thing or process that can be coherently articulated and explained. To study knowledge management with a view to investigate and potentially develop new methodology and to inquire into the role of knowledge management methodology further requires that the underlying epistemology sees knowledge as not being simplistically fixed, certain and thus defined but as something able to be analysed, created,
generated and developed and, most specifically, to be managed. This is immediately problematic as a divisive argument within the field of KM is whether or not knowledge is a defined, externally objective entity that can be managed, or whether knowledge resides only in people and therefore cannot be managed except by managing people. (This in turn leads to the similar argument that people are not managed but led - "you manage things and lead people" interview, Academic #15). Yet another critical but separate argument, regardless of whether knowledge is exclusively internal and person-based or able to be externalised, is the question as to whether knowledge management is a noun or a verb: a 'thing' or a 'process'. This debate regarding the epistemology of knowledge as possession or practice was explored in chapter 2 (Cook & Brown, 2002).

These issues are explored further in the course of this thesis but the starting point for this study is that knowledge management is not exclusively about managing and manipulating objective data or information. Rather, as discussed in the previous chapter, it is fundamentally about knowledge held, shared, created and generated within and between people as they make sense of their situation and the information involved. Knowledge management from this perspective is therefore more about people and their sensemaking, creativity, synergy, and social interaction than it is about data or information management although both data and information management become, within those parameters, necessary components and by-products of knowledge management.

This thesis takes a subjectivist viewpoint that reality is a matter of personal perception and is socially constructed. It is written from an essentially modernist (Neuman, 2003) or “post-traditional” perspective in that it builds from an assumption that standards exist about which most people can agree, although it borrows from post-modern, or “late modern” (Giddens, 1984) thought regarding the value of intuition, imagination, personal experience, and emotion to support the modernist value of logical reasoning. The study takes an optimistic stance about the

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1 To protect privacy, all interviews have been coded with alpha-numeric descriptors and names are not used with the exception of occasions when the CEO of the organisation (ABS or UEA) is quoted. Otherwise, when quoting from interviews, only generic positions are used to describe interviewees.
future and the possibility of research to lead to progress that includes better understanding and improvement in the social world.

The goal of the research is to develop a better conceptual appreciation of knowledge and knowledge management that can lead to the development of understandings, systems and processes of pragmatic use that will assist the business world in KM practice. Most of the means used to develop the research take account of personal experience and constructed meaning. As a result the approach is subjectivist working from the assumption that reality is personally interpreted and socially constructed (Denzin & Lincoln, 2000; Patton, 1990; Miles & Huberman, 1994; Blumer, 1969) and that “an interpretivist/constructivist framework allows the participants in the research to exert a considerable influence on the important questions and findings” (Williamson, Wright, Burstein & Schauder 2003, viewed 28 October 2004).

To a great degree this subjectivist viewpoint is founded upon an understanding of reality as perceived and interpreted by the process of sensemaking and of sensemaking in organisations (Wiley, 1994; Weick, 1995; Boland et al., 1994; Cecez-Kecmanovic, 2001; Cecez-Kecmanovic & Jerram, 2002; Dervin 1998; Dervin & Nilan, 1986). "Generally, sensemaking involves processes of perceiving, believing, interpreting, explaining and predicting by both individual and collective agents in an organisational setting" (Cecez-Kecmanovic, 2001). The sensemaking (or meaning-making) approach to social reality assumes that there is a social world external to the self of which each individual makes sense by a personally developed set of perceptions that are created internally from personal experience and socially through human interaction (Cecez-Kecmanovic & Jerram, 2002; Radnor, 2001; Blumer, 1969). As each participant in a social setting expresses and lives out their perception and meaning making of the world around them, this is shaped and modified by interaction with other humans who bring their own personal meanings and sensemaking to the same experiences. This belief in the significance of sensemaking, meaning-making and a socially constructed view of reality led to the selection of research methodologies compatible with socially constructed forms of empirical evidence gathering, particularly the use of interviews to gain the perceptions and meanings of the persons involved in the research phenomenon under investigation.
It is perhaps necessary at this juncture to acknowledge that there are other schools of thought that have developed concepts of sense and sensemaking, most notably Dervin (Dervin 2003, 1998; Dervin & Nilan, 1986). Dervin’s sensemaking theory, which has been under development since 1972, is particularly located within communications and social science disciplines. Many of the ideas and developments within Dervin’s sensemaking theory share common foundations and perspectives with the sensemaking works of Cecez-Kecmanovic and the seminal authors from whom she has developed her theories (Weick, 1995; Wiley, 1994; Ryle, 1949) and parallel understandings and approaches can be found. In large, however, Dervin’s sensemaking theory takes a different focus and conceptual approach than that of Cecez-Kecmanovic. For instance, Dervin (1998, p. 36) summarises her approach to sensemaking for knowledge management in this way:

Primary emphasis is placed on moving conceptualizations of users, information, and reality from the noun-based knowledge-as-map frameworks of the past to verb-based frameworks emphasizing diversity, complexity, and sense-making potentials. Knowledge management is described as a field on the precipice of chaos, reaching for a means of emphasizing diversity, complexity, and people over centrality, simplicity, and technology. Sense-Making, as an approach, is described as a methodology disciplining the cacophony of diversity and complexity without homogenizing it. Knowledge is reconceptualized from noun to verb.

There are both parallels and divergences between Dervin’s and Cecez-Kecmanovic’ approaches to sensemaking for knowledge management but it is Cecez-Kecmanovic’s sensemaking framework for organisations that is the major approach used in this thesis.

This study assumes the social construction of reality, and focuses on the complexity of human sensemaking and meaning-making. Emphasis is placed on context, and process as influenced by context (Walsham, 1993). The study is primarily interpretive (Babbie, 2004; Schwandt, 1998; Garner, 1991; Klein & Myers, 1999) as it assumes that knowledge is gained through socially mediated construction of sense or meaning-making. That knowledge is emergent, flexible and situational rather than a fixed and predefined entity. Individuals make sense of and create knowledge about the world around them through understandings developed through
experience and interrelationship in context of situation and prior experience and sensemaking.

A focus of the ABS field study is the sensemaking of the ABS Executive and knowledge workers as they deal with the context of an entire systems change and ongoing systems development as part of the ABS KML. Similarly, the UEA field study investigates the sensemaking of the UEA Executive and staff as they struggle to come to terms with a large-scale systems and work restructure changing 3 separate systems into a single unitary structure. The focus of each study is very much upon interpreting and understanding the sensemaking of the people involved in the systems and technology changes within their organisations.

The interpretive epistemological foundations underlying the conduct of this thesis assume that knowledge of reality is always filtered and interpreted through personal context, personality, insight and history. It also assumes that knowledge gained and individual interpretations of that knowledge are strongly influenced through social constructions. However, as well as perceiving knowledge to be interpretively understood and mediated by social construction this work investigates the pragmatic application of methodology in knowledge management and is grounded in a sense of pragmatism. Davenport and Markus challenge IS researchers to be aware of the need for “excellent practical research that differs from excellent traditional academic research” (1999, p. 20). This thesis seeks to incorporate pragmatic answers to practical challenges in the business world of KM. As Dervin states (1999, p. 748) “There is an inextricable relationship between metatheory, methodology, substantive theory, and method.” The metatheoretical assumption underpinning the thesis is that the social and business world studied here is interpreted and expressed by the participants through socially constructed understandings filtered through personal perceptions. From this epistemological foundation an interpretive methodology using sensemaking theory and method has been selected as the most appropriate means of conducting the research.

**RESEARCH METHOD**

Comparative case study is the primary method chosen for the empirical study in this thesis. Specific research interests lead toward specific investigative methods and
analysis methodologies, as Tesch (1990, p. 72-73) illustrates in her Graphic Overview of Qualitative Research Types (see over page). The empirical research for this study is located in the third strand of Tesch's (1990) graphic overview, 'the comprehension of the meaning of text/action'. Drawing on hermeneutics, which Gadamer (2003, p. 164) calls “the classical discipline concerned with the art of understanding texts” and Blackburn (1996, p. 172) describes as the “method of interpretation, first of texts, and secondly of the whole social, historical and psychological world”, interpretivist case study (Merriam, 1998; Patton, 1990; Glazier & Powell, 1992) is the primary means of inquiry for this study into KM praxis within organisations.

![Tesch's Graphic Overview of Qualitative Research Types](image)

**Figure 4.2**  Tesch's (1990) graphic overview of qualitative research types

First order analysis, which is primarily descriptive, is conducted in order to present the voices of the individuals in the context of the case study and to enable their
voices to be heard and their particular subjective views to be communicated. Second order analysis is conducted by the researcher through a theoretical lens in order to gain understanding and make sense of the phenomenon in question. The first order analysis in this study uses some of the concepts and methods of phenomenology and grounded theory (Miles & Huberman, 1994; Neuman, 2003) for 'identification (and categorisation) of elements, and exploration of their connections', preparatory to analysis through the sensemaking framework (Wiley, 1994; Weick, 2001; Cecez-Kecmanovic & Jerram, 2002) for the second order analysis. In balance, the first order analysis equally draws on the 'discerning of patterns' looking not only to categorisable elements in patterns but also to irregularities and elements which, by drawing attention to themselves as exception, invite inquiry by qualitative evaluation. The primary research design, however, centres upon comparative case study, theory construction and empirical testing of theory through comparative analysis of the field studies.

**Comparative Case Studies**

Comparative case study was selected as the best means to meet the goals in shaping the overall design of this thesis. "[Case study] is employed to gain an in-depth understanding of the situation and meaning for those involved. The interest is in the process rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation" (Merriam, 1998, p.19). Case studies "become particularly useful where one needs to understand some special people, particular problem, or unique situation … a great deal can be learned from a few exemplars of the phenomenon in question (Patton, 1990, p. 54).

It was highly desirable from a research design point of view that a case study be conducted into an exemplar of the phenomenon in question – in this case, knowledge management. The Australian Bureau of Statistics is well known for best practice in knowledge management, and was thus an ideal choice for study. The ABS KM Initiative is well established, clearly defined, planned, measured and supported. The ABS Knowledge Manager actively studies knowledge management and participates in KM conferences and forums, constantly developing his own understanding and praxis in KM. As a part of the ABS KMI, a large scale whole-organisation systems and technology change had occurred with the adoption of
Lotus Notes as a common platform throughout the organisation. This systems change provided a specific event as a clear focus for the investigation into the ABS KMI. Persons from all levels of the ABS structure were available for interview, from the Australian Statistician (CEO) to entry-level employees, as well as all members of the KM Initiative staff. Twenty two persons from across these different levels and interests in the ABS were selected for interviews. Some were selected by the researcher; others were selected by the Knowledge Manager as persons whom his context-specific knowledge determined as best meeting the criteria, such as diversity of both ABS experience and tenure and involvement in the KMI, for a balanced and insightful study of KM praxis in the ABS, including persons supportive of and critical of that praxis.

This is a particularly interesting case to study, as the core business purposes of the ABS are information and knowledge. In most organisations, knowledge and information are tools to support and enable core business processes of some other type (manufacturing or retail, for instance) but in the ABS, information and knowledge are not only the tool but also the product. This is both a strength and a weakness from the point of view of a case study on knowledge management. Although this means additional depth to the case study, investigating the KM and IS processes of an organisation atypically dedicated to knowledge and information as a core product, it also reinforces the necessity that the second field study also be, for comparative purposes, an organisation with a similar core business focus of knowledge and information. For comparative purposes, it was also desirable that the second case study be of an organisation undergoing similar systems and technology changes as the ABS but doing so without a knowledge management initiative.

A university meets the criterion of an organisation with core business processes and products of knowledge and information. At the time this research was undertaken, the University of Eastern Australia\(^2\) was engaged in a large scale, whole-organisation systems and technology change. It did not have a recognised Knowledge Management Initiative or department. This situation provided a clear parallel to the ABS KMI that permitted comparative analysis. Twenty two interviews were

\(^2\) The name of the university has been changed for this study.
originally conducted with various personnel of the university, engaged at all levels and types of employment within the university, both academic and administrative. This was later extended to twenty-five interviews, as the UEA moved into a second phase of systems change and restructure to address issues raised in the first phase (and identified in this study) that could not be ignored if a balanced understanding of the absence of purposeful knowledge management practice in the UEA was to be presented. Consequently, additional personnel who were specifically responsible for the second phase of the systems change also needed to be interviewed.

A case study "is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994, p. 13). In this study, the contemporary phenomenon is knowledge management, and the real-life context in each case study is a whole-organisation systems and technology change. In the case of the Australian Bureau of Statistics, this was the changeover of the technological platform used for supporting all core business processes (the roll-out of Lotus Notes). In the case of the University of Eastern Australia, it was a restructure merging three small universities, requiring a systematic reworking of all technological platforms used to support all core business processes. In the ABS and the UEA, the boundaries between knowledge and information management are blurred as they occur within the context of organisations dedicated to information and knowledge. The studies do, however, provide an overview of a phenomenon (knowledge management) in a specific social and disciplinary context (organisational restructure for systems and technology change).

METHODS AND TOOLS

INTERVIEWS AND DOCUMENTS

Semi-structured interviews were the most suitable form of data collection for these field studies, as "we interview people to find out from them those things we cannot directly observe...The purpose of interviewing, then, is to allow us to enter into the other person's perspective" (Patton, 1990, p. 196). It was desirable to obtain participants’ perspective and viewpoint in both organisations to be studied, as a principal objective of the study was to examine the sensemaking processes by which the participants reached their understanding of the systems and technology changes.
in their organisations and motivating their responses to those changes. “...the decision to use interviewing as the primary mode of data collection should be based on the kind of information needed and whether interviewing is the best way to get it” (Merriam, 1998, p. 72). Semi-structured interviews were selected as they allow the structure of a similar framework of questions for comparative analysis and the flexibility to allow the participants to voice their own issues and concerns and explore their own answers to better understand their own sensemaking processes (Patton, 1990 p.343). The interview guide used for each case study was specific to that organisation (copies can be found in Appendices 1 and 2). In the ABS, where an acknowledged Knowledge Management Initiative was in place and was directly tied to the systems and technology change under investigation, questions included specific references to the participants’ understanding of knowledge management and the specific ABS knowledge management initiative, as well as their own understanding of themselves as a knowledge worker and their role in the knowledge management initiative of the organisation. In the UEA where there was no knowledge management initiative in place and, according to senior personnel, no knowledge management taking place, the interview guide approached such questions indirectly. In this case, questions specific to the participants’ role in the restructure systems and technology change in the first phase of the restructure were asked, and linked to questions of collaboration, organisational learning and personal empowerment in their ability to perform their work. An interesting by-product was that in all cases in the UEA, participants enquired about the central focus of the research and consequently expressed an opinion as to what the term ‘knowledge management’ meant to them and their belief in the role knowledge management needs to play in the organisation. As a result, the interviews from the two studies paralleled even more closely than was originally designed.

The selection of whom to approach for interviews was determined by the focal point of the systems and technology change undergone by each organisation. In both cases, ‘handpicked sampling’ was used: “Handpicked sampling involves the selection of a sample with a particular purpose in mind” (O’Leary 2004, p. 110). In the ABS, the Knowledge Manager and his senior personnel at each of the three ABS sites visited used their insider knowledge to select persons they considered to be representative of a diversity of experience and opinion within the organisation in
the use of the new systems installed during the technology changes, as well as the staff specifically responsible for the knowledge management initiative. Their selection deliberately included persons from all levels of experience and seniority from the CEO (The Australian Statistician) to junior administrative staff, and included persons who had been with the organisation a long time, during the systems change, and a few newer personnel who had only experienced the new systems. It was requested that personnel selected were not screened for ‘loyalty’ or ‘positive responses’ to the ABS KMI systems changes but were assured of anonymity and permitted to voice approval or disapproval for the knowledge management practices, processes and results being investigated.

In the UEA, the systems and technology change was underway as part of the process of a university restructure during the time of the investigation. Choice of interviewees was similarly selected by a Professor of Information Systems drawing on insider knowledge of the personnel affected in ways parallel to those interviewed in the ABS. Selection included a deliberate diversity of all experience levels from the CEO (the Vice Chancellor) and senior most decision-makers to junior academic and administrative staff, varying in lengths of tenure within the organisation. Again, anonymity was assured, and staff were encouraged to express approval and disapproval of the management practices, processes and results being investigated. They were not asked about knowledge management practices, processes and results, as these were not employed by the university at this time, and the lack of a KMI was one of the criteria for focusing the comparative field study. Nevertheless, as stated above, these KM issues arose and participants voiced opinions on these subjects as well.

Other written and documentary sources were available to provide additional insights about what was going on in KM praxis in the ABS and the UEA, and these were collected and collated. They include organisational statements published for both internal and external use. The ABS has several published papers documenting the story of the ABS KM Initiative. Senior members of the ABS are frequently called upon to speak at conferences about their KM Initiative. Copies of these works, the PowerPoint presentations for the speeches, and internal documents for training staff in KM and other such pragmatics have all been useful in
understanding KM praxis at the ABS. The University of Eastern Australia also published many documents and created PowerPoint presentations concerning the whole restructure and about the systems and technology change, in both the first and the second phase, and these were also collected and collated. On all occasions, however, the primary evidence used in this study has been the data gathered through interviews with managers, KM practitioners and personnel affected by their work. These interviews were transcribed, verbatim, from digital recordings and analysis was conducted both using electronic and hard copy of the typed transcripts and listening to the recorded statements of the interviewees. As previously noted, during transcription all interviews were coded with alpha-numeric descriptors and, to protect the privacy of the participants, names are therefore not used in this thesis. There is one exception to be noted, and that is on occasions when the Australian Statistician (ABS) or the Vice Chancellor (UEA) is quoted, speaking as the CEO of their organisation. Both the Australian Statistician and the Vice Chancellor have given their permission to be quoted in this manner. Otherwise, when quoting from interviews only generic positions are used to describe interviewees.

**Mode of analysis**

Analysis, in this study, was conducted in three stages: first order analysis using thematic coding for data reduction and organisation; then second order using the sensemaking framework to interpret the data and achieve theoretical understanding; and finally meta-analysis using the iterative research process to hone and refine the sensemaking framework. This staged process was brought to bear on the data to ensure that significant findings could be focused and interpreted within the local context and a broad view of the case organisation. “To review a set of field notes, transcribed or synthesised, and to dissect them meaningfully, while keeping the relations between the parts intact, is the stuff of analysis” (Miles & Huberman, 1994, p.56). The emphasis in analysis was on the employment of the sensemaking framework but first order analysis using descriptive coding was employed to identify interesting data and thematic groupings of data to which the sensemaking framework could be applied (Miles & Huberman, 1994, p. 57).
**FIRST ORDER ANALYSIS: CODING**

In qualitative research the iterative process of coding and analysis is integral to the process of theory building as it “... represents the operations by which data are broken down, conceptualised, and put back together in new ways. It is the central process by which theories are built from data” (Strauss & Corbin, 1990, p. 57).

First order analysis is used in this study for the processing of raw data towards findings or interpretations:

The challenge is to make sense of massive amounts of data, reduce the volume of information, identify significant patterns and construct a framework for communicating the essence … (Patton 1990:373).

'Identifying significant patterns and constructing a framework' is an iterative process, and for the purposes of this study, during first order analysis the interviews and documents were coded in four phases. In the first phase, coding was the simple allocation of theme or topic names to pieces of data, while reading through interview transcripts, as a first process of conceptualising the data within the context of the study. "Coding (or indexing) is seen as a key process since it serves to organize the copious notes, transcripts or documents that have been collected and it also represents the first step in the conceptualization of the data" (Bryman & Burgess, 1994, p. 218). These are “descriptive codes; they entail little interpretation” (Miles & Huberman, 1994, p.57). They were simply ordered alphabetically as they arose, for example, the original list of codes started with: accomplishments; accountability; appropriate roles; and assumptions. As descriptive codes, these codes had no specific order or relevance to each other until later phases of coding. Examples of first phase coding can be found in Appendix 3 for the UEA and Appendix 7 for the ABS case study.

Iterative recoding has primarily been used as a first order organisation bringing some order and coherence to the mass of data. In the second phase of coding the list of codes allocated during the first phase of coding was organised into a more coherent format through assigning topical headings to groups of codes. This was a reflective process in which ‘chunks of data’ were tagged with ‘interpretive’ labels (Miles & Huberman, 1994, p.57) [italics in original] to begin reducing the volume of data and organising it into recognisable patterns and identifiable themes.
Coding is analysis… This part of analysis involves how you differentiate and combine the data you have retrieved and the reflections you make about this information (Miles & Huberman, 1994, p. 57).

It was by this process of reflection, in both case studies, that data was reduced and collated in such a way as to form meaningful patterns that establish commonalities and differences. The second iteration, which Miles and Huberman refer to as ‘revising codes’ (1994, p. 61) recoding the data with ‘pattern’ codes (p. 57) identifying themes and consistent patterns. One theme that arose was identified as “frustration/anger”, with sub-headings including: communications; delegation; disempowerment; emotional decisions; imposed choices; lost goodwill; no one knows; personal environment; technology issues; “them”; and understaffed. At this stage, the theme and sub-headings were still fairly loose groupings of similar topics, rather than tightly defined themes but had a coherence that permitted the next phase of coding. Again, examples are given in the Appendices, with the UEA 2nd phase coding in Appendix 4, and the ABS in Appendix 8.

For the third phase or iteration of coding, the concepts underlying the sensemaking framework were applied to the themes and coding patterns, creating additional codes and revising others (see Appendices 5 and 9). This process created too large a selection of codes, themes and patterns and was reduced in a fourth iteration to a list of thematic codes divided into a short list of primary codes and a longer list of secondary codes (Appendices 6 and 10). For instance, once the sensemaking category “individuals / intra-subjective” was added, the list of codes beneath it included champion; cynical; and personally hard. “Cynical” and “personally hard” each had a number of sub-categories but in the fourth iteration, only “champion” was selected as a primary code for second-level analysis, as it was a code that appeared under a number of other categories including: KM planning and strategy; leadership; intra-subjective sensemaking; generic-subjective sensemaking; and inter-subjective sensemaking. This fourth phase of coding then shaped the approach for the second order analysis.

SECOND ORDER ANALYSIS – SENSEMAKING FRAMEWORK

Development of the sensemaking framework for second order analysis is described comprehensively in Chapter 3. Essentially, the sensemaking framework based on the works of Weick (1995), Wiley (1994) and of Cecez-Kecmanovic (Cecez-
Kecmanovic 2000; Cecez-Kecmanovic & Jerram, 2001, 2002) on sensemaking and the work of Tsoukas on organisations as distributed knowledge systems (Tsoukas1996; Tsoukas & Vladimirou, 2000) were developed into a methodological tool for second order analysis in Chapter 3. In Chapters 5 and 6, this framework is used as an approach to analyse the understandings of the participants at the ABS and the UEA as expressed in their interviews. In Chapter 7, these understandings are compared and contrasted, again using the four sensemaking levels of the sensemaking framework: individual intra-subjective, social inter-subjective, organisational generic-subjective, and cultural extra-subjective. These four levels of sensemaking were applied to the content of the interview transcripts (and documents) gathered from each of the two cases, within the patterned concepts focused through the first order analysis coding. Thus the intra-subjective, inter-subjective, generic-subjective, and extra-subjective understandings of the participants in the ABS and the UEA were analysed according to their expressed views on coded subjects such as leadership, strategic planning, and trust and credibility – themes that arose from the first order analysis patterned coding.

Application of the sensemaking framework was again an iterative process. The four levels of the sensemaking framework were applied to the coded data list created in the fourth phase of first analysis coding. Each sensemaking level was applied to each of the primary codes. Each sensemaking level generates its own set of questions that brings a different perspective to the coded data. For instance, the topic “champions” was listed under the themes of intra-, inter- and generic-subjective levels of sensemaking, as well as under the themes KM planning and strategy, and leadership. The data that had been coded with the topic of “champion” was examined from the perspective of each of the four levels, asking such questions as: what are the intra-subjective understandings of KM champions in leadership; how do these differ from the inter-subjective understandings of KM champions in leadership; is there confluence or conflict in the different sensemaking perspectives on this issue; how are these similarities and differences reflected? As similarities and differences within and between case studies were identified parallels were drawn and frameworks created to help analyse the findings. From these frameworks a multi-level perspective could be gained, allowing identification of the perspectives attained at individual levels, and their relationships
with one another in a holistic sense. These methods were applied to the individual case studies and to the comparison between the case studies.

The process of analysis and synthesis working back and forth between the four sensemaking levels and the issues identified by first analysis coding was a reflexive process that led to meta-analysis, or the constant examination and re-working of the framework through application.

**META-ANALYSIS – REWORKING THE SENSEMAKING FRAMEWORK**

The analysis and synthesis of the data gathered from the ABS and the UEA was, as has been stated, an iterative process. The principle of the hermeneutic circle (Klein & Meyers, 1999) was employed through interpreting each case study individually then comparatively. This process was also an iterative process engaging with the theory that informed the analysis. Thus, as in first order analysis, the codes were constantly revised, so as a result of second order analysis, the sensemaking framework was similarly revised as part of the critical process of using interpretive analysis to generate concepts that structure and develop theory (Glaser & Strauss, 1967). As concepts are developed they permit the building of coherent theories that can be developed, tried and tested. The concepts discussed in Chapter 3 were developed, tried and tested on the comparative case studies of the ABS and the UEA. The iterative process of working through the application of the sensemaking framework developed as a methodology in Chapter 3 to apply it to the case studies in Chapters 5, 6 and 7, produced continuous refinement and adjustment to the sensemaking framework with subsequent cycles of revision to both interpretation and the shaping of the framework, in the ‘principle of dialogical reasoning’ (Klein & Meyers, 1999) which refers to being aware of and sensitive to possible contradictions between theory and preconceptions that guide the research design and the actual findings. This involved some reworking of the original development of the concepts discussed in Chapter 3 but is mainly treated in the discussion in Chapter 7. Consequently, by the end of the study, the concepts originally developed in Chapter 3 had been applied to the field studies of Chapters 5 and 6, discussed in Chapter 7, then modified and reworked in response to the iterative process of dialogical reasoning, allowing the concepts and framework to be modified by application.
QUALITY AND CREDIBILITY

ETHICS

As interviews with participants were involved, ethics were a consideration from the beginning (Babbie, 2004; Berg, 1998; Denzin & Lincoln, 2000). Before commencing the field work with either case study, all planned approaches, letters, interviews and questions were submitted and reviewed by a University Ethics Review Committee. Consideration was particularly given to ensuring that interviewees’ participation was voluntary. Anonymity was guaranteed where possible, although for the UEA Vice-Chancellor, the Division Head of the UEA ITD, the Australian Statistician, and the ABS knowledge manager, it was recognised that this is not possible due to public knowledge of their role (Babbie, 2004). However, these participants were happy to be interviewed on this understanding. Many other participants stated their willingness to have their names used and to “go on public record” but throughout the thesis all names have been substituted with codes to preserve confidentiality consistently for both field studies. It was of particular concern that all participants know that they could speak honestly and freely without any risk to their jobs or their work relations. Participants were offered the opportunity to read, review and correct the transcript of their interviews. Throughout the field studies, a primary concern was that no harm come to any of the participants (Babbie, 2004; Neumann, 2003; Denzin & Lincoln, 2000).

RIGOUR

Issues of quality, credibility and rigour are important whether they are labelled triangulation, validity or authenticity (Denzin & Lincoln, 2000; Patton, 2002). As an interpretive work, assuming a social construction of reality, the criteria used for this study are those labelled “Social Construction and Constructivist Criteria” by Patton (2002, p.544). The criteria include: the acknowledgement of subjectivity (discussed in epistemology and ontology); triangulation by capturing and respecting multiple perspectives; reflexivity leading to Versteven through use of the sensemaking framework and meta-analysis, as discussed above; and particularity, focusing on the uniqueness of each of the two cases.
The primary source of data has been interviews and the means of multiple sources most sought have been that of obtaining a wide cross-section of staff to interview, gaining different opinions and different perspectives, in both of the field studies. In the ABS study, interviewees included people from all levels of service from The Australian Statistician to entry-level workers, employees working with the KM Initiative and personnel opposed to it, all from a variety of departments and divisions including support divisions such as the Library and the Methodology Department and employees from a variety of divisions such as Population, Economics, and Large Business. In the UEA case study, a similar depth and breadth of data was obtained, with interviews conducted at varying levels from the Vice Chancellor to junior administrative and academic staff, and varying levels in between such as Associate Lecturers, Lecturers, Deans, Heads of School, School and College Administrative and Divisional workers and officers, and Heads of Divisions. Use of documentation such as websites, intranets, handbooks, mission statements and similar internal documents, publications and other external or objective sources are included in both cases to ensure more breadth to the study and as forms of multiple sourcing. The specific organisations chosen as field studies were selected to provide a contrast between an organisation that claimed to engage KM practice as a fundamental structure underlying their core business processes, and an organisation that did not claim to engage in KM practices. To give the investigation rigour as a comparative study, the specific process of a whole-organisation change in systems and technology was used as the focal point of the investigation into each organisation’s KM practices.

Rigour and trustworthiness were also considered in the careful matching of research design and methodology to be consistent with the underlying ontology and epistemology informing the study. The integrity of the research design for trustworthiness is discussed in the early pages of this chapter, under 'ontology' and 'epistemology', and application of the principles of multiple interpretations, of the hermeneutic circle, and of dialogic reasoning (Klein & Meyers, 1999) demonstrate that the nature of the iterative hermeneutic process employed as methodology is consistent with the subjective and interpretive stance expressed.
CROSS-CHECKING

As a final means of trustworthiness and rigour in the study, analysis was verified by cross-checking or, as Patton (2002, p. 560) refers to it, “multiple analysts”. Two academic supervisors volunteered their time to analyse selected interviews to ensure that similar results were obtained when analysing and categorising / coding the interviews at both first and second order levels. The value of this cross-checking for trustworthiness of research results is discussed by Seale: “… in spite of debate about the philosophical assumptions … in practice data do appear to speak in similar ways to different people” (1999, p. 28). This form of cross-checking with two academic supervisors was used for the first order coding analysis and the application of the sensemaking framework in second order analysis and in meta-analysis.

RELEVANCE

This thesis is framed by theory-informed praxis. From the beginning of the research there was a goal that this study be not only academically sound but that it contribute to knowledge management practice. A common complaint in the field of KM practice is the irrelevance or unusable complexity of most academic offerings, from the point of view of practitioners in the field. This is a common theme in the monthly meetings of the NSW and ACT KM practitioner and academic forums that are held in Sydney and Canberra and is echoed in the ongoing email listserv shared by these two groups. The following quotes are expressed by KM practitioners from the NSW KM forum:

I agree that defining knowledge will not explain KM. I see the benefits of understanding knowledge better as flowing to KM practitioners in developing their discipline… My feeling is that there are probably a few hundred people around the world, mainly academics, that have a good grip on the topic, even though it’s still the subject of intense debate. However these people seem to specialise in writing incomprehensible books on the subject that examine it from every conceivable angle. What they fail to do is package it in simple terms and language that communicate the issues easily (TK, 11 December 2002, NSW KM forum).

Other concerns frequently expressed by KM practitioners include the lack of consensus of core definitions, and the consequent lack of standing of KM in both the academic and business communities.
However, while KM isn’t going to go away it will continue to be seen by many as a fad if we don’t ever reach some kind of consensus about: [1] what we mean by knowledge (I know, the age old question... but then, what do we mean by ”risk”, ”change”, ”projects” and ”quality”?) [2] the scope and organization of the KM BoK [3] the outcomes or changes it produces (JD, November 19 2002, NSW KM forum).

The concerns expressed in the knowledge management forum are representative of the need within the KM discipline for rigorous studies that contribute to definition, scope, organisation, purpose and goals, and overall - ”flowing to KM practitioners in developing their discipline” (TK in quote above). The research methodology used in this study was designed to lead to results that accomplish, in a rigorous and trustworthy manner, the objective of this thesis: [1] to develop a theoretical foundation that provides a deeper understanding of the knowledge phenomenon in organisations and then [2] based on that, develop a methodology that assists in exploring these phenomena and improving KM processes.
CHAPTER 5 THE ABS CASE AND CONTEXT

This chapter and the next each present a case study of an organisation that has a knowledge- and information-intensive focus. This chapter focuses on the case of the Australian Bureau of Statistics (the ABS) and the handling of systems and technology change through its knowledge management Initiative (KMI). The events recounted in this Chapter about the Australian Bureau of Statistics’ system and technology change were elicited in response to a series of questions about the individuals’ understanding of their systems and technology, knowledge management and the knowledge management initiative (KMI) implemented throughout the ABS.

The chapter begins with a brief outline of the ABS as an organisation, its purpose and structure. It then presents the story of the introduction and running of a critical systems and technology change (to a Lotus Notes® Platform) through the ABS’ knowledge management Initiative (KMI). It presents a synthesis of the story as told by twenty five (25) different personnel from the ABS. This story is then discussed, first on a thematic basis, considering issues emphasised by interviewees, and then revisiting the issues and points of interest as filtered through the lens of the sensemaking theory of knowledge in organisations. Further discussion arising from this chapter is taken up again in Chapter 7 after exploring the case study of The University of Eastern Australia in Chapter 6.

CONTEXT AND HISTORY OF THE AUSTRALIAN BUREAU OF STATISTICS

"The ABS is the world's best international statistical citizen" – Hermann Habermann, Director of the United Nations Statistical Division.

The Australian Bureau of Statistics (ABS) is a well-known public sector organisation. In the simplest terms, the ongoing work of the ABS is to collect data, principally through survey and census, to collate that data, and transform it into statistical information of use to Australian (and international) government, business and citizens. Thus, the core business of the ABS is the production of information. The official ABS Mission states:

The Australian Bureau of Statistics is Australia's official statistical organization. We assist and encourage informed decision-making, research and discussion within governments and the community, by
providing a high quality, objective and responsive national statistical service (ABS website).

Originally, Australian statistics were collected by each State with the Commonwealth Bureau of Census and Statistics (CBCS) collecting national statistics and coordinating the collection of state statistics from 1905. By the late 1950s, all State Statistical Offices had amalgamated with the CBCS, then in 1974 the CBCS was abolished and the Australian Bureau of Statistics was created in its place. The Australian Government established the ABS as a Statutory Authority in 1975, and appointed a Permanent Head who was given the title "the Australian Statistician", responsible to the Treasurer.

In the 1960s computers were introduced to the ABS impacting number and size of collections and permitting more complicated statistical methods (www.abs.gov.au/websitedbs). In the early 1980s the then Australian Statistician introduced an early form of email to facilitate communications and knowledge sharing among the Executive precipitating a leap into technological support ahead of the common experience of the time. In 1990, all staff had access to email to facilitate their communications. In 1992 the Technical Services Division (TSD) of the ABS recognised the need to extend their information management and communications practices to include more extensive information and knowledge management. Strategic goals were set and technologies investigated to find the tools to meet the goals. A Lotus Notes® platform was chosen. This will be discussed in greater detail below.

The ABS is an organisation employing approximately 3,000 personnel almost half of whom (1,500) work in the National Office in Canberra, ACT. Predominantly these staff members are statisticians, mathematicians and economists and other such specialists who fit within the generic "knowledge worker" category. As a government organisation that collects, collates and publishes statistics about Australia, the Australian Bureau of Statistics (ABS) is an information- and knowledge-intensive organisation. Structurally, the ABS is divided into large organisational units that are called Groups that handle "subject matter", such as Economics Group and Population Statistics Group. The functional units within the Groups are called Divisions. In addition to the Operational Groups (and a
Methodology Division responsible for quality of data gathering, surveys etc), there is a supporting Group which includes Human Resources Group, Information and Data Management and the Technical Services Division (TSD), which is responsible for both Information Technology and knowledge management. The knowledge management team specifically, and the TSD as a whole generally, are responsible for information systems, technology, and the knowledge management Initiative (KMI) in the ABS for the support of the information- and knowledge-intensive core business purposes of the organisation.

In 1992 the then CIO, under direction from the CEO, created a list of strategic needs of the ABS and found two potential software packages to match them. In the "Office Computing Trial Evaluation Overview of Lotus Notes and ICL/Fujitsu Office Power" document, it is stated that the overall objectives for the product were: "To improve office systems performance in the following areas: ease of use; document management; reduced administrative support costs (eg: online forms); electronic applications; workflow resource usage accounting; integration with the statistical environment; and security" (Exec #H2).

The need or requirement for a groupware-type product - and it's often been described in the ABS as "groping for groupware" back in the early 90's - the process of actually looking for one came from the CEO of the organisation. He recognised that an organisation like the ABS needed to become much better at managing processes and become much better at capturing what information it had and much better at storing it. And for that reason he initiated a process whereby the ABS went looking for a product to achieve what we were trying to do. We had in our mind a vision of an organisation where everybody could collaborate, share information, and there wouldn't be any isolated silos or groups. And we went looking for the product and found it. Lotus Notes  (Exec #H1 KMI).

Lotus Notes® was chosen and was, originally, to be rolled-out over the years from 1992 - 1995. It proved to be so powerful and to facilitate work so effectively that there was immediate high demand from all executives and teams and consequently every staff member in the ABS had a personal computer with Lotus Notes® on their desk by late 1993.

The Lotus Notes® platform had been chosen for strategic reasons but the acquisition of Notes® and the capacities it provided stimulated more ideas for
strategic uses. Thus the "Object Management Strategy" was established in 1993 in response to this greater understanding of strategic possibilities provided by the software. The Object Management Strategy was the origin of the knowledge management Initiative which was established in late 1993, as a unit of the Technical Services Division of the ABS. The acquisition of Lotus Notes® as a technology platform more extensively facilitated communications and collaborative co-creation of knowledge within the Bureau.

Lotus Notes®, particularly the in-house developed Workgroup Databases which are the core tool in the ABS' Lotus suite, are a technology platform that permit all members of a group to work inside the same database simultaneously, so that a document that is being collaboratively created does not need to be emailed around to the members of the group with each person having a separate stored copy but is kept in a central location accessible to and editable by all members of the group. Emails can be sent to and from the workgroup, again permitting a single, central repository where all persons involved can see exactly the same communication at exactly the same stage rather than a series of emails all stored repetitively in different persons' email in-boxes with confusion as to who has the latest copy. The central repository and shared workspace of the workgroup databases is not only a freeing tool for collaborative co-creation of knowledge it is also a vehicle for transparency and knowledge sharing, as other persons not in the workgroup can still access the workgroup's database and see the information there and the work in its current state of progress. This facilitates management and frees individuals on all levels from hours of time spent hunting down knowledge or needing to access information through gatekeepers. Almost all of the information and knowledge in the ABS is held on and processed through Lotus Notes® Workgroup Databases, and almost all persons have access to almost all databases, making the entire organisation's information and knowledge base transparent, freely accessible and available to all members at all times.

The KMI team of the TSD have developed or integrated other pieces of software that contribute to the collaborative work environment or promotion of accessible information. One such application is Newspoint, a desktop banner that notifies all users about corporate events and is the first thing users see when they log on.
Grapevine, an externally sourced product, reads through allocated documents every day, looking for specific criteria that each individual nominates then notifies the individual each time a match is found, again saving hours of time and making needed information freely available and limiting information overload. This freedom of access to information and knowledge is specifically selected and developed to facilitate knowledge sharing and promote efficiency and effectiveness in the workplace.

On the whole, the ABS is an organisation that practices knowledge management (KM) to support core business processes and to regulate all systems change processes and is well known and respected for “doing KM” extremely well (Jerram, 2004, FN, KF) making it an exemplary case study for the investigation of knowledge management methodology and praxis. The ABS has, in fact, long been internationally recognised as the world’s leading organisation in handling information and knowledge in the domain of statistics.

It's not surprising to know that the ABS has been consistently ranked among the top two [with Canada] in the world in terms of statistical agencies" - Dr Paul Cheung, Chief Statistician, Singapore Ministry of Trade and Industry, 25 January, 2002.

That it has, in recent years, also developed a reputation as a leader in successful knowledge management, is evidenced by the growing number of organisations that approach the ABS to learn about their KM Initiative. Another signifier is the growing number of organisations, in Australia and around the world, that request speaking engagements from the Knowledge Director (KD), the Chief Information Officer (CIO), and the Australian Statistician (the Chief Executive Officer or CEO), on the general topic of KM and the specific topic of the ABS KM Initiative (Exec #H1 KMI).

**ORIGINS OF THE ABS KNOWLEDGE MANAGEMENT INITIATIVE**

**LEADERSHIP DRIVEN AND TOP-DOWN**

The knowledge management initiative (KMI) in the ABS has been leadership-driven. In 1986, the then Deputy CEO, later Australian Statistician, foresaw the possibility of new technology (email) to facilitate the strategic information and knowledge sharing that he wanted to happen in the ABS.
But [he] thought the best way of working where we were going to go with it, was to actually force us to use it and learn from the experience (Senior Exec #H1).

The persons 'forced to use' the technology at that time were the senior executives, who found it so useful that they wanted to share it with those who worked with and for them. Consequently the next level of Executive was 'forced', to use the new technology in communications with the senior Executive. Within weeks, the technology of the time was 'rolled out' to the entire Executive. At the time, the ABS functioned on a mainframe system and very few staff had computers at their desks. By 1990, all staff had an early form of emulation-type character based email, even though the computing technology was primarily mainframe with multiple servers, and terminals were shared among the various personnel. This format of rapid technology take-up was repeated later but more extensively, with the introduction of the Lotus platform. With the introduction of Notes®, the ABS also changed from mainframe servers to individual personal computers (PCs). The original plan was to roll-out the technology to all executives and some shared PCs among the knowledge workers. However, once executives experienced the immediate communications and workplace facilitation all wanted it for the knowledge workers of their own departments as did the workers themselves. This immediately changed the plan for 2200 PCs acquired over three to five years to 3300 PCs acquired within a year until every staff member in the ABS had a PC on their desk and full working access to Lotus Notes®. This reflects the prototype strategy described by Orlowowski (1992) that allows necessary structural and cognitive changes to occur with transfer of learning from the pilot groups of the initial rollout and onwards throughout the whole organisation. This desire to share information and knowledge at all levels and to have the use of common platforms for doing so seems to be typical of the Executive attitude in the organisation.

It's had great support from the top but also the extent that we're prepared to be open about things like senior management… we're actually prepared to share with the organization, the documents that we're looking at and the results of those discussions (Senior Exec #H1).

This rapid and extended rollout of facilitative technology demonstrates the critical nature of the KMI involvement in systems and technology changes in the ABS and is indicative of three aspects of the ABS KMI that are particularly noteworthy. The
first is that there has been, and is, an unusual degree of involvement with and
knowledge about knowledge management on the part of the senior leadership of
the organisation. The second is that the culture of the ABS is conducive to
knowledge management as there is both a practiced willingness to document and an
identified openness and willingness to share and communicate. The third is that the
KMI has been very closely associated with the use of technology for accomplishing
strategic goals since the 1980s. Each of these aspects will be addressed in turn.

**KNOWLEDGEABLE LEADERSHIP**

Not only did the first stirrings of the KMI originate with a former Deputy CEO in
the 1980s but the current CEO of the ABS also proved to be exceptionally aware of
knowledge management in general and the ABS KMI in particular. Although
knowledgeable about the KMI the CEO is not involved in the KMI program
directly. Thus it cannot be said that the ABS KMI is now driven or led from 'the
top' as happened originally in the 1980s but it is led from a senior level of leadership
within the organisation and has the support and encouragement of the CEO. When
asked why the KMI is so successful in the ABS, the immediate response by the
CEO was to nominate two issues – culture, and supportive IT environment – that
will be discussed at later points in this chapter. This response also implicitly
highlights the significant and unusual degree to which the CEO is knowledgeable
about the KM in his organisation.

When asked why he was so well informed about knowledge management and his
own organisation's KMI the CEO laughed and laid responsibility on the necessity
to stand in for his CIO and CKO in international speaking engagements: "I was
sort of thrown in at the deep end and asked to do a session on knowledge
management" (CEO). In the process of learning for the presentation, giving the
presentation and receiving feedback afterwards, real insights into knowledge
management were acquired then shared with others:

I got feedback afterwards that for the first time [the audience] actually
had some understanding of knowledge management. What really
seemed to hit home was that we've always had some form of
knowledge management. We used to call it our library and our filing
systems and what-not. And what IT is, is a great enabler, enabling you
to do it better and more efficiently. IT isn't knowledge management –
and I think they'd mainly been hearing about knowledge management
from the IT gurus and getting very confused about what it was all about (CEO).

Here the CEO makes the significant comment that "IT isn't knowledge management" as did others in the organisation including the Technology Services Division personnel. This comment is significant regarding the role of technology in KM strategy. This point will be discussed in the strategy and technology section of this chapter following the next segment on culture.

**Conducive Culture**

Three issues arising from the CEO's comments on the origin of the ABS' KMI are of interest. They are [1] the unusual degree of CEO understanding and support which has been discussed above [2] the culture of the organisation and [3] the role of technology in accomplishing strategic goals. This next segment of the chapter discusses the second issue of "culture".

A number of employees at different levels within the organisation identified the long-standing and unified nature of the ABS culture. One particular aspect of the sense of continuity and well-established culture was identified by the long-term careers held throughout the organisation. There is a sense of potential for a lifetime career in the ABS which is reflected at many levels from the most senior to quite junior levels.

I've only been in the organisation for five and a half years, which in this organisation, is still a very short time (laughter) to a lot of people that have been here a hell of a lot longer than me… of the forty people in senior management positions, probably ninety to ninety-five percent of them have been in the organisation twenty years plus (Knowledge Worker #A7).

One explanation for the long career service within the ABS was the opportunity to change positions without leaving the organisation because of the freedom to move from division to division, sometimes through promotion, and often as a lateral move within the organisation. When asked 'how long have you been here?' a fairly typical answer was "In this Division - about eight weeks. In the ABS, about seven years" (Knowledge Worker #H11). This long-term stable employment within the ABS has a security based on trust in the organisation.
We've never been merged with another organisation; we've never been split in two. We've never had any huge cuts. So that stability has helped our culture. People feel confident and have been able to develop trust, I guess (Exec #H2).

When asked about his vision for the role of knowledge management in meeting the ABS mission the CEO's immediate response was to identify the culture of the organisation:

We feel like we're one big happy family but we want to work together; we want to share each other's know-how. So that I see as one of the strengths of the organisation. That exists now, and I want to preserve it. We had an audit done by Delphi Corporation a few years back, that showed us up very strongly, in terms of being willing to share information between ourselves (CEO).

This culture is partly based on the established norm within the ABS, which is to document relevant information. As documentation facilitates sharing this is an important foundation to a knowledge sharing culture.

A number of culture-based issues are revealed in the CEO's statement about the KMI's role in meeting the ABS mission. One assumption is that the ABS mission is a foundation that is known and does not need to be stated. Other concepts specifically communicated are those of a culture that is friendly; collaborative, and willing to share information and know-how. This openness and willingness to share are demonstrated at all levels including senior Executive. There is also an implicit acknowledgement of a culture that is strong and unified and a pride in that culture and identification with the organisation. Each of these issues will now be examined.

The durability of careers in the ABS and the freedom to move around within the organisation has effects that benefit the organisation as a whole. One such benefit is the building and continuation of a culture of friendliness: "I like the people here. That's what's kept me here at the ABS [for 24 years]" (Knowledge Worker #S6). Another consequence of long but mobile careers within the single organisation is expressed clearly by one executive:

I think that creates in them both a sense of obligation and an awareness of the benefit of actually leaving knowledge and information behind them, so that they inherit it when they move into their new role (Senior Exec #H2).
In knowledge management circles and forums the need to stimulate knowledge sharing in organisations is a constant issue. This does not seem to be a relevant problem at the ABS:

A lot of people who have been here a long time are very happy to share information… I just sent a message to that person and asked them how they did it and next minute they're just explaining it to me (Knowledge Worker #S3).

The same staff who receive benefits of knowledge sharing by others also express how normal they consider it to share knowledge themselves.

Their skills aren't particularly high in that particular area on the computer. Mine aren't great but they're better – so I've been able to show them some of the tricks of the trade that I've learnt since coming to the Bureau… to me that is just knowledge sharing (Knowledge Worker #S3).

Friendliness and knowledge sharing between colleagues was implicitly demonstrated by relationships, and evidenced in voice, eye contact and interaction on a daily basis, even more so than in the explicit statements in interviews.

One aspect of culture demonstrated throughout the interviews was pride in the organisation. All were aware of the international status of the ABS as the "world's leading statistical citizen" (Habermann, UN), from the CEO to the person who was most critical of the ABS overall but said "The Bureau's got a good reputation externally. And that's nice when you say that you work for the Bureau" (Knowledge Worker #A20).

A lot of people in the ABS really are proud of the organisation…. even the staff who might whinge and complain a lot – if you talk to them about statistics and the organisation's role in the development of Australia, that sort of thing – they will become really proud of their organisation (Knowledge Worker #A7).

The consequence is evaluated by one of the senior executives as resulting in an esprit de corps that is fundamental to the friendliness, comfortable working relationships and overall working environment of the ABS. There is also an awareness of privilege in working with the ABS as an organisation considered to be less than usually vulnerable to staffing cuts and budgetary lay-offs.
unlike a lot of organisations – who would normally come along and say, 'okay we don't need those people – bye-bye'. The organisation said, 'well hang on now, we've got some valuable people out there in those States – and for this we're all fairly grateful – let's not get rid of them, just give them something else to do' (Exec #A2).

This sense of security or invulnerability to staff cuts wasn't entirely universal. One less happy member of staff, for instance, felt that their particular area within the ABS was more vulnerable and less privileged than others "because whenever there seems to be cutbacks that need to be made, they're the area that seems to – that they can afford to lose people" (Knowledge Worker #A20). Another staff member spoke of 'not being a knowledge worker' when they began in the same section and only progressing to knowledge work on moving to a different division.

...generally true that most of them in data entry and the lower areas of the section – they're APS [Australian Public Service ranking] 1 to 3s. And it's a much older group as well. It's an older group of people that are at lower levels. Whereas, if you go into some of the more knowledge based areas, you'll get younger people at higher levels (Knowledge Worker #A11).

Contrary to that view, however, another "lower level" employee spoke optimistically of a potential promotion. Overall, the weight of comments from a variety of people tended to assume that the ABS as a culture was loyal to staff in such a way as to engender staff loyalty in return.

Trust was commonly perceived to be an important foundation for the prevalent culture. Trust is a significant issue within the ABS because it directly conflicts in many respects with the needs for security. An early decision in the implementation of the new systems technology was to keep every database open with free access to all personnel but at one time there were so many external contractors and consultants working in the ABS and automatically acquiring full access to all databases that it was suggested to close some of the information off.

And people really reacted to that. At every level. They said "No, no, no! We thought this information was supposed to be accessible. What's this talk about closing it off?" (Executive #H2 KMI).

And trust then became more important than closing off that Database. What happened then was that documents were marked as "Confidential" and people were trusted to respect the confidentiality. Rather than being locked out. (Exec #H1 KMI).
Trust is necessary for collaborative and co-creative work as is free access to necessary information. Consequently, staff perceive and appreciate this trust and the openness of the databases. There is also an awareness of a sensible balance and that those databases that are securely inaccessible need to be.

But of course there are things that I can't access. I can't access other people's personnel records or anything like that, of course. And I can't access it if it's an embargo – hasn't been released yet. But it's really a fairly small part of the entire information repositories that we can't or don't have access (Exec #H2 KMI).

The trust that is so integral a part of the ABS culture also facilitates a belief in the organisation and the freedom to commit to the ABS wholeheartedly. "What excites me about the Australian Bureau of Statistics is that they are very professional and – they've got that culture. And a belief in their own organisation" (Visiting Executive #H1). Although common, this opinion was not universally shared:

I've been with Immigration, Multi-Cultural Affairs and Human Services and Health and this is the most conservative Department I've seen. They're a lot more restrictive on the types of work practices and the trusting of staff. They seem to be more security conscious than other Departments even though I feel that other Departments have the same level of secure information (Knowledge Worker #A2).

The dissenting voice came from a 'non-grad' at a lower level of knowledge work. In fact the speaker (Knowledge Worker #A20) stated a conviction that the Bureau would not consider their position to be knowledge work. Yet another worker whose position in the APS is ranked even lower, when asked if they considered their self a knowledge worker, replied with confidence that they were. So, despite some dissent, the trust and belief in the organisation and the individual's role in the organisation is a common expression of the culture of the ABS.

The ABS therefore, both culturally and organisationally, has a culture that fosters documentation and knowledge sharing and creates an environment of pride, loyalty and friendliness. The systems technology change and the KMI were implemented within this established culture.

Someone asked me the other day, 'is what you did culture change?' … And I had to admit that no it was probably more behaviour than culture had changed. I mean, we weren't asking people to adopt a different culture. We just asked them to adopt some new behaviours which was quite a different challenge (Senior Exec #H2).
Demonstrably, there was no attempt – or necessity – for the ABS to change its culture in order to be able to implement a knowledge management initiative. The requisite culture for knowledge management practices was already established and only certain work patterns, practices or behaviours needed to change to facilitate such practices.

Reviewing this section, it is seen that culture is a critical component of the success of the ABS' knowledge management initiative. The particular aspects of culture that can be observed as contributing to this effect include longevity of career spans within the ABS, a friendly or even family-like environment, an established practice of documentation that facilitates a culture of openness to sharing of information and knowledge, pride in being a part of a recognised first class organisation and loyalty to that organisation and its leadership, and an established trust, externally and internally, of the organisational quality, work, ethic and environment. Overall, however, the ABS' KMI did not require a culture change but was instituted by behavioural change within an amenable culture. These cultural attributes and behavioural qualities are supplemented by pragmatic organisational behaviours such as incentives to share and a minimisation of negative incentives.

The next section of this chapter examines the knowledge management and organisational strategies of the ABS and the role of technology and information management in the support of such strategies.

**Strategy and Technology**

This section looks at the third issue, identified above, arising from the CEO's comments on the origin of the ABS' KMI – the organisational and knowledge management strategies of the ABS and the role of technology in accomplishing strategic goals.

In the same way that the early venture into email was successful with the Executive in 1986 then with the whole organisation in 1990, on most occasions each new platform or technology found for furthering the work and the ability to share information and knowledge has been introduced first to the Executive and distributed rapidly throughout the organisation when it has been experienced as
useful and valuable. This has lead to a wide-spread assumption that the ABS' KMI is technology-driven rather than strategically driven. This is not necessarily the case. Within the ABS itself there are different perspectives. One executive states that "by and large, the main things we've rolled out we've had a clear idea of what it is and how it's going to be used and what it's going to be for" (Exec #H2 KMI), while another replied to the 'which came first, technology or methodology?' question, “I suspect the technology. I think it was a case of looking at things like discussion databases and saying 'these look very powerful. How would we like to use them?'” (Senior Exec #H2).

The same person, however, identified of the previous technology and choice of new technological tools that "they weren't actually serving to really help people communicate and collaborate as multi-disciplined teams across locations. So we went in search of some" (Senior Exec #H2). This understanding is more consonant with the 'history stories' of the origin of the modern KMI which reflect that, although there is a technology focus, that technology focus is specifically to implement ABS strategy and meet organisational needs and goals.

Outside the Technology Division many personnel in the ABS were unaware of, or unfamiliar with, the KMI.

I don't think the vast majority of people who work in the ABS think of knowledge management at all. I don't think it's a term that they necessarily come across. And that doesn't mean that they're not working effectively within a knowledge management environment (Exec #S1).

However there was a very strong awareness of the technology used by the KMI and the effects it contributes to the functionality of the workplace. Whether aware of the name "knowledge management" or not, most personnel were very aware of the primary tools and the purposes of the principal KMI tools such as Lotus Notes®, Workgroup Databases and supplementary software such as Grapevine or Newspoint. Despite some suspicions among personnel against the TSD with fears that technology and technologists drive the working life of the ABS with a technological agenda, the personnel working within the TSD have a very clear focus that technology is simply a tool that is used to support the core business of the ABS and its key processes. "IT is the tool. We've just got to make sure that we don't
lose focus – it's the tool, not the end" (Knowledge Worker #A4 TSD). Other staff also have this understanding and appreciate it, both for the IT and for the KMI itself.

Knowledge management is one of the aspects that merely contribute to the outcome of what we're trying to achieve, which is a productive relationship. Without it, life would be extremely difficult, like it would be extremely difficult without a telephone or a car for example – it would make life harder. It might make it impossible. However, we're not in the business of being knowledge workers. It isn't why we're here. We're here to qualify this relationship. We're here to manage the relationship with our external/ internal clients (Knowledge Worker #S1).

It was common amongst the ABS staff to have a solid understanding of 'why we're here' and an understanding of the core business mission of the ABS and of their own department's work.

**TENSIONS AND CONFLICTS ARISING FROM THE KMI TECHNOLOGY**

Tensions and conflicts that have arisen in the ABS in response to the systems changes and technology implemented for knowledge management strategic purposes tend primarily to focus around two specific issues. One is a degree of suspicion as to the TSD / KMI agenda, as touched on above, and which will be discussed below in the section labelled "Strategy" and the other is the lack of a 'proper office suite' which will be addressed next.

The elimination of desktop word processors in the ABS was a strategic change undertaken for organisational purposes to facilitate (and enforce) collaborative work practices and knowledge sharing and capture throughout the organisation.

We removed the distraction of a word processor, where people were more interested in formatting than the information content, in many cases. So we removed that distraction by removing the word processor and saying 'no, you author your content into here’… They now did their work in what we call a KM environment, so it wasn't like they had to go to some special place to create information or knowledge. It was just part and parcel of where they worked (Senior Exec #H2).

It was a strategic decision that has, demonstrably, been effective. The CIO and the KMI team believe it has facilitated a primary goal in knowledge management which is to have a knowledge management environment that is an embedded "part and parcel of where they work" rather than a knowledge management project 'tacked
on' to what people are doing. It has saved time, money and effort in the elimination of "lone cowboys reinventing the wheel" (Exec #H4). In the past there had been many occurrences of duplicated effort as individuals all created an application or conducted work in the privacy of their own pc that someone – or several others – had already created elsewhere.

It is indicative of the need of many individuals to create and personalise programs and workspaces that, even after the elimination of the word processor and the introduction of Lotus Notes® and the collaborative work areas, the problems of redundancy and 'reinventing the wheel' would reoccur.

They'd say "oh, we can make Notes do this", so a lot of little applications sprang up. At one stage we had at least 9 [one per office] and probably more, room booking systems. All written in Lotus Notes, all written differently – independently – some of them cloned from each other…A lot of it is experimentation. And a lot of reinventing wheels… (Exec #H2 KMI).

Consequently much of the facility for independent application development or customisation of desktops was removed.

Originally we gave everyone the Notes Developer license and we provided quite a lot of training in how to construct the applications. And more recently – in fact I only became aware a couple of months ago as to how tight it had become – we only issued licenses to people on request after they jump through certain hoops (Senior Exec #2).

The ABS management and knowledge management team wanted to encourage and develop the innovation but remove the redundancy and wasted time and effort that were expended in so much duplication of effort. They also wanted to eliminate the loss of created knowledge when innovations were hidden in personal desktops and not shared with and fostered by the organisation.

There's another organisation that runs the same platforms that we do but has nowhere near the degree of innovation. Their CEO wants to have a field where there are hundreds of little flowers popping up everywhere and he describes it as 'germinating ideas'. But what happens is that all their ideas – the 'flowers' bloom and then they wilt and they die. Because there's no ability for the person to get that information – no data capture (Exec #H1 KMI).

The necessity for data capture of the innovative ideas and developments as well as the elimination of duplicated effort, are the principal drivers behind both the
elimination of office suites, and particularly word processing capacity, on individual
desktops and the reduction in freedom of personal application building in Lotus
Notes®. The KMI team identifies the collaborative work environment and
elimination of private desk space for individual (unshared) innovation and
development as an important component of the effectiveness and success of the
KMI.

I recoil in horror when someone tells me, 'oh you're the guy who's
behind this bloody Notes or something' – and you think, 'God don't
you love it. Let me convince you that you love it'. But they're in a job
where they don't have… they don't see a lot of the benefits I see. They
don't see a new Graduate coming in, and they don't see the eyes light
up when one day, 'gee I can access all this knowledge that might help
contribute to my project or help me in the next job – with some
understanding of what this job does'. They don't see that (Senior Exec
#H2).

Many of the knowledge workers who use the collaborative spaces (workgroup data-
bases) also express appreciation for the enhancement of their collaborative
knowledge environment. One knowledge worker who expressed herself at having
been dismayed upon her original encounter with the KM environment said that
now "I can't imagine life without it" (Knowledge Worker #S5). Another couple of
persons stated that Lotus Notes® were 'easy'.

And because I found it easy, I wanted them to find it easy as well. Once
you know where an icon is, you've got it. They had never really been
shown or taken an interest. So I've shown them some of the skills and
they say "but that's so easy, I didn't expect it to be so easy" (Knowledge
Worker #S3).

Nevertheless, a majority of the knowledge workers interviewed expressed
ambivalence or antagonism for the lack of a word processor and office suite. "Too
much of KM is tied up with Lotus Notes which a lot of people, including myself,
we're violently hostile towards Lotus Notes" (Knowledge Worker #H11). The
complaints were not (usually) against using the workgroup databases that were, for
the most part, accepted as valuable for others if not themselves. A particularly
fascinating aspect of this complaint is the fact that each worker does have an area
within Lotus Notes® that is called their 'personal holdings' – in other words an area
in which they can write, work, record and email in private. These were almost never
mentioned. Personal holdings provide privacy, or a non-shared area for work but
privacy is not particularly the issue. The complaints were specifically about the lack
of word processing facilities and the difficulties of interfacing with a predominantly Microsoft world outside the Lotus-based ABS.

We don't have a word processor for example. And it is so frustrating trying to draft something without a word processor... having to use the Internet because Lotus is terrible as a browser. Lotus 123 is terrible with anything to do with Excel... (Knowledge Worker #A7).

Very few personnel have permission to acquire a rare ABS ‘license’ to use either Microsoft Word or Excel for their work and they have to present a very strong argument to justify the acquisition.

Oh yeah. Well I use the two things [Notes and Microsoft] for different purposes. If I'm creating a complex document that's going outside the ABS I don't use Notes because it would drive me absolutely nuts. And it does drive people nuts who are here and have to do that sort of thing. Creating a report in Notes isn't a great deal of fun. You just don't have the flexibility that you have in a word processor (Knowledge Worker #A3).

As one knowledge worker who does have Word and PowerPoint for their external work has pointed out, those who do not have these facilities 'are driven nuts' using Notes® instead of a word processor:

Lotus word processor power is very basic. There's not much you can do in the way of formatting... the Web Browser¹ fails all the time. It can't handle Java, and these days, everything uses Java (Knowledge Worker #A8).

Sometimes the focus of complaint was on the inadequacy of Notes, other times on the frustration of not having freedom of choice about which applications they used.

what I don't get is access to the decent tool for the job. Either because it won't work with Notes or it won't be entertained... the results of a Lotus Notes environment, has been to close down all the software and technical options... In an ideal world, we will be able to use other tools, which we can't, because we've got Lotus Notes (Knowledge Worker #H10).

Sometimes the complaints were not specifically about lack of access to Microsoft products but against upgrades within Lotus Notes® that appear to have worked against the freedom to tailor the Notes® to personal preference or, sometimes, simply a reduction or change in preferred facilities.

¹ In 2003, after all interviews for this study were completed, the ABS facilitated an Internet Explorer interface to the Lotus platform, which has adequately addressed many of these complaints, particularly those relevant to the browser
We had an actual proper electronic catalogue on our workgroup database that had keywords and categories and locations, and everything in it... Notes 5 upgrade killed it. I want my catalogue back (Knowledge Worker #H11).

The most frustrating thing with our technology platform is when we start feeling like they've got it right, they'll change it. Every two, three years, they'll come through and they'll revamp something. Something that worked before; something that isn't working; things that you used to be able to do; things you can't do...So that's more frustrating (Knowledge Worker #A20).

Ironically, these last complaints were shared by the TSD themselves who held Lotus responsible for the unhappier upgrades. One such complaint that was repeated in several departments was the loss of a desktop workspace through a Lotus upgrade.

Lotus – they really stuffed that up. They just didn't think through the workspace and how the customers would make the transition to the new arrangements and then – My understanding is they came under last minute, and very heavy pressure to keep the workspace which now no longer really works. And I think that's a problem (Senior Exec #H2).

Because the ABS, as such a long-standing customer of Lotus Notes®, often shares in the development of new Lotus software there is often confusion amongst ABS personnel who assume that the ABS TSD is responsible for Lotus' errors. In fact, the TSD are frequently responsible for ameliorating such problems rather than creation of the original problem.

Despite the antagonism and the yearning for lack of office suites and Word Processor capability amongst many of the knowledge workers the implementation of the deliberately collaborative environment has worked and effectively provides shared workspaces for innovation and knowledge sharing.

Who do I know who doesn't like Lotus? Most of the people that have got to interact with the outside world! (Laughter) When I first came into the environment, I didn't. Especially creating documents that you wanted to – multi numbering/multi layering numbering them, and that you can't do in Notes, it's just too hard. So I was one of the ones that complained bitterly (laughter) about not having it. But after having been here three years, you certainly appreciate the reason for it. And I don't think the ABS would be where it is now, with its technical solution knowledge enabled, knowledge enabling, if they didn't go down that Lotus Notes path (Knowledge Worker #A5 TSD).
Although many non-TSD personnel suspect that TSD and KMI decisions were technology-driven, the leadership in both the TSD and the KMI recognise that strategy was the foundation upon which to build knowledge management just as service and support of core business functions were the goal of knowledge management, information systems and technological services.

**Strategic KMI**

Critically, the ABS' strategic planning and knowledge management planning both share the same focus as the ABS' core business function. The official knowledge management Strategy states under "Vision":

The ABS Mission states that the ABS assists and encourages informed decision-making, research and discussion within the community. The ABS knowledge management Strategy seeks to encourage those same principles within the ABS. (ABSMM/2000/3 (Oct) Att. 05.E.03).

This official ABS knowledge management Strategy at once makes it clear that the role of knowledge management in the ABS is to support the primary purposes and goals of the organisation. The Knowledge Director referred to the results of a Delphi™ audit that revealed that the Technology Service Division staff were more responsive to the concept of knowledge management than staff in 'subject matter areas' such as the Population Census Group or the Large Business Unit.

We are the support services, not the core business of the ABS. We drive innovation and creativity but those other people have to keep their eye on the ball because they can't afford to be wrong. But we work for them. They don't work for us” (Exec #H1 KMI).

Through the process of the interviews it became clear that the majority of persons working with the TSD were more aware of the strategic nature of the KMI than many of the subject area staff. Some staff members are aware of and consider some of the processes and appreciate the strategy they recognise. Other staff members, however, are suspicious of the TSD and assume that all technological and KMI initiatives have been enforced upon the staff without thought or strategy to suit the preferences of the TSD "who really don't care about your needs" (Knowledge Worker #H9).

Nobody's interested. Not your problem – you've got to pay for it. It's typical of the approach of TSD… The IT Division also has a very clear view of its job, its role, its mission – and it's a patronising approach to
its users. So from where I'm sitting, I'm just another pawn in the TSD 'we'll decide what's best for you'. And that comes over very strongly in many of the Bureau's technical decisions and directions. Like a lot of people, I resent it bitterly (Knowledge Worker #H10).

TSD as a division is seen, basically, to take everyone's money without providing any benefit (Knowledge Worker #H11).

This is recognised within the TSD as a reasonable degree of "jealousy between certain members of other divisions and TSD because we make our money off a client… we're a cost neutral division" (Exec #A2 TSD). Other divisions have to pay TSD for each PC, laptop, application, developer time: "It even got to the stage where you were paying for the amount of CPU time… We charge for about twenty-two different infrastructure services" (Exec #A2 TSD). Volume of email is charged for, and the PC on the desk is charged at three different levels – the physical box, the network component and the technical support. "So all in all, TSD are seen by other people as a bunch of leeches" (Exec #A2 TSD).

Yet despite the sometimes-negative view of the TSD and the services they provide and consequently negative feedback, the TSD are mostly confident that their work is strategically designed, particularly those personnel who have been in the TSD long enough to be aware of deliberately incorporated changes. "What we were really trying to do was influence people's behaviours and encourage them to work a certain way rather than just deploy a technology" (Senior Exec #H2 TSD).

When appointed to the position, the current Knowledge Director of the ABS investigated a number of methodologies and means of direction-setting and measurement to help determine and clarify KMI strategy before embarking on any particular course of action, particularly action that involved systems or technology changes that impact on the organisation. After an extensive research process he determined that the KPMG model\(^2\) was the measurement and directive methodology he would employ. The ABS understanding and use of the KPMG

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\(^2\) The KPMG model was acquired through extensive reading, not through the normal method of consulting with KPMG, and is the Intellectual Property of KPMG, which has given ABS permission to cite their model with this disclaimer.
model is best understood as published by the Knowledge Director in a case study book by Standards Australia:

ABS currently describes its approach to KM using a model developed by the UK arm of KPMG. In its fuller form the KPMG model describes knowledge acquisition as a ‘journey’ through a number of levels, from ‘chaos’ through to the development of a ‘knowledge enabled and managed’ organisation capable of developing to a point where its knowledge systems completely sustain the business (see following table 5-1).

<table>
<thead>
<tr>
<th>KPMG term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Knowledge is left to its own natural processes, with the inherent problems associated with chaotic</td>
</tr>
<tr>
<td>aware</td>
<td>this; ad-hoc information storage, difficulties with access and retrieval, incompatible systems, processes for collecting information may be ineffectual or non-existent and people may be reluctant to share information.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>The organisation understands the need for managing knowledge and is actively planning enabled</td>
</tr>
<tr>
<td>enabled</td>
<td>for, or evaluating systems. There may be a pilot underway.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>A number of early, ‘stand-alone’ initiatives are managed</td>
</tr>
<tr>
<td>managed</td>
<td>under way.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>A comprehensive set of initiatives is underway;</td>
</tr>
<tr>
<td>centric</td>
<td>There is a fully implemented and integrated ‘knowledge system’ supporting the business – turning knowledge into value in the fullest sense.</td>
</tr>
</tbody>
</table>

Table 5-1: KPMG model of knowledge management used by ABS

ABS considers it is currently operating between ‘knowledge enabled’ and ‘knowledge managed’. There is a comprehensive set of KM initiatives in place, underway and in development. ABS is seeking to achieve a position somewhere between ‘knowledge managed’ and ‘knowledge centric’ but we acknowledge that the concept of a completely ‘knowledge centric’ organization may be Nirvana (Chatwin, 2002, p. 17).

The Knowledge Director of the ABS considers this to be his key methodology when approaching knowledge management even though it does not prescribe the direction of knowledge management, specific strategies, or tactics or tools to be used but allows the user of the model to determine these. This model’s strength is allowing an identification of the level at which knowledge management is present in an organisation and – for the Knowledge Director – a measure of the degree of success to date in knowledge management implementation and need for future planning. As stated in the article above (Chatwin, 2002) the ABS KMI consider
themselves to have accomplished the stage of ‘knowledge enabled’ and to be working toward ‘knowledge centric’ even while determining that perfect knowledge centricity is not possible. There is a commitment to strive toward that mark so as not to become complacent about success and fail to achieve in the future or to continue to grow to meet new challenges.

Although the TSD and its KM unit celebrate achievement they are not complacent about their success.

I'm convinced in my own mind that the knowledge management in the ABS is not as successful as some people think it is. Technically, it's very good – there's no issue with that. But….Victoria had a very strong push to push people into workgroup databases rather than using their personal e-mail. And you notice the language of the e-mails changed. It became less personal. There was less sharing of ideas within the e-mails. They became more formal. And those that still use personal e-mail still use emotional words and things like that, when they're e-mailing. So that sort of got me thinking (Knowledge Worker #A5 TSD).

Satisfaction or dissatisfaction was fairly equally divided between technology inadequacy, and in personal responses and interrelationships and the communication processes about the technology and the strategic relations and purposes of the technology.

I feel as though our division, from a technical point of view, is driving KM too much with technology. I'd rather see a culture within the organisation for people at all levels, across all client groups, understanding the concept and embracing it in such a way so that we don't have to try and explain to people what we are trying to achieve, each time we come along with something (Exec #A2 TSD).

Different TSD and KMI personnel have diverse visions for what next needs to be improved or developed in the ongoing improvement of the TSD and KMI support to the ABS’ core business.

It's the capturing side that I'm concerned about. You know, the initial capture of knowledge rather than… I think we do a very good job once we've got it. Manipulating it and pushing it out and showing people where it is. I think that works very well. It's actually getting it [that needs improving] (Knowledge Worker #A5 TSD).

Despite the awareness that there is still more to be accomplished and areas that still need to be addressed, the ABS personnel working in the KMI and the TSD are
conscious that what they have accomplished is still impressive and significantly more advanced than that accomplished by many other organisations.

We’ve got something in practice and operating and working and which is integrated into the daily life of the organisation. Whereas what I see in a lot of other organisations is an attempt to try and bring in another piece of technology or another system, and to try and buckle that on to what they already have, without any ability to do it. Because it won't become part of their culture (Exec #H1 KMI).

This returns the focus of this study to one of the other key factors discussed previously – the role of culture in the successful implementation of the KMI. The ABS KMI takes an unusual attitude to the comparative roles of technology and culture.

The role of technology in KMI? It's an enabler. But it can lead to cultural change, too. We’re an organisation that argues that you can use technology to achieve cultural change. A lot of other organisations say you can’t do that. I think we've proved you can (Exec #H1 KMI).

This may seem contradictory to earlier statements that the ABS already had a culture conducive to the KMI but there is a degree of justification for this claim. The ABS already had, as has been stated several times above, an established written culture with willingness to document and a friendly environment with a willingness to help one another. What the KMI-introduced technology has accomplished within this culture is the additional willingness to share information and co-create knowledge in the collaborative environment of the Lotus Notes® Workgroup Databases.

Because the degree of success of the ABS KMI is a fairly rare story in KM circles various factors are considered and evaluated as reasons for success. Some have already been discussed in this first order analysis. First, there are the factors pertaining to culture or, as the CEO put it, “the right mix between culture and enabling technology”. Second, there was the combination of strategic planning and evaluation and the ability to follow through effectively with a unified effort by the whole organisation.

Gartner would call us an "innovative creative organisation" and yet we never take the first version of something. So we’re not bleeding edge. But what we do is we bet on the things that we have evaluated and have analysed and are confident can actually be implemented. And when we do, we are very good at putting the weight of the organisation
– the weight of the process – behind it, to ensure it occurs (Exec #H1 KMI).

The third significant factor was the identification that 'success breeds success'. The original efforts in the KMI were expensive:

There was a massive retooling of hardware because of the way in which the technology just revolutionised the ability of the organisation to work. So in a sense it cost us lots for the technology. But what it did from another sense was absolutely revolutionised our productivity. And productivity gains in the early '90s towards '93 - '95 were massive (Exec #H1 KMI).

The critical factor in this story was not "it cost us lots" but rather that the "productivity gains...were massive". Conspicuously successful return on investment (ROI) established a trust in the worth of KMI investment. This early success factor with conspicuous ROI has created an organisational environment in which the KMI has more latitude and more purchasing and implementation capacity due to an established trust factor than is the norm in most organisations. It is a rare case when a Knowledge Director can say, as at the ABS, "I've never been questioned as to 'why would I go in this direction?' As long as there's a clear goal to improve the environment and you can see that return on investment" (Exec #H1 KMI).

**SUMMARY OF FIRST ORDER ANALYSIS OF THE ABS KMI STORY**

The Australian Bureau of Statistics has a reputation for the successful implementation of their knowledge management Initiative. There is a pride in the accomplishments of the KMI which is founded on an established pride in the ABS itself as "the world's leading statistical agency". This has contributed to the creation of an established culture empowered toward knowledge management goals such as knowledge sharing and collaborative co-creation of knowledge and information within an information- and knowledge-intensive organisation. As information is the core business product of the ABS, much of the knowledge management initiative is information focused as well as, or instead of, knowledge focused. There is a strong technological support base for both information and knowledge management and sharing with a well-developed Lotus Notes® Workgroup Database environment to support the KMI. The technology and the strategy initiatives that drive the technology are both appreciated and resented within the organisation. Many advantages accrue to the technologically supported KM environment that personnel
recognise and appreciate. These, however, are balanced by the necessary compensations, such as loss of a normal office suite, that are part of the cost of the collaborative Notes® environment. Despite such resentments the KMI and the technological environment used to support the KMI for core business purposes are perceived as a success both internally within the ABS and externally by other organisations. Improvements are still (and always) sought but there is a confidence within the ABS that their KMI is a powerful example of how strategically planned and technologically supported knowledge management methodology can be implemented successfully. For the purposes of this thesis, this highlights the value of knowledge management and knowledge management methodology to furthering success in systems and technological change.

A SENSEMAKING APPROACH TO THE ABS CASE

In this second half of Chapter 5, 2nd order analysis using sensemaking theory, as developed and explained in Chapter 4, is applied to the events of the Australian Bureau of Statistics' knowledge management initiative to give clarity and understanding to the processes and events of the ABS KMI.

This part of the chapter will follow the same events as the first half of the chapter in the same order so the flow of analysis will start with considering the origins of the KMI particularly considering the role of the ABS leadership in vision and drive in the development and maintenance of the KMI. Next the culture will be explored, particularly examining why the culture could be considered conducive to an effective KMI implementation and looking at the friendliness and knowledge sharing; pride in and loyalty to the organisation, and the distinctive trust factor exhibited. Strategy will then be discussed with particular emphasis on the role of technology in supporting and driving strategy in the ABS KMI. Tensions and conflicts that arise from the KMI and the effectiveness and the role of strategic planning for the KMI will conclude the analysis. The end of the chapter will summarise the findings and conclusions drawn from the analysis before proceeding to a parallel study of the University of Eastern Australia in Chapter 6.
ORIGINS OF THE KMI INITIATIVE

LEADERSHIP DRIVEN AND TOP-DOWN

What is apparent in the original rollout of new technology is that, while the Deputy CEO ‘forced’ the use of the technology he wanted used, which could be viewed as a move made within the confines of a generic-subjective point of view and method it was done within the Deputy CEO’s immediate circle of social interaction. Essentially there was a move on the part of the Deputy CEO to create a new set of embedded knowledge and routines with the new technology but it was done originally on a small scale within the smaller boundaries of an immediate intra-group set of social interactions for the specific purpose of facilitating collaborative knowledge sharing and offering the potential of collective mind. Because this was successful it moved intra-group in a series of inter-group adoptions so that eventually the embedded knowledge and routines of the Executive organisational structure had changed and all executives were using the collaborative software collectively. Because of the incremental introduction, always only to a small group at a time, and precipitating a desire to ‘have’ in the ‘have-nots’ who saw the effective implementation that had not yet been granted to them, this was an extremely painless rollout of a new technology, meeting less resistance and achieving greater successful take-up than is usual in an organisation responding to a coercive move imposed from the generic-subjective level.

This method of rolling out a new technology for strategic purposes established something of a precedent within the ABS so that other new technologies such as Lotus Notes and organisational behavioural changes such as collaborative documentation through databases were rolled out incrementally based on first an intra-group then inter-group acquisition on a progressive scale from small group to whole organisation. Consequently the KMI had a gentler and more effective implementation rollout than is the norm in many organisations despite the fact that the rollout and use of the new technology was actually mandatory.

We’ve always had a very corporate governance of IT in that people in ABS don’t have much choice about what platforms they use, what software they use, because the organisation always said "we want a consistent IT platform across the whole organisation. We don't want pockets using some bits and pockets using something else."… So it's not something people have had a choice over whether they use it or
not. Basically it was a case of "this is what ABS is adopting and let's all start using it" (Exec #H2).

Resistance was, and still is, encountered as is discussed below in the segment "tensions and conflicts" but such resistance is minimised and effective implementation maximised by the carefully orchestrated rollout through the social interaction level utilising existing groups and communities of practice.

**KNOWLEDGEABLE LEADERSHIP**

Because of the uniformity of application and the fact that the technology was rolled out first to the senior executive level this also ensured ongoing CEO support even after the original CEO left as each new CEO was promoted from the ranks of the senior Executive. When the current CEO was appointed to the role of The Australian Statistician, the responsibility for the KMI had for some time been given to the Technical Services Division with a specifically appointed specialist in the role of Knowledge Director. This meant that the CEO was not as directly familiar with the KMI as a knowledge management initiative as previous CEOs had been, knowing it simply as the technology base upon which the ABS functioned. However he was familiar with the history of the technological implementation, familiar with the technology, and consequently able to grasp the nature of the KMI when it was explained to him in the degree required for him to adequately represent the KMI in delivering a paper on behalf of the CIO. The shift that occurred in the CEO's understanding of the KMI highlights an interesting aspect of the corporate culture within the ABS. While it is the norm within an organisation for a CEO to be unaware of the knowledge management initiatives implemented and their causes, value or effect, it is not, perhaps, so normal for the CEO to be so approachable. That the CIO felt comfortable requesting that the CEO speak on behalf of him and the knowledge management initiative demonstrates the awareness of senior leadership and a culture that makes believable the CEO's statement that "we're one big family". There are layers to this approachability when it is remembered that it had been said originally of the CEO that:

I know that [the CEO] earlier this year when asked by another couple of organisations about whether the ABS was doing knowledge management, said "oh no, I don't think we're doing anything at all". Yet what underpins everything we do in this place is knowledge management strategy (Exec #H1 KMI).
Having the confidence to let the CEO speak on behalf of the KMI meant trusting the CEO to be able to take on new information, recognise and change a degree of ignorance about his own organisation, and learn new knowledge from junior executives to then impart externally on behalf of the ABS. A number of personnel had stated that the CEO had an impressive degree of authority and respect. "And our loyalty is to the Statistician, too… you are responsible to the Statistician, not to the government, as such…that loyalty goes past when you leave the ABS, it's for your life"(Exec #H1 KMI). Yet it was possible to approach this CEO and request that he learn about and speak on behalf of the KMI. This signifies a culture of trust and of respect for the individual and particularly trust in the leadership and the CEO specifically that is noteworthy, as it overrides the more normative formalism of the generic-subjective level and must contribute to the climate that shaped the conducive extra-subjective culture that is part of the success story of the ABS KMI.

**Conducive Culture**

Several aspects of the ABS culture were discussed in the first half of the chapter. They include the long-standing nature of the culture, strongly built upon the longevity of careers in the ABS and founded on faith in and commitment to the ABS mission. This implies a culture that provides for and is compatible with individual needs, drives and desires. An organisational culture develops through the interactions of individuals and groups within the framework of organisational decrees and processes. For an organisational culture to be so people-friendly that it engenders the kind of trust displayed by the ABS personnel requires either that the rules, regulations and decrees stratified from the generic-subjective are extremely people-friendly and compatible with the extra-subjective or that the leadership and management are understanding and sympathetic in their interpretation and operational application of the organisational structure at inter- and intra-subjective levels. As the ABS is a government organisation restricted to Public Service policies there is reason to believe that both of these cultural determinants are in effect.

The Australian Public Service (APS) has a strong reputation for the care and treatment of employees. However, accountability to taxpayers requires a certain stringent inflexibility in policy making and adherence. Within the ABS itself individuals in similar circumstances perceive certain cultural aspects of the ABS so
differently that they might be talking about different organisations. Making sense of such contradictions within the same framework suggests that the differences originate in the local leadership within the organisation and the interpretation and application of both ABS and APS policies within the small segment of the larger organisation. Thus friendliness, willingness to help and share information, possibilities for promotion and lateral moves around the organisation must all be permissible within the generic-subjective framework of APS policies and encouraged and nurtured by the various levels of leadership within the ABS organisational structure. Consequently, as new staff members are recruited into the ABS they find themselves welcomed into a friendly, sharing and free-moving organisation. They then become part of a working environment of social interaction within that extra-subjective climate and thus become a part of the ongoing culture in their daily interactions and the manner in which they themselves then welcome and treat newcomers to the organisation. This continues in the way in which they lead as they are promoted to management positions themselves. The story of the CEO depicts this kind of framework as it is evident in his decision-making and behaviour as well as in his words, "We've been a strong organisation for some time – for at least thirty years. And the succession of leadership teams have also been regarded as quite important to remain a very strong organisation…" (CEO) that this is the manner in which he learned and within which he worked throughout the years and now continues and develops as the CEO.

There is also a long-standing culture of willingness to document as part of the process of meeting the ABS mission goals. "We're in many ways, a written culture" (Senior Exec#H2); "Well our culture is right… There's a willingness to document things" (Senior Exec#H1). This willingness to document and habit of doing so provides a solid foundation of information management to support the more complex tasks of knowledge management. Because the primary knowledge management tools in the ABS KMI are technical and, most specifically the workgroup databases, the habit of consistently documenting work within the databases almost guarantees an effectual implementation of that aspect of the ABS KMI methods for knowledge management. This is still not universally adopted as the Executive and KMI team recognise and more than one knowledge worker admitted in confidence:
our team we tend to not use [the workgroup database] probably quite as much (laughter)…as we should do…a lot of the work we do we write on paper, put it in folders, have printouts of stuff so a lot of the data that we have…well these documents and stuff they’re hard copy rather than in the database. We don’t always document all the stuff we do. We leave it in the scribble format. (Laughter) I think it’s because a lot of what we do, it’s not in words. It’s not like we write down a description of what’s going on. For example, what I’m doing at the moment – it’ll look like a page full of numbers with arrows and a little table here….your thoughts and stuff. It’s very informal. And that can – particularly because I’m working on stats where it can be a lot easier to follow than having to try and type it up and formalise it. Especially because then once you’ve put it in the document, you’ve sort of got to explain what you’re doing… (Knowledge Worker #A12).

So there is a certain degree of reluctance to work in the database (more a concern of ‘too much effort’ or ‘not ready yet’ than ‘don’t want to share’). Nevertheless, for the most part work is created and stored in the shared database. Although there is still a long way to go before everyone puts everything in the shared databases the ABS is confident that they have already achieved at individual and social interaction level a higher degree of compliance with generic-subjective policies in knowledge sharing, technology use and KMI directives, than is the norm in organisations as reported in the literature and by their peers at conferences.

Other aspects of the culture of the ABS that is so conducive to effective KMI implementation include a family-like friendliness, willingness to share knowledge and information, and pride in and loyalty to the ABS linking strongly to the commitment to the ABS mission, mentioned above. All of these are founded upon and expanded by the trust that seems to be a long term and ongoing aspect of the ABS culture. The culture of trust has been discussed above, as has the willingness to document and share. The other aspects will be discussed in detail below.

An unusual aspect of the culture of the ABS was that many of the ABS personnel share a conscious awareness of the culture of the organisation. Organisational culture is commonly regarded as being the largely unarticulated and even unaware background environment of "how we do things around here" in an organisation. It presumes a commonality of assumptions, attitudes and behaviours and is the foundation of communally created understandings that are rarely specifically identified and nominated. In the ABS, however, the specific aspects of the culture
are recognised, acknowledged, and identified as the root of certain behaviours, attitudes and habits. Some of the specifically identified aspects of the culture included an environment of trust (discussed below), pride in working for the ABS (also discussed below), the longevity of career spans within the organisation and the freedom to move jobs within the ABS, and the friendliness, helpfulness and openness of the personnel who work at the ABS. A culture of friendliness, helpfulness and openness that facilitates knowledge sharing is one that needs to have been built, supported and maintained on all four organisational levels not just the extra-subjective or cultural level. Knowledge sharing requires that each individual be willing and comfortable with sharing their own knowledge and receiving support and shared knowledge from others. For this to be possible there needs to be an environment of support for inter-personal relationships and inter-personal sharing at the inter- and intra-subjective levels, as discussed above.

Within the ABS it was evident that, apart from some animosity directed toward the Technical Services Division (TSD), which is primarily related to the corporately mandated position that sections must pay for their IT services, there was for the most part a degree of friendly inter-departmental comfortability and mutual respect built upon a network of relationships possibly created by the regular interchange of personnel as people within the organisation moved positions, jobs, departments and divisions quite regularly. Each person interviewed demonstrated an ease and friendliness, even a tight-knit cohesion, with the team of their current position. They equally communicated the same kind of ease and friendliness with previous teams from previous positions, some persons dropping quietly amused comments about "our networks" [of contacts from previous positions] as a more reliable means of keeping up with intra-organisational news and events than the official channels. Significantly, on a couple of occasions, individuals chose not to be interviewed alone but brought team-mates with them, creating a situation of joint-interviews in which teams demonstrated the kind of closeness that might be considered indicative of the regular exercise of collective mind. In one such instance, team members frequently left sentences unfinished, as half-communicated thoughts were adequate for understanding between each other. Sometimes, as demonstrated in interviews of two different teams, team members would finish each others' thoughts and sentences. More frequently, they would partially state the
first half of a sentence and allow the rest to be understood, unvoiced, by their teammates. Their mutual understanding and heedful interrelating was so strong that the interviewer was able to follow and comprehend the meaning of these elliptical half-sentences at the time and in the presence of the persons communicating so fully on a relationship-based intuitive process. However many parts of the transcripts of those interviews are incomprehensible to a reader who was not in the room and participating in the camaraderie and mutual comprehension shared between such a tight-knit community. Similar relationships and mutual communication patterns of heedful interrelating were observable even in off-task occasions in-between interviews in staff-rooms, hallways and over lunches.

Such attitudes and behaviour in intra-group and inter-group relationships are indicative of comfortably experienced communities of practice that were evident in tighter terms of immediate practice (the smaller teams) and in the larger scale terms of interrelated practice of groups or divisions. There was also a communication of the whole ABS organisation as a community of practice of statisticians. Such sense of community must equally contribute toward and be derived from or supported by an extra-subjective cultural environment that stimulates and encourages friendliness, openness and sharing. Similarly, for persons to inter-relate and behave in such fashion there must necessarily be a climate in which individuals are respected as individuals and individual contributions are acknowledged and important in the inter- and intra-subjective development of team-created knowledge work. The degree of heedful interrelating observed between team members requires that each team member be willing to subordinate self to team needs, comfortable with the knowledge that they are an important part of the team that they represent, and that their contributions to the team are important and valuable (Weick & Roberts, 2001). This confidence and comfortability were transparent among team members who were interviewed in both their confidence to speak and their interrelationships between each other. At the generic-subjective level this openness and freedom for sharing and friendliness is facilitated by the policies that permit and encourage freedom of movement from job to job (staffing, promotion and recruitment policies) and provides a collaborative environment that both permits privacy (in each worker's 'personal holdings') and encourages interdependent co-creation of
knowledge when working in teams (knowledge management policies supported by enabling technology) (Cecch-Kecmanovic, 2004).

A less positive aspect of the culture that was raised by some employees was an implication that there is a different level of protection and privilege accorded personnel in "lower level" work than is accorded to the knowledge workers. When asked about this, one executive stated that "[that person] probably doesn't have any real chance of promotion or moving around, because of not being a graduate. There just aren't as many opportunities" (Exec #A2). It would appear that many of the opportunities and encouragements available to staff in the ABS tend to favour graduate employees and be less available to non-graduates, or 'grads' and 'non-grads' as they were most commonly named. Making sense of such an attitude and behaviour within the overall communication of the culture of the ABS, there are a couple of possibilities that might explain this aberration within the overall climate. One possibility is that the limited possibilities for non-grads are true of that particular location, or regional office, of the ABS. This could be due to mechanical facts; one disgruntled non-grad said: "I'm at the factory end, as it's referred to in the Bureau, and there are no other factory ends in this office anyway that you can really slot into" (Knowledge Worker #A20). If the limitation is simply one imposed by the mechanical realities of available jobs and requisite qualifications then it is not a cultural issue except, perhaps, within the realm of how the organisation supports and encourages personnel who are in such a discouraging situation. Equally, the limitation could be imposed by a stricter following of staffing policy in that regional office and a looser and kindlier interpretation in other offices in which case the cultural differences in that one situation would be specific to the leadership within that one area. A third possibility is to perceive the issue as one originating not so much at the level of organisational structure with policies and leadership implementation 'at fault' so much as considering the individual level and the perspective, habitus, attitude and behaviour brought to the situation by the individuals in question. Any of these three possibilities could reasonably explain, for example, the difference in responses of two 'lower level' employees. One employee considers himself a knowledge worker within the ABS and the other does not, the first of whom is excited about promotion possibilities within the ABS and the other
who sees no promotional opportunities at all, and of whom an executive said that promotional possibilities probably did not exist.

Overall, considering the culture of trust in the daily working environment of the ABS, this feature is not simply to be understood by sensemaking at the extra-subjective cultural level but is created, as has been shown above, by a complex interweaving of trust and trustworthiness at all four levels. The continual lateral movement around different positions within the ABS creates networks of friendship that break down many of the more normal divisional barriers within organisations. The aspect of work that is so group-based fosters strong intra- and inter-group relationships greatly facilitated by the work-sharing practices enabled by the workgroup databases. The organisational structure, reflecting both APS and ABS concern for employees, and particularly the common ABS practice of leadership-led innovation and rollouts, with Executive concern that staff have powerful enabling tools for speed and clarity of communications, all contribute to a climate of trust within the organisation. The generic-subjective policy clearly values and enhances that trust as is demonstrated by the openness of the databases, including executive levels, and the policy decision to allow databases to be left open and 'secured' only by being labelled 'confidential'.

STRATEGY AND TECHNOLOGY

TENSIONS AND CONFLICTS ARISING FROM THE KMI TECHNOLOGY

Technology is a critical factor in any discussion of the ABS KMI. Most members of the TSD and the KMI focus much of the credit for the success of the KMI on the technology they have provided. Strategic technology choices, powerful technology platforms and careful technology upgrades are all seen to be the critical factors that have created the successful knowledge management environment for which the ABS is renowned. Similarly, however, most conflict within the ABS focuses on the technology.

The one consistent and widespread source of discontent or conflict in the ABS was centred on the lack of a 'normal office suite'. Particular complaints were the lack of Microsoft access and capabilities and the continual removal of desktop customising capacities with each new Lotus® upgrade. The Microsoft-specific debate has
several issues: the lack of a 'decent word processor', the weakness of the web browser (which has now been addressed with the introduction in 2003 of Internet Explorer into the Notes® platform) and the frustration of dealing with Lotus Spreadsheets when interacting with external agencies that use Excel. At an executive level, a strategic decision was made to enforce generic-subjective work practices that facilitate knowledge sharing and document it in an electronically collaborative process that is transparent and 'capturable'. This serves many organisational purposes. The use of workgroup databases captures the previously undocumented processes of knowledge co-creation and permits rapid and easy information access from creation to production for the entire organisation. Information management is served as well as knowledge management. At a social interaction level the workgroup databases enhanced collaborative work for local and geographically-dispersed teams. On an individual level, however, there are contradictory effects. The individual's ability to collaborate with colleagues is facilitated by the introduction of Lotus Notes® whilst there is a widespread perception that their own work is debilitated by the lack of capacity to tailor tools to their personal needs or at least employ 'adequate tools for the job'.

The tension here is specifically between the generic-subjective level and the individual intra-subjective level. At first the issue could be understood as one of functionality. However, dissatisfaction attributed by individuals to the elimination of the word processor and its functionality may have been conflated with individuals' need for personal control to tailor their immediate work environments. These are separate issues that need to be distinguished, for each have different implications for organisational action.

At the individual level, there are those knowledge workers who claim that they struggle with their lack of "a decent office suite" (Knowledge Worker #H1). Yet several members of the Executive expressed their ability to perform all the functions that knowledge workers complained were inaccessible to them on Lotus Notes®. How then can sense be made of these conflicting viewpoints? Either the executives fail to understand the work needs of the knowledge workers and therefore are mistaken in assuming that the necessary functions are available to all individuals or the executives are correct about the functionality of the program and
the individual knowledge workers are unaware of the range of functions available to them. If the functionality which the individuals identify as needed but absent through the loss of an office suite are actually available to them on the Lotus® platform then training that identifies those facilities and empowers the individuals to use them might do much to redress the individuals' grievances and the organisation's losses. The ABS has an extensive training program but as this has not been specifically geared to address this particular issue this possibility for training to address these tensions has yet to be explored.

Another frustration with limited functionality was illustrated in relation to the catalogue of keywords and the 'upgrade' that changed the desktop interface. Senior Executives considered this as a problem originating beyond the ABS' control in the Lotus® upgrade. From an executive point of view generic-subjective complaints about lack of functionality and work effectiveness need to be considered and evaluated. If inadequate tools genuinely hamper workers' productivity then both time and resources are being wasted. The removal of the office suite was designed to improve efficiency of time and resource usage, not to be detrimental to productivity.

However, the tension between two sensemaking levels, the individual intra-subjective and the generic-subjective level, is underscored by elimination of the word processor. The desire for personal control to tailor the immediate desktop work environment continues to be an issue for many at an intra-subjective level. Yet this 'experimentation' and 'tweaking' that may lead to new processes and products are mostly incompatible with the system as required by the generic-subjective and strategic goals as they also lead to 'reinventing the wheel' by 'lone cowboys'. The need for creativity and innovation to take place in workgroup databases is an organisational need to capture data, information and knowledge as it is created and stored and not to allow it to be lost or untapped in personal work spaces as well as a need to ensure collaborative co-creation of knowledge. The need for personal space to play, experiment and express oneself is a conflicting need on the part of knowledge workers who stated their requirement to build a supportive desktop environment to feel free to function creatively and expressively. "I remember our previous version where you were allowed to change the colours and
stuff of Memos and you can't do that any more" (Knowledge Worker #H3). There is inherent conflict here in that freedom to tailor the immediate environment also means the freedom to create in isolation, potentially losing knowledge sharing, knowledge co-creation and opportunities for knowledge 'capture'; the recognition, codification, storage and distribution of valuable new knowledge. Yet the inability to create a personally intuitive, supportive and workable workspace can inhibit the creativity of the knowledge worker who is the source and wellspring of the knowledge creation processes in collaborative spaces. This issue needs to be balanced against the knowledge that all personnel have 'personal holdings': desktop and server space where they can, indeed, create and work in privacy, as personal holdings are not shared work spaces. Yet these personal holdings seem to be rarely used and were rarely commented upon by staff. Those staff members who complained about the KMI technology's lack of word processing and other capacities and against the Lotus® upgrades that removed desktop customisation control did not perceive their personal holdings to be germane to the problem. Thus privacy would appear not to be an issue in this struggle between individual intra-subjective and organisational generic-subjective needs.

**Strategic KMI**

A critical factor in the success of the KMI as an initiative to support the organisation's core functions is that the strategies underlying the initiative are harmonious with and supportive of the strategies lain down as foundations at generic-subjective level. The knowledge management Mission Statement is almost a verbatim duplicate of the organisation's Mission Statement. It does, in fact, state that the Mission of the KMI is to support the Mission of the ABS. The understanding that "we work for them, they don't work for us" is a critical concept in the ability to design, develop and maintain a KM initiative that will support core business functions rather than become a purpose in itself. This understanding is clearly demonstrated in the KMI Initiative and in the attitudes of the staff members responsible for the KM program. The harmony of strategic planning and design for the generic-subjective level from executive to divisional and departmental level reflects, again, a harmonious extra-subjective culture as well as careful strategic design at the structural level that takes into account the inter- and intra-group level and reciprocal courtesy as intra- and inter-group levels conduct themselves in
harmony with organisational policy. Even the friction and conflict that is aroused by the staff dissatisfaction with certain technological limitations imposed at the generic-subjective level by the Executive does not seem to disadvantageously affect the production of core business processes.

The one area in which trust is lacking inter-group is the suspicion expressed by several departments against the TSD. There is less or no suspicion among those individuals and groups where there is an awareness of strategic planning and the value of the KMI strategies to the core business processes affected in the individual's or group's division. Where strategy is not visible or not particularly relevant to the division or group then the KMI policies and their consequences are regarded with distrust and resentment. In some cases this is a simple lack of inter-group communications and clarification by the TSD or the KMI with resentful groups or individuals might reasonably be expected to resolve the tension. In most such cases, however, it is recognised by the TSD that the policies and technologies that facilitate the core business processes for the majority of individuals and groups within the organisation will, in fact, be challenging for, or have little to offer, to other individuals and groups. While the TSD seek to ameliorate these drawbacks the strategic understanding is that this is an unfortunate but realistic cost to the effectiveness of the strategic implementation. At this point trust is placed in the extra-subjective cultural environment and the inter-group inter-subjective relationships that the overriding culture of trust, sharing and helpfulness will lessen resistance and the value gained by the majority will be appreciated not only by the majority but also by the minority who do not gain from it.

**Summary of the ABS KMI Story**

Overall, it would appear that much of the success of the ABS KMI is due to the degree of harmony between the vision and strategic goals of the different levels of the organisation. The organisation creates, implements and maintains executive policies at the generic-subjective level that are compatible with the extra-subjective organisational culture and that facilitate the social interaction level within which the majority of ABS staff work. Longevity of careers in the ABS means that almost all executives, and certainly the senior personnel, have been in the ABS and immersed in the ABS culture for many years creating a leadership that governs the generic-
subjective and drives new growths and policy in sympathy with the ongoing environment and climate of the organisation. Major decisions are planned strategically in line with the ABS Mission Statement. The Mission Statement links directly to the core business processes of the organisation and is known and subscribed to throughout the organisation. Information systems and technology are used strategically and dynamically to implement change and facilitate core business processes. As one of the key drivers to the KMI success, technology is also the source of the major conflicts and tensions within the organisation. Most conflict arises between individual (intra-subjective) preferences and organisational structure (generic-subjective need). Although the organisation seeks to ameliorate negative effects on staff and improve the working environment by eliminating sources of conflict, the sources of discontent, such as lack of an office suite or customisable desktops for individuals, are seen by executives and by the KMI as a small price to pay for the benefits of the technological environment created for the organisation as a whole.
CHAPTER 6  THE UEA CASE AND CONTEXT.

This chapter and the previous one each present a case study of a knowledge- and information-intensive organisation that deliberately undertook systems and technology change to support core business processes. This chapter focuses on the case of the University of Eastern Australia and the approaches taken to the systems and technology changes required during a recent / current restructure as three networked university members unified to become a single university. The data presented in this chapter were elicited in response to a series of questions about the individuals' understanding of knowledge management and of the systems and technology changes, their substance and impact during those changes effected for the restructure of the UEA. Semi-structured interviews were conducted following a semi-structured pattern. Initial questions asked are listed in Appendix 2. Responses were varied in degrees of knowledge and understanding of the necessity for change, perception of change management, and in degrees of understanding and attitudes toward the UEA restructure.

The chapter begins with a brief outline of the UEA as an organisation, particularly presenting the purpose and shape of the restructure and its consequent critical systems and technology changes. It presents the events as told by twenty seven different individuals from the UEA, spanning two different phases of the systems changes within the restructure. As much as is possible, this chapter echoes the format of chapter 5, the case study of the ABS. In this chapter the UEA story is discussed, as presented by participants, on a thematic basis considering the issues emphasised by interviewees. These themes are then reviewed considering the issues and points of interest from a sensemaking perspective of knowledge in organisations. Further discussion arising from this chapter and Chapter 5 are taken up again in Chapter 7, tying together what has been learned from both case studies. and the preceding case study of the Australian Bureau of Statistics in Chapter 5.

FIELD STUDY: THE UNIVERSITY OF EASTERN AUSTRALIA

The University of Eastern Australia (UEA) is a ‘new’ university, having been created from former Colleges of Advanced Education, in response to the 1988 White Paper on Higher Education (Dawkins, 1988) first as a federation of three universities (former Colleges of Advanced Education) and now as a single
university. The UEA is currently located on seven campuses that are dispersed over nine physical locations, some of them only two to five kilometres apart, others nearly 80 kilometres apart. It is the seventh largest university in Australia catering to a large and diverse population. The student population comprises many first generation university students as well as a high percentage of international students.

In 1999 a restructure was announced unifying the three federated networks of the university into a single university. The challenge of the restructure was complicated by the need to serve current students, enrol new students, graduate completing students and maintain research programs even whilst losing and moving staff, changing the information systems and technological support systems that run the administrative processes of the university and reshaping and modifying all processes and procedures that are part of the daily life of a university. In the course of an organisational restructure of such magnitude information and knowledge management practices are critical particularly in those aspects of the restructure that deal directly with changes to systems that support core business processes. This chapter investigates the information and knowledge management practices vital to the critical systems changes that occurred during the UEA restructuring over the period from 1999 to 2003 focusing primarily on two significant phases in the restructure. The first is the period of greatest initial upheaval from 1999 - 2001. The second is the 2002 investigation into the severest consequences of the restructure and the 2003 changes instituted to remedy some of the more serious consequential effects of the first phase of the restructure.

As the scale of the restructure is considerable in a university of 30,000 students and over 3,000 staff this study is bounded to specific restructuring processes within the larger scale of the entire restructure. Thus, the study focuses on changes to the information systems that significantly affect services to the students and staff.

**CONTEXT AND HISTORY**

The University of Eastern Australia was created in 1989 as a new kind of university unique in Australia at the time. It was established as a federated network formed from three Colleges of Advanced Education: the Naseby College of Advanced Education, Hatton Agricultural College and the Morton Institute of Higher
Education¹. The federated network university was not a successful structure, confusing to external persons and institutions and particularly proving to be an inadequate structure for effective governance. In 1999 the Audit Office of NSW published a Report detailing that UEA had the highest costs of administrative staffing of any University in the state, chiefly because of triplication of administration; and that rivalry between the three member institutions caused poor service to students and community (Audit Office, 1999). Consequently the new Vice Chancellor published a paper entitled "The Shape of the Future: A Structure for [UEA] in the 21st century" ([UEA], 1999). The paper proposed a structure that merged the three federated network members into a single integrated University that streamlined all governance to a single set of common academic and administrative units that operated across the seven campuses as one University. That same year the Board of Trustees accepted the proposal and the following year, 2000, it was ratified by Parliament. Thus in 2001 UEA became a single multi-campus university ([UEA], 2002; Treleaven, 2004).

Each of the three independent members had a unique culture and historical background. Specific regional identities tied each closely with its own locale in widely disparate regions of the city although each member had at least two campuses thirty kilometres or more apart. All three members had independently undergone at least one restructure between 1989 and 1999 with varying degrees of success. Each member-University had an academic culture tied not only to historical academic roots and traditions but also to the development of their independent histories around sometimes charismatic and forceful academic leadership. There may have been equity within the members but there was no structure to provide equity across the university. The force of the personalities that were in positions of authority, rather than some externalised or agreed set of values and protocols to provide transparency, accountability, or parity, determined much of the running of the University (Senior Exec #1). There was an extended history of animosity between different members with some fierce rivalry in research and teaching in many of the Faculties with overlapping disciplines. The process to unify these three disparate members into a single entity located on seven different

¹ Not the real names.
camps was therefore an immense and risky task but necessary to comply with
Government regulations for university governance and accountability.
we clearly cost more to administer than any other university of equal
size, and that was almost undoubtedly due to the triplication. The
financial affairs of the university couldn't be managed. The probity of
our activities couldn't be managed. Our resources overall couldn't be
managed. And there was no equity in the distribution of resources
across the university (Senior Exec #1).

The first issues of governance that were the focus of the restructure were the
unifying and streamlining of all reporting structures, with emphasis on financial
accountability.

… the wildly inefficient and illogical ways of working that characterised
each of the members. Financial systems were different. How did that
come to my notice? You couldn't get a unified and sensible set of
accounts for the Board of Trustees who were more than a little
unhappy about that. When the auditors came they were less than
complimentary because they had to audit three sets of books with three
different types of accounts. And things like that. They were evident
because they made working here tremendously hard – and this is not
just for me, this is for everybody – getting consistent information
impossible; and you could see that things were being done over and
over again so they cost a lot more to do than if you had some level of
consensus (Senior Exec #1).

This meant immediate consolidation of all information systems (IS) and immediate
changes were begun on the Financial and Accounting Systems, Human Resources
Records, Student Enrolment System, the Student Records System, and the various
systems that necessarily integrated with these, such as the Tutorial Registration
System. To enable these systems changes the entire Information Technology (IT)
infrastucture needed radical overhaul, changes and improvements. The course of
the restructure caused staff shortages in many departments and divisions and much
of this IT infrastructure change was necessitated while severely under-staffed,
particularly in technically skilled personnel. Again, all these changeovers had to
occur either during semester while computer labs were in use by students and
ongoing records were accessed and upgraded and graduations scheduled or between
semesters when enrolments and registration systems were at a peak. There were
brief intervals of 'down-time' such as the Christmas break, in which none of the
major university functions were engaged with students and staff but these were
short periods providing inadequate time for major overhauls.
There was considerable loss of, and relocation of remaining, administrative staff. Thus the major administration of the university was conducted by staff who were not only using new or hybrid systems in the process of a changeover but who also did not know the routines, tasks, contacts or networks necessary for the performance of their new jobs in new locations. Relocation of staff sometimes occurred where the employee had the same general job description but was physically relocated to a different campus. On other occasions, the employee remained in the same geographical setting but was relocated from one type of job and set of responsibilities to a different job with different tasks, responsibilities and knowledge requirements.

The new systems being implemented, in a process that took over a year, included a move to TimsPlus (a new Timetabling Systems) from the old Syllabus Plus and another similar system; the use of a new Students Records System integrating information from three previous different systems; and two of the three different Tutorial Registration Systems were to be shifted over to Platform Web, an internally developed program in use at one of the former members.

we still are captive to computer systems and information systems like … the current Student Record System which is a legacy system that is held together by bandaids (Senior Exec #1).

Along with the changed systems and relocated staff new policies were issued as to who dealt with what and who might or might not handle certain tasks and negotiations with or for students. For the most part, staff now allocated to deal with students directly had not done so before and did not know the students, colleges, schools, subjects, teachers, prerequisites or circumstances pertinent to any of the issues critical to the students, and no information management or knowledge management processes were put in place to alleviate or overcome the problems inherent in this situation. Therefore, a consequence of so many changes in so many aspects simultaneously: systems, staff and policies without information management or knowledge management procedures in place, was that the first eighteen month period of implementation of the "new UEA" did not go smoothly or easily for stakeholders including staff, students, and the local community.
COMPLEXITIES AND COMMUNICATION CHALLENGES

An issue that arose very early in the restructure was the inconsistency between what was communicated to staff, students and community as being the vision and intended consequences of the systems changes on both micro and macro levels of the restructure and the reality as it eventuated. To understand this divergence, it is necessary to know about the primary purpose of the systems changes and of the restructure as seen by the executives initiating the changes and as differently perceived by the academic and general staff.

As a federated university the UEA had three student information systems, three financial systems, three human resources systems, and so on throughout all the information systems that supported the university business processes, controlled the organisation, recorded and reported and presented for auditing. In other words, from a whole organisation perspective, the University was ungovernable to the degree that it could not reasonably be audited, monitored or controlled. To make it governable in a manner acceptable to the Federal Government, which controls funding, many things had to change. Principal among the necessary changes were the systems supporting the structure as well as business processes. Thus a restructure was announced with the stated purpose of unifying the three network members into one university and eliminating triplication, saving money and providing better service to students and the community.

The new Vice Chancellor (VC), who is essentially the CEO of the University, drove the UEA restructure. The Vice Chancellor and the Executive leadership intended to ensure that, as change must happen for auditing and governance reasons, it should also be change that would benefit the University, the teaching and the research in the long term. In 1999 the VC published two vision statement papers "The Shape of the Future: A Structure for UEA in the 21st century" and "What Kind of University?" ([UEA], 1999). These papers outlined the need for immediate radical change and looked at potential models the University could choose to follow. The vision specifically aimed at becoming an innovative university renowned for teaching and research excellence and serving its local communities with strong regional ties. So although the immediate, urgent and actual purpose of the restructure and consequent systems changes was to make the university governable
and accountable (Senior Exec #1) the purpose that was communicated to the
stakeholders was a general vision that promoted the ideas of unifying the three into
one university, eliminating triplication and saving money and providing better
service to students and the community.

…I think there are mixed messages coming out … on one hand “you
want simplicity and less committees” and so on – the real hand is the
opposite. Why is that so? It’s an interesting management question. It
was clearly stated, “to save time and save money” yet I’m not sure it’s
doing that. How much money are we spending with people shunting
across campuses? (Senior Academic/Exec #8).

When promoting the changes, the Executive emphasised how the restructure would
benefit students, staff and community. Such benefits included the new UEA
developing and becoming renowned for improved teaching, research and
community involvement. Unfortunately, the initial consequences of the systems
changes for the restructure all included painful disruption to services essential to
quality teaching and research. There were several reasons for such disruption but
the primary reason was that the first changes of the restructure were solely
cconcerned with the immediate need to reshape the political structure of the
University for efficient governance and accountability to meet government
requirements.

Now I feel fairly confident that the university is not going to be cited
in Parliament for improper conduct. It's not going to be unable to tell
the auditors where its money is and what it's doing with it. It's going to
make fair and reasonable decisions about what buildings are to be built
and where the need really is. It's going to be able to treat with student
associations more fairly and more even-handedly. It's going to be able
to reach out to the community with at least an umbrella of a single face
– I mean, obviously, we're all diverse and we all do lots of different
things. It's going to be able to represent itself to the outside world as
one university and not three. And it's going to be able to do positive
things like develop its research capacity using the leveraged funds and
resources that we've got, leveraging those funds and resources and not
just dissipating them into, say, three Research Offices, and so forth
(Senior Exec #1).

This focus on governance and accountability is crucial to understanding the
apparent contradictions between the stated purpose and goals of the restructure and
systems changes and the lived experience of the staff undergoing the changes. The
urgent need to become governable and meet government auditing standards had to
be the first priority for the UEA Executive but was not a desirable message to be
communicated to the UEA community. Therefore, what were communicated to the community were the secondary goals. As the unification restructure and consequent systems changes were a necessity it became the goal of the Executive to use the opportunity to improve the university and upgrade its profile in teaching, research and community liaison. While urgent work was undertaken to streamline inefficiencies and eliminate redundancies and correct systems to meet government demands the changes were promoted as part of the overall construction of a “new improved” UEA.

Stakeholders were angry as many of the more urgently enforced preliminary changes were detrimental in the immediate consequences to teaching and research but this original priority of the need to be governable, auditable and accountable was not, and possibly could not be, communicated to stakeholders. The university Executive expected some of the negative consequences of these changes and perceived them as unfortunate but necessary. They did not anticipate the degree to which many of their best intentioned efforts were perceived negatively and suspiciously by the staff and the students. Vision statements, for instance, were expected to ameliorate pressure and garner support but were greeted with scepticism “the strategic vision for what is happening hasn’t been put forward and hasn’t been articulated, if it exists” (Senior Academic #6). Cumulatively, the damaging events during the first stages of restructure did not visibly support a contention that the restructure would improve the situation or meet any of the vision statements issued by the OVC. As the primary drivers or purposes of the restructure such as governance and accountability were not communicated to the stakeholders and the consequences of the restructure as a daily experience were painful and failed to deliver or align with the vision of improved teaching and research, or even to equal pre-restructure standards, Executive credibility suffered.

**EMAIL**

The Vice-Chancellor’s commitment to answer all emails also became a bone of contention and cause for increased credibility with some but severe loss of credibility with many.

I always write back to people who write to me. In that ‘Agenda 2000’ period, I got up to a thousand emails that I had written a substantial email in response to myself that I hadn’t actually given to anybody. And
then I stopped counting. That was in one period. I think that was in the period through the first four months of 2000 (Senior Exec #1).

Some few of the persons interviewed agreed that everyone who contacted the Vice Chancellor had received a response. Many others, however, expressed an opposite view.

But it seems to me that it's a practice within the university, from the Vice Chancellor down to the Dean – and down to the Head of School, so far as I can see – at least, that's my experience – that if they don't like the question that they're being asked in writing, they just don't answer. So I've got a whole host of unanswered letters and emails. But I've still got them (Senior Academic #17).

Other staff expressed the belief that the scale of the task made it impossible for the VC to maintain this promise, although they suspected that it was sincerely meant, and had probably been kept in the first months until the volume became too large. Staff from the OVC state, however, that even at this stage the VC did read all the mail after a screening and sorting process:

What we did for [the VC] in the process...is when messages came in we would catalogue them by college, school, issue so [the VC] would take them home on weekends and just flick through them... [the VC] looks through them and says "We'll send her a reply" or would write a reply [personally]. And it was a hugely onerous task but it was an important one and it is only information overload (Admin Officer /Exec #16).

To resolve the contradiction between staff saying they did not receive replies and the VC stating a personal reply was sent to every email, the OVC staff were asked if the person given the full-time job of screening and sorting the VC’s mail also edited and pre-determined which was forwarded or not forwarded to the VC to read but no reply was given. As it stands, there is an unresolved contradiction with the OVC staff stating that the VC answers every email personally and a number of staff stating that they have sent communications to the VC that remain unanswered.

**No knowledge management?**

The Vice Chancellor stated that there was no knowledge management or information management involved in the preliminary work of the UEA restructure. The director of the ITD stated that he and the previous member ITD directors had together designed a strategic plan but that strategic plan did not incorporate either
knowledge or information management needs or processes in the planning. This was a partially erroneous point of view, based upon a limited understanding of IM and KM, as some of the strategic plan did indeed cover IM and KM issues. It was generally thought by most of the senior executive, academics and administrative staff interviewed that “knowledge management is completely non-existent in the UEA” (Academic #22). Nevertheless, two senior executives expressed a belief that it is impossible for there to be no knowledge management. It might not be called that but there has to be some knowledge management happening or the whole place would have crashed (Senior Exec #26).

That senior executive (#26) described many efforts by different individuals like the Deputy Vice Chancellor Resources who was sponsoring the development of a Business Continuity plan who had inherited positions in which much of the data and information resources required to inform their work was missing from their division. Their efforts to undertake the processes required to rebuild that foundation knowledge for their division were the core information and knowledge management processes involved in establishing information and knowledge management programs that support core business processes. What emerges from this picture is an understanding that some knowledge and information management practices were being undertaken by individuals to address immediate and identified needs within their sphere of operations. So the knowledge management practices were present but simply not identified as being knowledge management practices. Principally, purposeful knowledge management and strategic planning were deferred for the UEA as an organisation until a “fix-up year” after the preliminary stages of the restructure were completed.

**Knowledge management, planning and strategy**

The focus of the restructure was to ensure immediate reduction of costs and compliance with government regulations. The overarching strategy was to achieve successful governance as quickly as possible, and “fix up the mess” (Senior Exec #1) afterwards.

I didn’t have a model for restructuring [UEA]. In fact I didn’t have a view that I would in the sense that it has been. What I found initially is what set me on a path of trying to bring some degree of virtual unification to the university (Senior Exec #1).
The lack of strategic planning was reflected through many levels of the organisation. More importantly, the lack of strategic planning from the Office of the Vice Chancellor (OVC) had ramifications that inhibited or prohibited implementation of strategic plans at other levels of the organisation. An instance illustrative of this is the IT crisis precipitated at the beginning of the systems restructure.

Immediately prior to the restructure the three former ITD directors together prepared a strategic plan and organisational model for the unification of the three ITDs into a single ITD for the new unified UEA. They looked at the critical roles that had to be filled to accomplish ITD responsibilities, pared down to the minimum and then created an organisational model that would be needed to fulfil these roles and responsibilities. This strategic plan and model called for 140 people staffing the new ITD for normal workload (not including extra duties for the process of the restructure itself). Without reference to the strategic planning by the ITD, the OVC declared that the ITD would be limited to 92 personnel based on “last year’s budget less 12.5%” (Senior Exec #13). After negotiation by the new ITD director, focusing on the fact that ITD was severely understaffed and last year’s budget did not allow for critically necessary staff for normal daily business processes, this was changed to 105, a figure that was still inadequate to meet the needs as drawn up in the organisational model or strategic plan prepared by the three former directors. However, a combination of factors further complicated the issue.

Staffing freezes in all three former members beginning in 1997 and continuing throughout the restructure had resulted in considerable administrative and technical staff loss. The ensuing loss of organisational memory (Treleaven and Sykes, forthcoming) in the ITD resulted in awkward situations where there were servers and machines that needed upgrading, fixing or replacing that ITD were not aware existed. Previous ITD personnel had made unrecorded commitments to academic staff, such as old classrooms to be converted to new computer labs, yet these commitments were not on any ITD list and ITD did not know about them or necessarily know how to fulfil these commitments (Senior Exec #13). Staff complained that on some occasions “requests that could be addressed in five
minutes by someone knowledgeable would take weeks of passing around and
hunting to find (or fail to find) someone with the required knowledge to fix the
problem” (Academic #22). The three former members were on different servers,
different systems, different structures and using different software so personnel
needed to be able to know and work with all the different systems to run and
maintain them before and during changeovers and sufficiently well to integrate
them into and manage the changeovers of systems (Senior Exec #5). Most staff
only knew the one of the various systems from their former member and as there
were almost no remaining staff from one of the three former ITD members there
were almost no staff at all who knew or understood the systems on three of the
seven campuses.

The degree of short-staffing caused by staffing freezes meant heavy casualisation by
frequently under-qualified personnel (Senior Exec #13). The Executive did
understand that the additional ITD workload of the restructure was undertaken by
less than 80% of the allocated staff-load but the reality was that less than 68% of
the number of trained personnel (140) which the ITD directors had analysed were
required to meet the need for sustained operations of the unified UEA were
available to engage in this effort. The recruiting procedures set in place for the
restructure then compounded the problem. This policy required that all staff hiring
must first go through an internal-only advertising and application process which
was an arrangement made to meet union demands that administrative staff fearful
of layoffs be assured the availability of positions for them first before positions
were advertised externally as there were more staff than positions available. The
ITD were suffering the opposite problem of having severely inadequate numbers to
meet the need as approximately one third of the already understaffed ITD
departments had left for other jobs when notified of the restructure. Rather than
fearing layoffs and job losses as was the case in other technical or administrative
departments, the ITD staff of the three merged departments already had more jobs
than they could cover and there were no people to fill critical vacancies.
Nevertheless, the policy was in place and jobs could not be advertised externally
until they had been advertised internally through a lengthy procedure. Then an
external process for hiring would be managed outside the department. There was
consequently a wait of eight to twelve months from the point of official recognition

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of the need for additional personnel and any opportunity of hiring those needed personnel. During that extended wait the ITD, despite being severely understaffed and simultaneously trying to bring all 7,000 UEA computers into line for Y2K compliance, still had to implement critical systems changes. Given the circumstances, it is not surprising that the ITD failed to implement systems changes adequately within the required timelines.

Interview data suggest that many divisions and colleges had similar challenges in which new policies for the unification process were incompatible with departmental structures or overset divisional strategic planning because of the overall unification budget plan.

They basically said ‘okay, we’re going to have one single administration. We’ll have one Finance area rather than three; one HR area…’ The next question that had to be asked was, ‘well how are you going to do that?’ But that wasn’t the question that was asked… And whilst that was essential, that we reduce our cost base it became a bedevilling factor in the whole exercise. Because the focus became one of cost reduction rather than one of logically looking at – how do you achieve a quality University in the area of Administration and Academic Support (Senior Exec #2).

The OVC did not issue a strategic plan but did make certain tactical decisions, principally a budget. This budget set parameters that, to a great extent, determined which divisions’ strategic plans could or could not be operationalised.

In fact one of the problems about the whole of the restructure if we go back to the fundamentals, is from an organisational development point of view – which is one of my areas of expertise – the whole restructure started from the wrong premise. They basically said "We have to save this amount of money" instead of saying "This is the organisation we want to have. This is the organisation we need to do the job that we have" (Academic/Exec #12).

With a lack of strategic planning at university level (Senior Exec #1) and often a similar lack at lower levels, very few Divisions or Colleges were able to harmonise from three member organisations into a single entity with any great degree of success, or without considerable distress. One division, however, was conspicuously successful.
CHAMPIONS

The Finances Division underwent the required changes quickly and successfully and met core business process requirements with minimal disruption or dysfunction to staff, students and community. This division had a leader who planned strategically then championed the needs of the division. In this case the director successfully challenged the stringent new policy that all divisions and colleges must be on at least two campuses and no more than three, and must not have isolated out-posted staff. He insisted on the necessity for all personnel in Finances being co-located on a single campus if the division was to function successfully, with out-posted staff liaising with colleges on every campus.

...in the case of Finance, we were told that they wanted to see a staff reduction from fifty one positions to thirty six... There was no use achieving the cost reduction, if what you are then going to do is to deliver a very poor quality of service to the users. So I started from saying, ‘well here's the list of the services we have to provide … here's the minimum staff profile I need’ …and I explained it to Management… ‘You want me to run an accounts payable service function, then I can do so. But I need to have eight people and I need to have them in one location. And they need to be in exactly the same location as accounts receivable’. So very much front up I basically said to them, ‘if you want me to get anywhere close to thirty six staff, you have to be willing to accept that there will only be one Finance Office in one location and a number of people out-posted’ (Senior Exec #2).

This ability to champion their own divisional strategic plan against university-wide executive policy was a distinctive difference between the successful and the unsuccessful divisions in the harmonisation process of the restructure.

CREDIBILITY ISSUES

Lack of specific knowledge management (and strategic) planning contributed significantly to the less successful aspects of systems changes and other restructure elements. This was evident not only in the more obviously ‘knowledge management concerns’ such as lack of vital information but was most apparent in the issues arising from and with knowledge workers. Staff members of the University knew themselves to be knowledge workers and deliberate attempts were made by the Vice Chancellor and executives to acknowledge this for academic staff during the course of the restructure. Measures included the provision of bulletin boards and
electronic forums, personal campus-based forums conducted by the Vice Chancellor and various other senior executive and or academic staff and a promise of personal responses to emails. These attempts to cater to knowledge worker needs were not really successful. Administrative staff in particular believed that they were not regarded as knowledge workers and that no particular care was taken in addressing their needs as knowledge workers.

It's people that have got the knowledge and they have just got fed up with it in the way that they have been treated and they have just gone – the ones that are left have just sort of got to do a patch work (Admin Officer #15).

This apparent failure to adequately address knowledge worker needs at administrative levels was one contributing factor to a perceived lack of credibility of the UEA Executive and leadership.

This issue of perceived lack of credibility was expressed principally in three ways. The most common was a matter of trust. Many persons expressed their belief that the UEA management were deliberately deceptive and had hidden agendas and ulterior motives driving decisions that would not be to the benefit of the UEA or its staff and students. The second perception was expressed as a belief that the senior Executive of the UEA were incompetent. A fairly common perception was that, although able academics, the UEA leadership were inadequate managers. The third perception was that the lack of credibility was due to enforced incompetence caused by overload and that the task of restructuring the UEA was too large, too difficult and being undertaken too rapidly for anyone to be able to manage the process with competence and credibility.

… just trying to grapple with something that's much too big to handle in any meaningful way. It doesn't mean the whole thing is crashed, it just means that at the margins people are just so stretched that anything that's not absolutely urgent falls off the plate (Senior Exec #19).

**STRATEGY AND TECHNOLOGY**

**PROBLEMS ARISING FROM THE INFORMATION SYSTEMS CHANGES**

The ITD began the restructure with the largest and most critical tasks of systems changeover for all the vital business functions of the UEA already understaffed and with their strategic plan overthrown. This was not the only disadvantage under
which the ITD began dealing with the difficulties tied to responsibility for systems and technology through the restructure. Another problem arising early was that technology was chosen piecemeal for instant fixes for each governance issue as crises arose, without careful strategic planning of fully integrated Systems, although there was a hope that 'in the end' all the systems would integrate and function.

It is probably fair to say that [there wasn't any knowledge management planning or contingency plan] is the case right across the board. Planning for the labs was that if we didn’t finish what we were doing then we would just go back to the old configurations ... after the problems had sort of surfaced and risen to a bit of a fever mode... we started anticipating very little change except perhaps different model and banner scripts. I didn’t mention the servers did I? Then we started having problems with the servers. Again it was pretty much capacity to ... Well you know it was at a time when placements had just been finalised - there was a whole bunch of vacancies, staffing issues, the walls were coming down everywhere, major problems at [Moresby West]... It was pretty much a case of “well what can we do” - midnight meetings to put people out and in hindsight you can say well we probably should have… (Senior Exec #13).

This lack of an integrated long-range approach was partially because long-term plans included another technology change to the new Callista system a couple of years after the initial systems change for integration. The second systems change to Callista did in fact occur in 2003. So for the original restructure systems changes tactical solutions were adopted first to cope with immediate needs such as the ability to enrol all students on all campuses in the coming semester or the ability for students to login on any campus.

In the original phase of the restructure three critical information systems were simultaneously changed. They were [1] the Student Record System (SRS) that handle the subject enrolment process [2] TutReg, the system that dealt with the tutorial registration process and [3] Syllabus Plus, the timetabling system. Ironically, the first phase of the systems change involved only the transference of human operators’ responsibilities prior to the major technology changes. The differences seemed minor but the effects were major as this was an area fundamental to critical knowledge management.
Before the restructure students would typically discuss subjects and subject requirements with the Faculty Administrative Officer (FAO) before enrolling (Fig 6:1). The FAO would advise a student to consult with a lecturer if there were questions the admin staff could not answer. Lecturers usually informed the FAO about relevant changes in subject delivery such as enrolment limits and prerequisites. In this old system students could also enrol via the Internet and many did but a majority preferred to enrol through direct interaction and consultation with the FAO. As part of the restructure a Central Student Service (CSS) was created with distributed officers on each campus and the position of a FAO was eliminated. Students were advised to register via the Internet which the majority chose to do that year. If they had problems or needed help they could go to the CSS. Unfortunately, the CSS officers had no answers for the students who sought their help. As one of the ex-FAOs describes it:

They took our jobs but no one asked us about our jobs – or what they need to do to make it work... They [new CSS officers] can't possibly know all the information for our subjects the way we do, for all the subjects across the entire college! … The students still come to me. I do as I'm told and send them back to the Student Centre and they don't know anything and send them straight back to me – but I'm not supposed to tell them anything. I do anyway but by then it's too late and they've already had this run-around (Admin Officer #21).

Figures 6-1 and 6-2 (above) represent the before and after circumstances of the Information Systems operation. The three IS Student Record System, TutReg and Syllabus Plus were larger but otherwise had not changed on the campuses investigated apart from some database improvements and upgrades. The only visible differences were that the student now went to the CSS instead of the FAO if they needed assistance and the academic had essentially lost access to the subject
enrolment and tutorial registration systems that they previously had through the FAO. The design of the restructured student services called ‘the one stop shop’ took place at the university level and was implemented top-down despite heavy opposition from ground-floor staff who insisted that the proposed new system which they renamed a ‘one stop flop’ could not work. Nevertheless, the implementation was enforced despite the fact that the new integrated IS, the key enabler of the new structure, was not yet fully operational. There was an assumption that the old systems with web-based enrolments and registration (Fig 6:1) would do the job in the new scenario with ‘only a staff change’. This assumption was never questioned.

This situation precipitated several crises particularly in the first semester of change but also continuing into later semesters. There were several incompatibilities between the different student systems that the FAOs had monitored and controlled. An academic might notify the FAO of a required limit to numbers in a lab due to software limitations, perhaps, and the FAO could enter this for automation in one system, closing out the computer lab for tutorial registrations but would have to personally monitor the other system and personally flag when classes were full or enrolments would continue. When this did not happen with the CSS in control and ignorant of these needs, one class had software for 60 students and closed registrations at that number but had 140 enrolments. As a result many angry students arrive to attend their first lecture having been unable to register in a tutorial and now found themselves unable to sit in a lecture room with seating for 60 (Academic #22). This was a common event across many campuses, colleges and subjects and caused great distress to students and hours of problems for academic and administrative staff. For many subjects the reworking of enrolments, registrations, availability of computer labs and software was not resolved until 6 weeks into the semester.

Similarly, the knowledge held by the FAOs was not communicated to the new Timetabling Officers (TO). These staff members were usually located on different campuses than their timetabling responsibilities and began their positions with out-of-date paper-based and electronic records. Consequently there were events where a TO would allocate a tiny room labelled ‘lab’ that had a single pc and a data
projector to a lecturer with 30 students for a computing systems lab class or would assign classes to computing labs that did not carry the software required for that subject.

To the FAOs the "consequences were obvious from day one" (Admin Officer #21) as soon as they learned about the proposed new structure, in the design of which they were neither involved nor consulted. They refer to traditional management and IT ‘blindness’ in not being able to perceive knowledge workers as part of information systems. There is a perception that the technology didn’t change and moving people didn’t count so it wasn’t a systems change. Nothing needs to be done to prepare for, monitor or supervise ‘no real change’. The FAOs knew themselves to be knowledge workers who were critical components in the student enrolment and registration system and in the timetabling system but expressed extreme frustration that neither management not IT personnel perceived the FAOs to be an integral part of the student services system.

CULTURAL BARRIERS

The three cultures that needed to integrate were quite different. Each had its own history and its own management styles. Therefore another underlying issue associated with the systems changes and the restructure as a whole was the merging of these three different cultures of the individual member universities. Within the discipline of knowledge management the necessity to merge any disparate cultures is a key issue of knowledge management and dealing with knowledge workers. The Vice Chancellor and Executive recognised from the beginning that the antagonistic rivalry between the three former members of the University was not only at the heart of the difficulties necessitating the restructure but would also be the major barrier to a harmonious unification process. However the UEA Executive did not consider the necessity to merge three disparate cultures as a knowledge management issue so did not take a knowledge management approach to address the need more specifically. Restructure planning to address this problem was limited to policies that dictated equal numbers of persons from former members being appointed to new roles of responsibilities, divisions being located on not less than two different campuses, school formation requiring that new schools be comprised of mixes of staff from at least two former members, and other such determinants.
With such radical changes happening staff losses occurred not only through persons leaving as their position was made redundant due to roles triplicated across three members were reduced to a single position but many staff chose to leave rather than participate under the new structure or undergo the painful process of the restructure in transition. As a result, organisational memory loss was significant not just in the ITD as discussed above but in many departments (Treleaven & Sykes, forthcoming).

I think there are a lot of people who have just got fed up and left. The people that they have lost that have gone to other positions – these people with the knowledge and they have just gone… the knowledge is gone – It's not something you can bring someone else in and say ‘all right you'll be in this position now’ because they can't. It takes time to build up… So what they are basically saying is they don't need that knowledge. The students and staff can get by without it (Admin Officer #21).

There were costly consequences in terms of confused and poorly serviced students who could not be given answers and were sent on a circular process from department to department and campus to campus trying to find somebody to answer their questions, address their needs, or service them in any meaningful way. Staff, too, struggled with dual issues of not knowing their own new job and having no access to anyone or any document that could inform them of responsibilities or networks or of having to deal with necessary support staff in this position.

ANTAGONISM BETWEEN CONFLICTING CULTURES

The UEA Executive identified that in each of the three former members it was common to perceive peers in the same discipline from the other two members as rivals, not colleagues. They perceived the need to eliminate these contentious cultures and replace them with a harmonious vision for a unified organisation. However, retrospectively they acknowledged that they failed to provide facilitation toward integration of these cultures or to address the specific cultural issues germane to each former member (Treleaven, 2004).

…it we came from 3 different campuses, 3 different traditions, universities, cultures and practices, and you're more likely to trust the known – even if they're not your friends as it were – than the unknown (Academic #23).
However, no processes were provided to enable the harmonisation of divisions or the formation of schools across these divisive cultural barriers. Only impersonal communications instruments were offered as vehicles for the harmonisation process. Electronic forums were arranged on the UEA intranet but with no provision for maintenance, supervision, ordering or removal; there was only opportunity to place items on the forum bulletin board, read and reply to other postings. No facilitator empowered this electronic process, edited, managed, or made it workable. Most staff avoided it. Attempts at coordination were being made by strangers through unsupervised electronic media.

the conditions in which we found ourselves – our dislocation and lack of shared experiences and not knowing each other – allowed us to develop mutual understanding in local groups and share them only when required. Affiliation with a particular proposal developed on disciplinary and geographic bases in most cases. If you imagine a different scenario in which we were all in one building I don't think that they would have developed as they did (Senior Academic #24).

The majority of staff used email which is a standard facility of the university. No email protocols were put in place, however, despite the prevalence of its use at all levels. Some email usage was through the all-staff email distribution system, cluttering the in-trays of every staff member with many emails that may or may not be relevant to their particular part of the restructure. Others used individual email causing anger, confusion and alienation when some staff were contacted or notified of meetings and others were not. Videoconferencing facilities were available on all campuses but never used for the purpose of the restructure, other than by the union when the union became actively involved in the process due to what staff perceived as abusive behaviour toward the general staff through the disruptive and untimely process of voluntary and enforced staff relocations and responses to voluntary redundancies.

It was observed by some staff that not only did the UEA fail to take steps to remedy the inherent conflicts between previous cultures; little was done to develop new culture or promote communication or fraternisation in the new structures or groups:

...communication is breaking down across UEA. Staff have been dispersed. There's a sad lack of tea rooms, common rooms, so on and so forth. And when you think about it, there are very few cases of staff meeting (Exec #5).
Despite the stated recognition by the Executive that one of the greater challenges of the restructure was the distributed nature of the UEA “one of the things that I think will be our lot in life for ever and ever and ever is being a distributed university” (Senior Exec #1) the University failed to provide structures of procedures to assist the restructure process to cross these boundaries of distance or culture.

**IDENTITY AND IMAGE**

At the time of the merger-restructure, one cultural aspect that all three network members shared in common was a peculiar ambivalence in that there was, and is, great regional pride with most staff living in the region and proud of having a new university in a region often denigrated by longer established neighbourhoods. Thus the location of the university is simultaneously a matter of pride and, to a degree, for some defensiveness. A fairly common perception is one of 'poor cousin' to the Sandstone Universities – lacking funds, lacking history, lacking prestige and esteem. the organisation accepts this belief of the people that want to enter the university, and right now the position of this university in Australia in the Sydney Morning Herald school guide is 2 stars. Other universities in [the city] for the first time have new stars like [other new university] – formerly 3 stars now 4 stars. Old universities all have 5 stars (Academic #25).

Staff salary packages are lower and workloads higher and student University Admissions Index scores that determine the academic grades of the students allowed to enrol are significantly lower in many courses. UEA as a new university has a high percentage of both international students many of whom do not speak, read or write English to the High School equivalent standard that is officially demanded and of first generation Australian students. The preponderance of students in UEA are the first members of their family ever to attend a university. At the time of the restructure common media reports reflected negatively on the UEA in newspapers, magazines, radio and television with little positive media to counterbalance negative stories. The cumulative affects of so many negative images and assumptions was to demoralise many of the staff, some of whom perceived themselves as “2 star out of 5” (Academic #25) or 'second class citizens' in the academic world and assumed that the rest of the academic world regarded the university in this negative light as well. Once the restructure began with so many
negative consequences aired prominently in local and sometimes state-wide media, these negative perceptions and expectations were reinforced and caused even greater cynicism and negativity about the restructure itself. Cynicism was evident in the statements made in interviews that staff were no longer willing to extend goodwill to the University as they perceived themselves as being abused in the course of the restructure. Academic, administrative and technical staff attributed a number of factors such as regional pride and dedication to students to their previous willingness to volunteer for extra work or accept it when it was put upon them, put up with unsatisfactory working conditions and extend themselves to meet the needs of the university and the students but a common thread through many of the interviews was a new unwillingness to continue to extend that goodwill any more due to negative perceptions of UEA dependence upon, and therefore abuse of, that goodwill in the continuation of staffing freezes, inflexibility of new policies and structures and muddled communications received.

**Success or failure?**

On the whole, interviews conducted during the most disruptive phase of the restructure frequently included predictions that the restructure would be a failure. Even at the time, however, despite the difficulties undergone during the processes some defined success differently.

Nationally – and certainly in the sector, and in the metropolitan area, people did not believe that we would succeed. There was a real expectation that UEA would dissolve and cease to exist. … The very fact that we’re here as one university is a complete success… You know, we’ve got some real problems – we had some real problems with admissions and enrolments and just getting through, and that will probably keep going for the next couple of years. But after that, it's going to be good. I think the fact that we managed to enrol some students and that we've managed to keep some staff, and we've still managed to keep teaching, and we got through graduation this year and, you know, I think that's a success. I think the fact that we're doing it – and we're going to keep doing it, and it will get easier – yeah, that's a success. We restructured – and people didn't think we would. And that's honestly the truth. You go and ask them and they'll tell you they didn't think we would (Senior Exec #26).

As this respondent suggests, success or failure of such a complex restructure and set of systems changes needs to be considered in the broad institutional context.
There was, however, an interim phase between the first chaotic part of the restructure and the current position of the UEA. This was the ‘fix-up year’ that the Vice Chancellor had depended upon for resolving most of the problems caused by the restructure occurred in 2003 and will be examined in the following segment “restructure revisited”.

**Restructure revisited**

Much of the disillusionment and cynicism reported in the first years of the restructure arose from a negative expectation that the painful stage of the first transition of the restructure was a permanent state of being for the 'new' university. One staff member stated during a conversation with the Vice Chancellor, "I'm just realizing I had the assumption that the restructure is finished and this is the way life will be!" (Academic #23). The Vice Chancellor's immediate reply was "God, I hope not!" This was expanded to “And so we are sort of in that dreadful liminal period where things aren't quite working yet… because we're still in the "fix-up" mode (Senior Exec #1).

Approximately 18 months into the restructure the Executive recognised the need to communicate that current challenges and difficulties were part of a transitional phase which they hoped to remedy through a “Quality of Service” campaign. Once the VC and Executive identified the need to "fix-up" (Senior Exec #1) many of the problems and challenges created in the restructure process, a large-scale survey by external consultants was conducted to identify the critical processes that most needed to be fixed from stakeholders' points of view. The “Are you being served?” survey, once finished, precipitated a large-scale remediation and marketing program “Quality of Service” employing strategic planning including stakeholder consultation, information systems planning, some knowledge management practices (although not by that name) re-branding practices and, as a top priority, improved communications.

Five hundred staff completed the survey in 2002, which resulted in the 2003 Quality of Service Program. The Quality of Service Program included the following seven improvement projects:

* Student Administration Processes
* HR Policy, Procedures and Processes
* Strategic Planning and Management Information systems
* Staff Empowerment and UWS Common Culture
* Internal Communications
The rollout of the “Quality of Service” or "fix-up" programs is most visibly apparent in the new logo appearing on signage, business cards, letterheads and publications. Little by little the problems caused by the restructure are being overcome in each of the areas listed by the Vice Chancellor, in direct response to the staff survey. This is primarily evidenced in the frequent posting of emails announcing new policies in each of the core areas addressed, as they are created and published.

In fact it is now possible three years after the initial rollout of the systems changes and well into the second “fix-up” stage of the restructure to begin to gauge the longevity of the public image consequences of the errors involved in the initial rollout at the UEA. (Gioia and Thomas, 1996). During the difficult time that followed the immediate rollout of the systems changes many stakeholders expressed the conviction that it would take “at least ten years before the UEA recovers from the negative consequences of these terrible experiences and all this bad media” (Admin Officer #20; Academic/Exec #12, et al). Yet only three years later the Universities Admissions Centre (UAC, 2004) release of the on-time application preference figures for undergraduate courses for 2004 indicates that the UEA has already significantly redressed its poor status in student preferences. This shift in public opinion demonstrated in market share for core business processes, as demonstrated by the first preference rates in the UAC entry (UAC, 2004), would indicate that despite the highly negative consequences of the original rollout of systems changes and other restructuring problems of 1999 - 2002 in only one year of “fix-up” mode, the UEA has partially recovered public image. This would indicate that the long-term damage to the core business and market share of the organisation due to the debilitating effects of a dysfunctional systems change and restructure has been ameliorated to some degree within one year of highly publicised damage and dysfunction.

Public image, however, was not the only consequence of the failures of the first phase of the restructure. Although fears at the time assumed that public image was
irremediably damaged or that it would take far longer to recover good standing in
the community there were other damages that have yet to be addressed and from
which individuals and groups within the UEA are still recovering. In particular,
systems are still not fully functional to the degree required for smooth business
processing with staff and students expressing continued dissatisfaction at the
beginning of every semester as the enrolment processes continue to be difficult.
Although the staff freeze has been lifted somewhat, a subsequent ban on
employment of casual staff has meant that staff continue to complain that their
departments and divisions are inadequately staffed and supported, with resultant
stress upon the full-time staff. Most of the issues still to be resolved lie in the
fundamental problems first addressed at the beginning of this case study, which is
the role of knowledge workers and the effects of policies and decisions upon
knowledge workers.

**SUMMARY OF FIRST ORDER ANALYSIS OF THE UEA KNOWLEDGE
MANAGEMENT FOR SYSTEMS CHANGE**

The UEA staff consensus was that no knowledge management planning or practice
was applied to the systems changes or the restructure as a whole. Staff also
identified that knowledge management issues such as identifying knowledge worker
roles, arranging for knowledge sharing, lack of archival procedures, etc, were at the
heart of many of the difficulties arising during this time. A minority felt that
knowledge management planning and practices did occur in small isolated incidents
primarily where there was a champion available to plan strategically and fight for
the necessary means to empower their knowledge management strategies. However,
members of the Executive agree that knowledge management was not a part of the
UEA approach to systems changes and to organisational restructure.

The failure to address knowledge worker issues was possibly the factor most singled
out by staff as having significant consequences in attempting large-scale systems
changes and full organisation restructure without knowledge management planning
or practices. This was expressed clearly in terms of the credibility issues that arose
with significant levels of distrust displayed by stakeholders in regards to the UEA
Executive and leadership. Distrust was primarily aggravated by the conflicts
perceived by staff between the genuine goals and drivers of the changes occurring,
the consequent behaviours enacted to meet those goals, the communication made to stakeholders regarding the changes, and the lived experience of the consequences of those changes. These consequences were contradictory as, while in reality governability and fiscal accountability to the Federal Government drove the changes, the Executive and marketing division quoted vision for improved teaching, research and community links as the espoused promotion for the changes; and staff and students perceived disruption to teaching, research and community links the very evident consequence to the actions taken to achieve governability. The result of such publicly visible contradictions was a lack of trust in the Executive leadership of the UEA by stakeholders.

Technology was a critical issue as is common in information systems changes. Primarily the failure to plan strategically for technology purchases or for information systems changes had painful ramifications. Tensions and conflicts arose from the poor management of the information systems changes. These had dual origin first in the refusal of the OVC to resource necessary staffing levels to permit the ITD strategic plan to be carried out or to meet the fundamental needs of the department. The second was the ad hoc means of selecting technologies for immediate or political reasons rather than strategically planned integration for future systems with deferment of integration awaiting the future installation of Callista. The third critical issue cited as causing disruption and IS failure was the failure to implement any information or knowledge management practices when the knowledge workers who interfaced with the vital information systems were changed and replaced. These knowledge workers knew themselves to be vital to the effective running of the information systems but the OVC and the Human Resources Division did not believe this and paid little attention to warnings and the ITD had no time, because of staff shortages, to invest in acquiring critical information from persons departing their systems jobs. Consequently, critical systems such as the student systems were left with no knowledge workers capable of making them run effectively and the results were described as extremely painful by students and academics. Key knowledge workers were removed and new persons put in their place with no attempt to identify, catalogue, store or transfer the core knowledge they had about vital processes.
Difficulties also arose on several fronts by the failure to perceive email as an information management or knowledge management tool. Although email was almost the only facility provided for knowledge sharing no protocols were introduced for either of the electronic media (intranet forums and emails) that were the only viable means of communication for former rivals and antagonists to come together, resolve their differences and build new relationships. Consequently the unmediated use of email inflamed situations and caused considerable anger and distress as different assumptions and cultures directed different uses of the same media with no protocol for their use or mediation of meaning.

No facility was provided to empower or enable knowledge workers from different cultures, backgrounds, assumptions and expectations to be able to engage with or understand one another. Nor was a common lexicon provided to empower information and knowledge sharing and to overcome many of the unexamined assumptions that prohibited understanding between knowledge workers as they endeavoured to come together and surmount the challenges of their former rivalry. Only guidelines such as the requirement that any official groups must contain persons from at least two previous rival members were offered to overcome the antagonism between conflicting cultures. Thus knowledge workers were expected to overcome unexamined assumptions and expectations, established antagonism and historic rivalry to come together in a situation of knowledge creation and knowledge sharing. As a consequence, many groupings of knowledge workers were unable to come together or source the critical information needed to facilitate the necessary processes and frequently failed to accomplish their objectives. However this did stimulate the emergence of champions who planned strategically, incorporated some information and knowledge management practices in their planning and implementation and had the force of character and the political power or position to champion their cause with the Executive.

The widespread demoralisation of the knowledge workers of the UEA was recognised as problems with identity and image and was one of the first seriously negative consequences of the restructure to be addressed by the Executive in the ‘fix-up year’. This was labelled ‘rebranding’ and much effort was invested in addressing the poor opinion held by staff internally and the outside world about the
UEA. Both the new Office of Marketing and Communications and the Media Unit were charged with the task of rebranding the public face of the UEA. The UEA sense of identity was also addressed. New processes introduced were to provide a tacit assurance that things would be better in the future. Such reassurances were received with a degree of scepticism by a staff of knowledge workers who consider themselves to have been "restructured to death" (Academic #23).

The question is raised as to whether the systems changes and the whole restructure of the UEA can be considered a success or a failure. Executives and knowledge workers have different views of the success or failure of the process and which perspective is taken ensures different understandings of the restructure and its success. These differences are examined, employing the sensemaking framework, in the second half of the chapter: “Making Sense of Events”.

**MAKING SENSE OF EVENTS**

This part of the chapter will re-examine the events analysed in the first half of the chapter from the perspective of sensemaking, as developed in Chapter 4. The analysis will start with considering the debate as to whether knowledge management planning, strategy or practices were used during the events studied, the credibility issues that arose through failure to understand the needs of knowledge workers, particularly looking at the cause of, communication about and consequences resulting from the changes instituted.

**NO KNOWLEDGE MANAGEMENT?**

Consensus opinion of the interviewees is that there was no knowledge management practiced for either the systems changes or the entire restructure of the UEA in the 2000-2002 timeframe. The only individuals who do perceive some knowledge management practices at work during that time perceive it on an ad hoc basis, primarily using other words and approaches to describe these practices (eg: strategic planning, risk management). There is no tension between the different levels of perception regarding this issue. The inter-subjective understanding of the senior Executive and those expressed in the groupings of staff members who interacted throughout the processes studied and the intra-subjective view of the individuals
participating in the events agree upon the lack of knowledge management throughout the process. Although it is not a desirable generic-subjective understanding for the UEA it is indeed a subjective understanding collectively shared by the whole organisation. Nevertheless, the views from these three levels of understanding show considerable tension and disagreement as to the particulars of the events and the majority of these tensions lie within the domain of the neglected knowledge management practices. Most particularly, many of the stronger disagreements originate in the failure of the Executive to appreciate the fundamental change of the generic meanings in the transition from three-member universities to a unified institution. This was perceived as inability or unwillingness to value or meet the individual (intra-subjective) and group (inter-subjective) needs of the knowledge workers of the organisation.

**Credibility issues**

Many of the credibility issues evident in the conflicting views between the VC and the Executive on one hand, against the staff and students on the other, are located in the tension between the generic-subjective level of sensemaking and the inter-subjective and intra-subjective levels. More specifically, it could be stated that major tensions reside between the desired generic-subjective level of sensemaking and the actual generic-subjective meanings generated and shared throughout the organisation.

As stated above, much of the credibility loss suffered by the Executive was due to the conflicts between stated and perceived goals of the restructure. As staff were largely unaware of the primary purposes of the restructure and were not informed of the urgent need to make the University governable and meet Federal Government auditing demands they were left to make what sense they could of contradictory information about less critical issues and the random assortment of goals and vision that were communicated from the Executive to the rest of the organisation as the generic-subjective meanings behind the restructure. As many of the lived experiences of the restructure were painful, most sensemaking on the subject was consequently negative and critical.

My personal view is that you can't implement the sort of change we've had – which is one of the biggest in higher education, certainly in recent years – without pain. It's just impossible to do. And I think we could
have done a lot better job in certain aspects of it. But… I would challenge anyone to prove to me that it could be – that there's been one that's similar, that's been done without anyone being upset or hurt or at a loss (Senior Exec #26).

These generic-subjective understandings available to the staff as the purposes of the restructure were primarily contradictory to lived experience. It is an inherent human necessity to make sense of the world and events around us, and the rationale for change provided to staff did not make sense to staff individually (intra-subjectively) or to staff collectively in groups (inter-subjectively). They needed to ‘create’ sense by developing understandings to reconcile the apparent contradictions for themselves. As they were not provided with communications that could reconcile generic meanings from the Executive and their individual sensemaking and collective sensemaking resulted in contradictory meanings they developed mistrust towards the Executive with subsequent disbelief and scepticism.

The stated objectives of the restructure to unify into one university, save money and improve teaching, research and community involvement were highly praised by the Board of Trustees and the wider community and the Executive understood their role in the restructure as sufficiently defined by these objectives. Their commitment to the overall UEA wellbeing to be realised through a complete restructure led them to believe that they had a mandate to design and execute the change. They conducted this change to the best of their knowledge and ability. This involved the change of generic meanings shared by staff in each of the three member universities to a generic meaning shared by the staff of a whole unified university. Generic meanings involve, for instance, shared understanding of educational policies and programmes by both academic and support staff; rules and regulations regarding enrolments, assessment, progression towards and completion of degrees; rules and policies about resource allocation, etc. Each member university had its own generic meanings, widely understood by staff, especially as they were applicable to their particular tasks, for instance the FAO understanding of the new details of the rules regarding enrolments.

All these former member-university specific social structures, policies, norms and regulations were abolished and new ones had to be created. But the creation of new generic meanings is not just a matter of specifying new social structures, policies,
rules and regulations. The essential aspect of the creation of new generic meanings hinges on the meaning of the word ‘generic’. All who will be expected to share in the common understanding of a policy, rule, norm or regulation must participate in the creation of that ‘common’ or ‘generic’ meaning. This is precisely what Karl Weick points to when he says that the essence of organizing is in managing the tension between inter-subjective and generic-subjective (Weick, 1995, p. 72). The Executive understood that to achieve governability their primary task was to create most, if not all, of the necessary unified policies, rules, regulations, structures and norms that in the sensemaking model are called organisational generic-subjective meanings. The Executive believed that by sequentially specifying these new generic-subjective meanings as they were created and by instituting the process of their implementation that these new generic-subjective meanings would be accepted by the staff. The Executive failed to understand that this process in fact was an attempt to impose their assumed meanings upon the meaning-making processes of the staff. As meanings cannot be easily imposed but are created and co-created in internalised and social interaction processes, these attempts to enforce a generic-subjective understanding upon staff failed. This emphasised and increased the tensions already present between inter- and intra-subjective levels of understanding at executive and non-executive levels of sensemaking within the organisation. The Executive whose own inter- and intra-subjective understanding saw sense and integrity in their own decisions did not perceive a need for employees to share the same understanding. They did not realise that staff who did not have access to the executive knowledge of the need to restructure to meet government demands would have to resolve the contradictions between stated goals and perceived experience to make sense of daily events. Consequently, they did not concern themselves about the generic-subjective meaning that could or would then be developed within the organisation. As the explanations the Executive thought appropriate to impart to the staff made no coherent sense to the organisation’s members at their different inter-subjective and intra-subjective levels of sensemaking this seriously inhibited the ability of organisational members to trust the Executive and undermined credibility severely.

Trust was then further eroded at inter-subjective and intra-subjective levels of sensemaking by the lack of trust in the senior staff exhibited by the Executive. Staff
could only make sense of cases such as the Executive refusal to accept the strategic planning of the ITD Division Head or permit him to hire the staff needed to meet his responsibilities, at an inter-subjective level of understanding, by assuming either incompetence or lack of trust on the part of the Executive or incompetence or lack of trustworthiness on the part of the leaders in question. Staff felt directionless and were increasingly frustrated as their work and progress was impeded by decisions not made, opportunities lost, and students severely disadvantaged because the Executive did not trust their own leadership and management personnel enough to allow them to make their own decisions. This impeded the ability of leadership to do their jobs and also debilitated their ability to contribute in an executive capacity to a meaningful generic-subjective level of understanding for the organisation or for their own division. One of the senior Executive analysed this:

the three major causes of disempowerment are the lack of information – particularly feeling ignorant in an area where you need to know; the inability to act upon things that are necessary; and uncertainty about the future (Senior Exec #5).

This summary about disempowerment very accurately described the situation of almost all the staff interviewed at the UEA at this time but was particularly apt as a description for those leaders who were engaged in executive roles but were not trusted with the ability to make the decisions involved in performing their jobs, as illustrated by the challenges facing the Head of ITD. These staff were in an isolated position denied much of the support of their peers with whom they socially interacted at an inter-subjective level as they were officially a part of the Executive yet prevented from taking their place and denied the capacity to understand at the inter-subjective Executive level, through lack of trust or delegation from the senior levels of management. As there was a deficiency of generic-subjective level understandings throughout the organisation, this left such persons without meaningful interaction for sensemaking at either inter-subjective or generic-subjective level.

Poor communication aggravated the disjunction between the sense made of events at the different inter-subjective levels. This was evident in two principal areas. The first was the disparity between stated purposes and goals of the restructure by the Executive and perceived reality experienced by the staff and students raising conflicting inter-subjectively determined understandings of the generic-subjective
realism. In the second instance, it was failure to clarify meaning or to provide common lexicons. One of the driving forces behind the restructure and systems changes was the need to eliminate the triplication and divisiveness caused by having three separate members and three sets of extra-subjective or cultural understandings and to unify to a single entity. It is therefore a rather extraordinary omission that the Executive did not first create a common lexicon to harmonise communications, since they knew that there were three different cultures, three different conceptual approaches and three different vocabularies in play. Communications continued to take place electronically and face-to-face with common misunderstandings stemming from conflicting vocabularies and unexamined assumptions such as ‘when you use that word, you mean the same thing that I mean when I use that word’. At every stage of the restructure the ability for persons coming from three different cultures with three different established extra-subjective understandings and three different vocabularies to communicate meaningfully at the inter-subjective level was important. A generic-subjective level of understanding or meaning-making common to all was critical but a common lexicon was not created by communication, understanding, and sense or meaning-making. Both the lack of provision of a common lexicon and the lack of an email protocol were significant omissions that impeded the change process, added to the difficulties involved at the intra-subjective (individual) and inter-subjective (social interaction) levels and debilitated necessary communications during the process of changing systems across three different cultures. Furthermore it prohibited or slowed the development of a unifying new extra-subjective set of common assumptions, perceptions and unifying cultural identity.

The misunderstanding between the number of persons who believed that their emails went unnoticed and unaddressed against the OVC conviction that the VC read and answered every email personally can possibly also be understood by considering the tension between the different sensemaking levels. The original commitment by the VC to answer all emails was an attempt to bridge the gap of sensemaking between the different inter-subjective and intra-subjective levels of understanding expressed by Executive and staff and to develop a generic-subjective perspective of trust and communication that would be valid for all UEA staff. Evidence suggests that in the earlier stages this was successful with the small
number of persons who first engaged in email correspondence with the VC. There was a sense of engaged social interaction with the senior representative of the Executive and a belief by those staff that they were ‘listened to’. However, once the OVC started participating in the process of honouring the VC’s commitment to read and answer all emails, this process lost any sense of social interaction at an inter-subjective level of communication between staff and VC and became part of the bureaucratic method of dealing with staff. From this point on dissatisfaction started with complaints that staff emails were ignored. It is possible that the staff who took on responsibility for the VC’s email had a different interpretation of the meaning of “read and respond to every email”. If they made sense of the phrase “every email” as “every important or relevant email” they would screen emails they thought redundant or unnecessary. This would cause unanswered emails to be a contentious issue with the senders who received no reply. Alternatively, the OVC staff could have replied on the VC’s behalf where the recipient of that reply considered this to be a ‘brush-off’ instead of a reply by the VC. What really happened can only be speculation considering the evidence brought to light so far. But whatever the cause of this conflict, interpretation through the sensemaking framework, and the understanding it provides of the events at the inter-subjective and intra-subjective levels, suggests a failure on the part of the Executive who perceive the same event from an entirely different intra- and inter-subjective level of understanding than the staff. This conflict in understanding the same event further aggravated tensions between sensemaking levels that were already high at the stage of the restructure when Executive failure to communicate adequately was a constant complaint.

An executive administrative officer in the OVC, when discussing the VC’s commitment to a personal response to all emails spoke of the effort entailed in following through this commitment. “… it was a hugely onerous task but it was an important one and it is only information overload (Admin Officer/Exec #16). [emphasis added]. This quote, although specific to the subject of the VC’s emails, raises another important issue. The executive explained her surprising phrase “only information overload” that: “in context, every additional piece of information is value-adding”. It was, however, an indication of a prevalent attitude toward information management throughout the Executive that was highly relevant to many
of the decisions made in the process of the systems changes in this restructure. The concept of “only information overload” as if information overload is an insignificant issue highlights the casual attitude taken to information, information management, information systems change and the stress that devolves on the human factor in systems change when it is mismanaged. When everyday information management is perceived as a minor and insignificant thing and the profound effects of information overload on humans is passed off with an “only”, it is not surprising that the higher order knowledge management is disregarded as unimportant when planning for systems changes and organisational restructure.

**STRATEGY AND TECHNOLOGY**

The perceived lack of trust by the Executive expressed in the failure to delegate was also an important component of the failure of critical systems changes because the Executive did not permit the ITD director to hire the staff he needed to meet the ITD commitments and obligations. It is important to note that this is unsubstantiated perception. The OVC ignored or overturned the strategically determined staffing needs of the ITD Heads of Division and insisted upon an externally imposed predetermined figure that was insufficient to the task. It was intra- and inter-subjective meaning making that perceived this as an indication of lack of trust despite official statements from the OVC indicating belief in the competence and trustworthiness of the ITD. Whether the reason the OVC failed to trust a Divisional Head to determine his own staff needs and hire the necessary personnel immediately when he needed them was caused by lack of trust or had some other origin, the sense made of this event by both ITD staff and the other staff and students was negative and meant that the ITD were unable to conduct their fundamental business processes to support the core business processes of the university.

The combination of lack of strategic planning at a whole-organisation level combined with lack of delegated ability for senior staff to hire necessary personnel at a divisional level led to critical systems failure and was detrimental to the ability of the ITD to execute successful systems and technology changes. The irony in this situation is that, as a Divisional Head, the ITD Director is an executive member of staff and might be expected to participate at an inter-subjective level of
understanding with the senior Executive yet was unable to do so. This was debilitating for his ability to fulfil his function as an executive leader as he had to operate from and carry out instructions issued from the senior executive without the necessary understanding that would have been gained through both the Executive level inter-subjective understanding and the failed generic-subjective level of sensemaking in organisational communication.

Another issue overlooked in the early stages of the restructure was the need for information and knowledge management at all levels of the organisation. Once the severity of the problems raised by failure to use information and knowledge management practices were recognised these approaches to management and change management were still neglected on the basis of ‘too late’ and ‘too hard’. At senior Executive level a decision was made to remove from the systems the Faculty Administration Officers who were key knowledge worker personnel with information critical to the smooth flow, process and implementation of the various systems. According to the FAOs thus removed, no attempt was made to discern the FAOs’ role, the information they considered necessary to the functioning of the systems, or their knowledge of the people and processes involved. With none of this critical knowledge sought, required or utilised there was no official generic-subjective understanding of the role of FAO. With no one assigned responsibility to develop the inter- or intra-subjective understanding of the role from either the FAOs themselves or those who interacted constantly with the FAOs the new Timetabling Officers had no way to know what rooms contained which facilities or what courses and subjects required which facilities. They also had no one to ask, and no simple way of obtaining this information. The Timetabling Officers interviewed were excited about the potential of their new role to service the academic and student community but acknowledged that it would take a long time to learn the basic information they needed to be able to fulfil their tasks adequately as all this knowledge and information that had existed in the minds of the FAOs now had to be re-created. This process has now taken nearly three years and is only now nearing completion. It may have been unnecessary had KM practices been in place for the exchange of information when FAOs left their positions.
Similar consequences followed the elimination of the role of FAO for students’ enrolment and registration. Most of the duties previously conducted by the FAOs were reassigned to the new CSS officers who did not know and had no means of knowing the students, subjects, courses, lecturers, facilities, prerequisites, special needs and so on that were all critical information for assisting students in deciding courses and subjects and correctly enrolling in subjects and tutorials each semester. The former FAO officers interviewed stated that they were given no opportunity to create documents communicating their standard operating procedures or to share their knowledge about these tasks with new personnel in any way. They were, in fact, expressly forbidden by senior administrative staff to do so and similarly forbidden to ‘interfere’ in the new process or communicate with the students when they sought their help. The reason the FAOs were given for this embargo was to facilitate a rapid transition to the new system from the old by denying access to old systems and forcing users to become accustomed to using the new system. While the motivation for the ruling that FAOs were not to share their knowledge in the new system was admirable it failed because no knowledge sharing was instituted to enable the new system. Although core information in databases was transferred from one set of users to another the knowledge workers operating these systems did not have access to knowledge or information transfer. Three years later students still state that they have difficulty enrolling in subjects and tutorials and do not have any one they can turn to who knows all the collated information critical to their needs that the FAOs used to know. This very simple omission of knowledge sharing from FAOs to new CSS Officers or new Timetabling Officers resulted in a further lack of generic-subjective understandings in critical areas of organisational need. The disruption of old systems for new without KM processes to facilitate the changes caused disruptions that, while lessening somewhat each year, have now continued for four years. These disruptions and malfunctions in organisational processes such as student registration and enrolment are suffered at the intra-subjective or individual level for students and the inter-subjective or social interaction level for the academic and administrative staff that have to deal with student distress and inability to find necessary information.
CHAMPIONS

The success of the leaders who championed their Division’s restructure successfully can be explained by their capacity to resolve the tensions between inter-subjective meanings and between generic understandings as they existed and as the Executive desired them to be. These champions were capable of articulating intra- and inter-subjectively created meanings to the Executive. They also had the power to insist upon the Executive ameliorating their policy making and negotiating the subjective generic that the Executive intended to create to meet the needs of the staff to be able to fulfil the roles the Executive wished them to accomplish.

So very much front up, I basically said to them, “if you want me to … you have to be willing to accept that ...” … I then got a tick to go about that…. Management were quite satisfied with the structure” (Senior Exec #2).

For example, the Head of Financial Division explicitly linked the capacity to accomplish a task with the particular structures and policies necessary for that accomplishment. His position was relatively straightforward. If the Executive wanted a goal such as reduction of staff to be successfully accomplished, they needed to accept the conditions required for their fulfilment. Yet other leaders within the restructure were not able to negotiate their equally critical needs so successfully. This was very evident in the ITD where the necessity for adequate staffing policy was critical to the ability of the whole UEA to negotiate the restructure successfully. The Director of the ITD was unsuccessful in his attempt to make this clear to the Executive. There are various possible causes for the Executive’s inability to hear one Division Head’s negotiation of critical needs while paying attention to and modifying policy for another’s. One such possibility is that the Head of Finance had historically achieved a higher status and was consequently perceived as having the right to negotiate equally at an inter-subjective level with the Executive. With previously established executive credibility, this person was able to address the Executive and be listened to by the Executive on an inter-subjective level. There is also the likelihood that the Executive understood the role of Finance and Accounting, that ‘accounts receivable and payable’ were familiar language and that, as fiscal accountability was a primary goal of the restructure they were consequently open to listening and being persuaded.
It is evident that the Executive did not understand the needs of the information systems and technology changes or the impact that understaffing in this department could have upon the whole organisation. The role and costs associated with IS and IT seem to have been unclear to the Executive and given less credibility than the role and costs associated with finance. If staffing policies had been determined with an understanding of the issues involved in the IT and systems changes, the consequences of inadequate staffing would probably be clearer and very different decisions may well have been made. As in the instance with the removal of the FAOs from the information systems, those persons who understood the situation were clearly and easily able to predict the damaging consequences of the decisions made by those who did not understand. In this case the IT Division Head was fully aware of the dangers of understaffing this critical area for UEA staff and students. As was the case with the FAOs he was unable to communicate this to the Executive who did not understand and consequently made decisions severely detrimental to their own goals for the restructure. This failure to negotiate meanings or policies at inter-subjective level between divisions resulted in a generic-subjective view within UEA that the IT Division was incompetent as they failed to meet the needs of the restructure. When the negative consequences of understaffing in the ITD had impeded restructure processes to the detriment of staff and students for over a year and to a degree highlighted by unfavourable press coverage staffing policies were finally reversed and the ITD given sufficient personnel to meet the tasks assigned to them. Rapid implementation of new policies and fulfilment of assigned tasks quickly evidenced competence and organisation in the ITD (see Appendix 11) but the negative generic-subjective opinion built during the dysfunctional stages of understaffing has taken time to change to reflect the new competence.

The few areas in which inadequate staffing or inflexible policies did not result in dysfunction were those areas led by a ‘champion’ able to negotiate with the Executive. In the Finance Division that successfully managed a smooth and relatively painless transition for the unification of three former departments into one Finance Division, the champion was the Divisional Head. Thus he was a senior executive of his own Division and part of the official Executive of the UEA with a comprehensive understanding of the generic-subjective meanings attributed to
language and policies within his own Division and throughout the organisation and the inter-subjective meanings attributed to language and policies within the Executive. He had clearly defined strategic plans, was able to state his case, defend his planning and insist upon his competence in his own area of expertise thus causing the OVC or senior Executive to modify their policies and requirements to enable those strategic plans to be realistically engaged and therefore successfully applied.

The director of the ITD was also officially a part of the Executive but was not empowered to engage in social interaction at an inter-subjective level as an executive peer with the OVC. It is not possible from the evidence available to determine why he was unable to champion the needs of the ITD strategic plan to the OVC but the consequences are clear. He was functioning in a critical executive role responsible for the generic-subjective level of understanding within his own vital Division in the process of critical systems changes. Yet he was unable to engage in social interaction at the Executive inter-subjective level to the degree necessary to negotiate changes in unacceptable policies and expectations from the OVC thus the ITD strategic plan was compromised. “Organizations in all fields suffer when key employees cannot effectively influence upper management” (Goldsmith, 2004, p. 20). The ITD division was consequently forced into the untenable position of engaging in systems changes with no viable strategic plan, inadequate resources for accomplishing the necessary processes and deadlines which could not be met under the given conditions.

Although there is inadequate evidence to determine why the ITD director could not champion his cause adequately to achieve the necessary compromise from the OVC in modification of Executive policies, it is clear that this situation reflected a failure in creation of a generic-subjective level of sensemaking for the organisation.

Organisations will need to do much more than just provide communication technologies and digitalised information; they need to investigate new ways to assist all participants at varying levels throughout an organisation to engage reflectively across contradictory discourses to explore in greater depth different beliefs, values, assumptions. As such they will need a willingness to disturb the social relations of power that inhibit, control and ignore knowledge sharing and co-creation processes (Treleaven, 2004, p.33).
The creation of generic-subjective meanings is not something that can be imposed by the Executive but must be created with mutual negotiation of understanding and meaning-making through the different levels of the organisation. Policies established at an Executive level without reference to the sensemaking and understanding of employees and other stakeholders are vulnerable to the kinds of failure evident in the ITD story (Treleaven, 2004).

CULTURAL BARRIERS

The cultural barriers that were identified above in the discussion about merging three antagonistic institutions permeated all levels of sensemaking throughout the former members and the ‘new unified’ UEA. To overcome some deep cultural barriers, generic-subjective structures and protocol were needed. Email was the primary and almost the only form of common communication available to all staff but without an email protocol structured, assumptions and resultant miscommunications proliferated at all levels of bureaucracy and academe as people engaged in well-meaning attempts to communicate but were hampered by critical deficiencies. These deficiencies included different vocabularies, different goals and different approaches, all based on unexamined assumptions. Without any formal protocol or alignment of vocabularies or means to identify cultures, recognise multiple meanings or even become aware of the conflicting assumptions, it was almost impossible to make sense of each others’ behaviour except in the most negative sense.

Various staff members interviewed state that they were willing at the time to come forward and negotiate, give a little, work together, ignore past rivalries and endeavour to form the best possible solutions together. They also believed, after attempting these negotiations, that the other stakeholders were not so willing but were deliberately obstructive or caught up in organisational politics. In most cases it would appear that all stakeholders did come together in an attitude of willingness to compromise but their conflicting inter-group vocabularies, approaches and assumptions about their own meaning and others’ meanings at the inter-subjective level of sensemaking caused frictions and apparent resistance to collaboration that reduced potential for understanding and productive outcomes. As nearly all conflicting parties state their willingness to collaborate and negotiate in nearly every
incident. It is arguable that a key deficiency was a normative set of protocols and lexicon to facilitate that willingness so that sensemaking would have cohered around shared understandings instead of fracturing against conflicting interpretations of the same words and events.

Without the vital aspects of a generic-subjective understanding of organisational norms, expectations, protocols and structure to facilitate these critical communication and negotiation processes of social interaction and inter-subjective understandings between inter-group stakeholders from different extra-subjective cultures, well-intentioned attempts to communicate and inter-relate were unsuccessful and cross-cultural barriers remained in place.

IDENTITY AND IMAGE… GOODWILL UNDERMINED

One of the primary reasons for the restructure of the UEA and the forced drive for immediate systems change was the need to present a unified image and be more accountable for Government (Senior Exec #1). However, most of the identity and image issues identified through interviews as impacting negatively on staff morale were responses to mismanaged systems changes. At the Executive level the UEA was heavily engaged in aligning systems as rapidly as possible to restore a generic-subjective image of accountability, governability and organisational viability for government auditing and for professional standing amongst other universities.

With such a clear focus on changing the external accountability, internal attitudes to identity were over-looked. Many of the staff interviewed expressed resentment at being taken for granted in this manner. From both individual (intra-subjective) and the social interaction (inter-subjective) level perceptions the Executive moved people around, eliminated jobs, shuffled others, reshaped the organisation, left stakeholders uninformed in some issues and misinformed in others and generally paid no attention to the needs of a generic-subjective level of understanding for the organisation as a whole. This was identified by academic and administrative staff as including double work loads, duplicated work as technical systems dumped or lost work already done, minimal or no support staff, bewildered and angry students, uncertainty as to their own positions, and the need to “make it work for the students anyway” (Academic #22). These staff members expressed the belief that
they had been extending goodwill to the UEA for a long time even before the restructure due to staffing freezes and the need to “not let the students suffer because of incompetence up top” (Admin Officer #21) but that they now felt their goodwill was being abused even while they recognised that most of the complaints were specific to the consequences of a large scale restructure and systems change.

The Executive was not oblivious to this detrimental situation but considered it inevitable during the messy stage of implementing the systems changes and postponed addressing the need for improved staff morale until the ‘fix up stage’ or phase two of the restructure (Senior Exec #1). When the time arrived to launch the ‘fix up stage’, these previous deficiencies were identified and addressed.

…but certainly at this stage, the Vice Chancellor recognises that there is no use simply keeping crisis management going. And that's what's been happening, in particular in Student Admin. And in Planning, frankly. We don't plan, other than for a disaster. Now we need to get out of that environment. We have to plan for normal business (Senior Exec #2).

The survey stage of this “Quality of Service” phase was called “Are you being served?” the title of which is a recognition on the part of the Executive that they needed to provide generic-subjective understandings, norms and protocols for persons at the other levels of the organisation who had grievances to be addressed.

**THE QUALITY OF SERVICE PROJECT: SUCCESS OR FAILURE?**

Phase two of the restructure, the “Quality of Service” project, was initiated by surveying staff, students and local community with the question “Are you being served?” Answers were catalogued to formulate a strategic plan to start reshaping generic-subjective understandings and to address other critical issues that had been relegated to second place for the immediate changeover of the systems and technology that supported auditing and accountability. Almost the first consequence of the survey was an understanding that this was ‘the absolutely last chance for the university to get it right’ (Senior Exec #2):

…the message that the University has got out of this – and I've made sure that the senior management have got it – is ‘don't not do anything now, and then ask us in a year's time what the problems are. We've told you the problems – fix it’ (Senior Exec #2).
Staff attendance at the public forums held for the Quality of Service project was significantly lower even than staff attendance during the earlier forums held for phase one of the restructure. A commonly expressed reason was: “they’re not going to listen to us so why bother?” (Admin Officer #20). Yet despite a great deal of scepticism from individuals (intra-subjective) and the social interaction (inter-subjective) level generally during the “Are you being served?” phase of the restructure, the follow-through for the Quality of Service Project has slowly started reducing some of the causes of tension. Specific changes included improvement of both identity and image with active promotion of UEA successes and triumphs in self-generated and wider media; a better-looking website and intranet that functioned more effectively and communicated a more professional image; many new processes for internal communications including some email protocol, newsletters and college or divisional magazines and e-zines; recognition awards for academic, administrative and technical staff; and the regular publication of new protocols and guidelines with careful distribution to the knowledge workers engaging with the policies involved.

Within two years of the second phase of the restructure, new systems usage has become less difficult as personnel start to absorb and learn their new jobs and redevelop the information and knowledge that was lost in the first stages of the systems changes. Resentment and complaints at individual (intra-subjective) and the social interaction (inter-subjective) levels have been reduced in some areas. Most notably, areas of organisational memory loss (Treleaven & Sykes, forthcoming) are slowly being reduced as staff in new roles, such as CSS officer or Timetabling Officer, learn the requirements of their job and gradually rebuild the knowledge lost four years ago with the displacement of the FAOs. It would appear from the reduction of confused ‘anybody know?’ emails that there is less uncertainty about decision making as emails are regularly posted with new generic-subjective policy statements and information about delegation of authority and decision making roles. This raises the issue as to why these critical measures were left to a ‘fix-up’ stage and how they needed to be incorporated into initial strategic planning for the systems and technology changes.
SUMMARY OF THE UEA SYSTEMS CHANGE STORY

On the whole the systems and technology changes undertaken for the UEA restructure suffered from a lack of strategic planning due to urgency-driven focus on immediate gains of fiscal accountability at the cost of core business processes and the wellbeing of stakeholders. One important aspect of the lack of planning was in the failure to provide a more transparent generic-subjective level of understanding in key issues for the organisation. There is evidence that the lack of adequate planning was based on an assumption that systems changes are inevitably messy and painful at the time of change and that anticipated unpleasant consequences can be addressed in a subsequent ‘fix-up’ mode. Such an assumption overlooked the strategic planning, information management and knowledge management practices that could have prevented and ameliorated much of the ‘inevitable’ mess and pain. It could also have contributed instead toward a healthier and agreed generic-subjective level of understanding on critical issues. There was failure to communicate clearly with the staff and students in such a manner as to permit them to make sense of the events that were disrupting their work and workplace. This lack of communication left employees and students to make their own meanings for the dysfunctionality they were enduring. There was a need for common lexicons and new protocols to facilitate communication at inter-subjective level where previous extra-subjective cultural barriers made communications difficult. A failure to provide generic-subjective understandings compounded with a failure to either communicate with staff making sense at the inter-subjective level or to provide facilitation to improve communications within the inter-subjective level led to conflicting and negative understandings of events and further impeded successful implementation of the critical systems changes.

A subsequent Quality of Service campaign to address issues, plan strategically and to listen to stakeholders’ needs and implement required changes has evidenced that strategic planning, improved communications, and strategically planned information and knowledge management processes can contribute to a healthy organisational generic-subjective level of understanding. This strategic planning and resultant action has accomplished some positive results within a year such as the reshaping of external image and new and more positive perceptions of previously negative situations such as the generic-subjective appreciation of the ITD. Therefore the
study raises the importance of generic-subjective level strategic planning, information and knowledge management and communications practices employed in critical systems and technology change processes.
Chapter 7  Contrasts and Comparisons

In the preceding two chapters, two case studies were presented. Both the Australian Bureau of Statistics (ABS) and the University of Eastern Australia (UEA) cases focused upon the knowledge management methodology used by the organisation at a time of implementation of information systems and technology change. Both were examined for knowledge management practices, although it was clear that the ABS purposefully engages in knowledge management practices, and the UEA does not. This contrast raises the question “What can we learn from the differences and similarities of these two cases?” In this chapter, the two cases will be analysed comparatively with emphasis given to the understanding raised by employment of the sensemaking framework for analysis.

Dissimilarities and Similarities

The theme topics discussed in each case study (see table 7-1 below) highlight some of the comparisons between the two cases. Where the ABS case study has ‘origin of knowledge management initiative’, the UEA has ‘no knowledge management?’ The ABS case study has a heading ‘conducive culture’ whereas the UEA has a heading ‘cultural barriers’. Nevertheless, there are points of similarity as well as differences between the two cases when considered through the lens of sensemaking theory. Tensions arising between sensemaking levels include the origin of systems change with particular emphasis on vision and on leadership; strategic planning and the role of technology to support strategy and core business processes; and cultural considerations.

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Table 7-1. Discussion headings for each case study: Parallels in ABS and UEA case studies
These similarities and dissimilarities will be briefly rehearsed in the first part of this chapter, and then their relevance to knowledge management methodology will be examined in the second.

As can be seen in table 7-1 above, the same issues are important in an organisation that does not practice knowledge management as in an organisation that does. This chapter will revisit the headings as presented in table 7:1 to examine the parallels. Then it will examine the methodology behind the ABS and the UEA knowledge management practices.

**APPROACH TO INFORMATION SYSTEMS CHANGE**

In each case investigation into the origin of the organisation’s systems and technology change raised issues about sensemaking at the generic-subjective level and the leadership driving the change. In the ABS the leadership drove a top-down rollout of new groupware technology to advance and accelerate core business processes in a strategically determined manner. In the UEA the leadership drove a complete systems change as part of an entire organisational restructure to address a crisis-level need to improve governance and accountability. In both cases the information systems changes affected the whole organisation and all key systems supporting the organisation’s core business. In each case the key proponent and driver behind the systems change was the leadership of the organisation. In both cases the information systems affected the whole organisation and was directly related to and impacted upon core business processes. Thus the first points of similarity between the two organisations are: the decision to completely change information systems; senior executive leadership precipitating and directing the changes; whole-organisation involvement and impact; and information systems involved critical to core business processes of the organisation. The one immediate difference between the two is that the ABS conducted the information systems change as part of a Knowledge Management Initiative using specific and deliberate knowledge management techniques whereas the UEA did not.

Looking at these simple comparisons from a sensemaking perspective, a key factor is that the Executive of each organisation chose to take action that would drastically affect the established generic-subjective understanding, policies, norms and
behaviours of their organisation. In doing so they undertook to replace a considerable portion of the organisation’s old set of understandings, norms, and policies with a new set. Again the significant difference between the two was that the Executive of the ABS was aware that the information systems change could disrupt all normal functioning and understanding and would need careful marketing, monitoring and knowledge management arrangements to make this a non-disruptive process and to provide a smooth transition from the old generic-subjective understanding of the organisation to the new. In the UEA there was a lack of awareness of the kinds and types of disruption that would eventuate with the changes made to the information systems, particularly the people-related changes, and no marketing, monitoring or knowledge management practices were put in place to effect the changes, protect against corporate memory loss, or ameliorate the dysfunctionality arising from changes that disrupted the fundamental generic-subjective understandings and operations of the organisation. Consequently, the ABS information systems change was a smooth transition from one system to another with little disruption or malfunctioning in systems or people whereas the UEA information systems change was a disruptive process that did not permit effective rollout of the new technology involved. This will be discussed more particularly in the section on Strategy and Technology.

LEADERSHIP

Further differences arise from the persons and styles of leadership in the two disparate organisations. These are specifically pinpointed in the four headings: Leadership-driven and top-down; Knowledgeable Leadership; Credibility Issues; and Champions.

Both organisations’ information systems changes were leadership-driven and top-down. The primary difference is that in the ABS this was expected and transparent.

He’s ‘The Statistician’ when it’s a case of what the business does. He’s a CEO when it’s a leadership and administrative side… he has a statistical background. But he also – he runs – he runs the place. He’s got deputies who do a lot of the work for him but he makes the decisions (Exec #H1).

In the UEA, there was a claim that much of the changes process would be driven from the coal-face and built bottom-up. Many of the negative perceptions
associated with this claim arose from the misunderstandings or miscommunication in the difference between consultation and collaboration.

I think people thought that consultation meant collaboration and it doesn't. You know, I think people thought they could re-negotiate the guidelines; they could interpret them any way they like (Senior Exec #0).

In the UEA only consultation was promised, not collaboration, and some consultation did occur. However, the bottom-up process that was promised only eventuated for some and not others due to the lack of clear guidance, unambiguous policies and workable structure at generic-subjective level. Lack of normative guides and stability for the generic-subjective level of sensemaking within the organisation resulted in organisational insecurity and instability during the change process.

Similarly, the topic ‘Knowledgeable Leadership’ arose in the ABS demonstrating at the most senior levels of executive leadership an awareness of the values, principles and practices of knowledge management. The result is an Executive that is supportive of knowledge management practices and incorporates them and relies upon them in strategic planning for the organisation. The UEA Executive were unfamiliar with knowledge management concepts and so did not incorporate knowledge management practices into their own planning.

In this case, the success of the systems change in the ABS and the problems with systems change in the UEA are directly attributable to the understanding of the role of knowledge management strategy and practices in supporting every aspect of core business at all four levels of sensemaking. This understanding begins with clarity of goal, and that goal being people-centric:

the ABS is fairly up front when they say what they want to achieve in knowledge management – and that's not the management of knowledge. They just want to enable their knowledge workers to have access to data when and where they need it rather than try to manage knowledge or the way people work (Knowledge Worker #A4 KMI).

The effect of this people-centric goal is seen in the impact upon the individual worker and the intra-subjective understanding of the situation, inter-subjective communications and social interactions and interrelationships, the generic-subjective aspect of organisational understanding and functionality and the escalating effect upon the whole organisation through the extra-subjective cultural level. Where knowledge management practices are an integral part of systems
change clarity and transparency of changes and consequences are marketed and monitored carefully to enable all individuals a clear intra-subjective understanding of their role in the organisation, the changes, and of any consequences of change likely to affect them. In the ABS, before the unstable period of the change itself, individuals’ needs and responsibilities were evaluated and knowledge sharing practices put in place to permit individuals to find at their disposal the knowledge they need and to be prepared for and able to transition with the changes as they were instituted. Thus at an intra-subjective level of understanding individuals did not need to make sense for themselves of the events occurring as the events made sense in the light of the clear communication from the Executive. Similarly, at inter-subjective level groups understood their role in the changeover of systems, understood the impact the changes would have on their work, the reasons for the change and any expected consequences, whether negative or positive, before the changes began.

At the instigation of the systems changes at the UEA there were no knowledge management practices in place. Consequently, at the intra-subjective level individuals were insecure and many were fearful for their employment status as they had old administrative roles removed from them and they were placed in new roles and almost without exception in new responsibilities for which there was no job description and no means to access information or a knowledge repository to help them understand or come to terms with their new commitments. Thrust into a situation which daily made no sense, employees were obliged to make sense of events for themselves at this intra-subjective level of understanding. At the inter-subjective level groups were disrupted and new groups formed through the shuffling of individuals. Communities of practice were disbanded and new groups were formed of individuals destabilised at their own intra-subjective level of sensemaking with no arrangements to reassure or restabilise them and no facility provided to empower the formation of new communities of practice. Similarly, no facility was provided for knowledge sharing, for communication, for the rebuilding of or creation of new group dynamics. Inter-subjective meaning-making consequently became an exercise in sharing and rehearsing the negative intra-subjective meanings that individuals had derived for themselves in the absence of credible explanations from the Executive.
In the ABS credibility issues were not a problem as there was a culture of trust in the integrity and competence of the Australian Statistician and the senior leadership. The questions of credibility that arose were suspicions that the Technical Services Division might be pushing the organisation to use certain technologies to meet a TSD agenda. Other than that integrity and trust are the norm as there are clear, consistent and undisputed policies and practices in place in the ABS. From the sensemaking perspective, a number of factors contribute to this but the over-riding factor is harmony between the four levels of sensemaking. At both intra- and inter-subjective levels individuals are aware of the transparency of leadership decisions through the stability and consistency of the generic-subjective understandings of the organisation. Stability in the generic-subjective aspects of organisational structure of the ABS is also consistent with stability in the extra-subjective understandings inculcated through a long-standing and well-established culture of trust and integrity and established organisational norms such as loyalty, knowledge sharing and equal access to knowledge.

In the UEA, the situation was very different. Lack of transparency and lack of clarity in policies, procedures, norms and expectations meant that generic-subjective sensemaking in the organisation was ambiguous and unstable.

So I think what we're doing at one level is managing information well but not managing understanding well. We're getting information out into the public arena but we're not insuring that the recipients understand it and cross check their knowledge against us (Senior Academic #4).

The generic-subjective instability caused by ambiguity in policies and norms compounded the lack of coherent extra-subjective understanding caused by three antagonistic cultures that had no common set of extra-subjective understandings. Individuals at intra-subjective and inter-subjective levels of understanding had to make sense of their own individual and group situations in circumstances of uncertainty and disruption where events that were an everyday part of their life were unpredictable and sometimes in contradiction to the stated objectives of the leadership. Consequently, the intra-organisational understanding throughout the restructure was one of distrust of any generic-subjective understandings promulgated by the UEA Executive.
One aspect common to both organisations was the emergence of champions for knowledge management. The ABS was fortunate in that the principal champions and proponents of KM were the executive leadership who had the power to shape the course of the restructure and ensure that knowledge management principles were a part of strategic decisions relating to systems or technology changes. In the UEA the champions who arose to meet the needs at the time of the restructure had power to challenge decisions that would not support the strategic and knowledge management practices they wished to implement within their own departments but did not have power to influence policy-making or executive decisions for the rest of the organisation.

**Culture**

One similarity between the ABS and the UEA that was evident was that the leadership of each organisation was very well aware of the culture of the organisation. In the ABS that awareness was a matter of pride and a comfortable confidence that the culture could be built upon and trusted as an integral part of strategic planning for the organisation.

The ABS really looks after its people here. Now you ask people who've been here 30 years or something and they won’t think so. They think what we’ve got is normal. They have no idea how good they’ve got it. But ask anyone who’s come here from another place, and they’ll tell you how much better it is here. It's definitely a caring workplace” (Senior Exec #A1).

Even for technology shifts and systems changes culture was taken into consideration and relied upon as an important foundation for changes.

… people’s day to day work operations changing so there’s more capability to document things – the culture of documenting things. We love documenting things. And probably always have (Knowledge Worker #A7).

It also guided and shaped changes so that they would accomplish the desired objectives but not destabilise or be detrimental to the existing culture. In fact, in the ABS it is a standard leadership practice to ensure that any changes deliberately made at generic-subjective level take into account and will be beneficial to the extra-subjective level as well. Thus the major systems and technology change that was
undertaken as part of the KMI, rolling out Lotus Notes® to the entire organisation, 
was built upon a culture that was prepared for and supported the requisite changes.

The UEA leadership faced a much more difficult challenge. One of the driving 
forces behind the need for the major restructure that demanded a complete 
reshaping of information systems and that meant considerable technology changes 
was the fact that the three member universities of the federated UEA were of such 
conflicting and antagonistic cultures. “...a lot of them had never met one another. 
And people would actually say – “are we allowed to talk to someone from [other 
member]?”” (Senior Exec #1). Thus there was no stable existing culture upon 
which to build. Decisions regarding the necessary systems changes had to take into 
account rival cultures to the degree that some choices were politically geared to 
placating jealousies between the separate cultures and not necessarily the best 
choices for the organisation and the systems it required (Senior Exec #1). Thus for 
the systems change the Executive undertook to change the generic-subjective 
understandings of three hostile organisations while simultaneously erasing three sets 
of adversarial extra-subjective understandings, climates and ways of life. The focus 
of the Executive seems to have been on the constructing of new normative policies 
and the elimination of old cultures rather than the construction of new cultures, as 
not enough attention was paid to create or develop a new culture or to retain and 
nurture those aspects of prior cultures that deserved recognition and continuation. 
The hostile extra-subjective understandings were left to disappear through natural 
attrition as the individuals from each culture were reshuffled into new roles and 
positions that alienated them from their old environments. The approach 
apparently taken by the UEA Executive was to rebuild a new organisation at 
generic-subjective level and allow that to eventually and naturally spill out into and 
develop a new extra-subjective culture over the years. This has, in fact, begun to 
happen to some extent some four years into the restructure and after the initial 
systems changes were instituted but it has been a slow and imperceptible, 
unplanned and unsupported process for the most part.

Another aspect of the cultural issues relevant to both organisations is that of 
identity and image. Because of the cultural climate of the ABS and its image and 
international reputation as the best statistical agency in the world, there was a strong
and healthy identity held internally at the ABS, even amongst disgruntled employees. “I'm proud to say, we do the job extremely well. That people – certainly in this office – are enormously capable” (Knowledge Worker #S2). This pride of identity and awareness of international image was an important aspect of the established culture of the ABS and the positive extra-subjective understanding shared throughout the organisation.

In the UEA, however, identity and image were negative factors contributing to the cultural barriers inhibiting effective systems change. The three disparate organisations and cultures of the old federated network created a confusing and unimpressive image of the university to the external world, particularly to other universities and governmental agencies, and the UEA’s standing in the academic world suffered accordingly.

I remember that, when I chaired the National Review of Nursing Education in ’94 that we took very little notice of [UEA], because we gave up trying to understand it. It had three nursing degrees in three separate colleges and they couldn’t speak with one voice and we couldn’t even find who represented them and in the end we said to one another “it’s really weird, isn’t it!” and went on focusing more on the universities that could speak to us coherently (Senior Exec #1).

Consequently, even in the three separate network members that comprised the old UEA identity was often a problem with negative self-perceptions in many cases. When image was compromised more severely through disruptive incidences throughout the restructure and systems changes, and particularly when these incidents were widely publicised with critical negative press, identity suffered even further. Working within an organisation that was in flux at an extra-subjective cultural level at the same time as changing the generic-subjective norms, policies and routines resulted in great insecurity for employees and caused further damage to internal image of the University.

For several years many of the staff had, out of commitment to the University, their students, their research and their belief in what they were doing, worked many hours above load, undertaken jobs for which they were not paid or recognised and consistently given “above and beyond” expectation. This occurred in all three of the
former member institutions. When the stressful events of the restructure and systems changes caused distress and insecurity many of the people involved felt their goodwill was abused and undermined. This response was felt very much at intra-subjective level and was responsible for many resignations but much of the social interaction at inter-subjective level also revolved around the issue of “feeling abused” (Academic #22). This set the tone for the extra-subjective climate.

it is pretty sad, it’s lost a lot of – morale of staff. With academics as well. It’s extraordinarily bad and I think the Vice Chancellor has lost a lot of good people (Academic/Executive #12).

The combination of undermined goodwill with identity and image issues was damaging to the extra-subjective climate and identity of the newly federated UEA to a degree which could potentially take a long time for recovery. Nevertheless there has been improvement of public image for the University. The UEA created a Marketing and Communications Division to carry this responsibility and the Division has been operative for over a year working to change both the generic-subjective understandings of the university that affect identity as well as the extra-subjective understandings that shape both internal identity and external image. The Marketing and Communications and the Media Divisions have embarked on a strategically planned Quality of Service program designed in response to the “Are you being served?” survey and have had many short term successes which they call ‘quick wins’ (Senior Exec #7) from tactics devised as part of the long term strategy. However they have many years’ work ahead to counter some of the negative side-effects of the restructure and change process, particularly in countering negative extra-subjective attitudes which were built during the early years of the restructure.

**Strategy and technology**

The approaches to strategy and technology differ considerably in each organisation. In the ABS tensions arose between the needs of the different levels of the organisation. There was the organisation’s need for standardisation at the generic-subjective level while attending to the needs of the intra- and inter-subjective for individual creativity and spontaneity. There was also the issue of the ‘greatest good for the greatest number’ as the software chosen to support key business processes was ideally suited to most persons working on the key business processes but was not necessarily so effective for persons who worked on peripheral or support tasks.
If I'm creating a complex document that's going outside the ABS I don't use Notes because it would drive me absolutely nuts. And it does drive people nuts who are here and have to do that sort of thing (Knowledge Worker #A3).

Nevertheless, it is generally recognised by the majority of the interviewees, even by those least suited with the chosen systems, that the software has been strategically chosen to support core business processes and, though less than ideal for them, is a perfect choice for the organisation. "I can't imagine life without it" (Knowledge Worker #S5). Even the people who least like working with the software agree that a degree of consultation and strategic planning goes into the selection of any new software acquired or developed by the ABS. Consequently, the conflict between the needs and preferences of the intra- and inter-subjective levels against the generic-subjective means that many personnel and even some groups working at the ABS are dissatisfied with the systems software and some of the policies surrounding its use but only with this one aspect of the organisation and their working lives. This attitude does not colour or affect their intra- or inter-subjective attitude to the organisation as a whole or even to the generic-subjective norms, values and policies as a whole. This ability to separate dissatisfaction with the organisation’s technical systems and policies from their overall attitude to the organisation seems to be rooted in an extra-subjective understanding that the ABS is a good place to work and that one can trust the ABS as an employer.

The tensions arising in the UEA around strategy and technology were different. Inter-level tensions arose due to a number of factors. Core business processes were regularly disrupted and there was confusion and anger at the intra- and inter-subjective levels of understanding at frequent systems crashes and technology failures. New technical changes caused anger and distress as, despite some consultation with staff, rollouts were frequently arbitrarily announced and inconsistently marketed without clear direction or policy structure for working with new systems. Such approaches to change antagonised employees due to misconceptions in which ‘consultation’ was misunderstood as ‘collaboration’ and promises of ‘bottom-up’ restructuring processes aroused erroneous expectations of more decision-making power for employees than was actually intended or experienced. The conflict between what was thought at inter-subjective level to be the generic-subjective norm for the systems change process as opposed to the
Executive’s intended generic-subjective norm created expectations that became negative filters for sensemaking that influenced perceptions of other aspects of the change process as well. One generic-subjective understanding that was consistently shared across the University was criticism of, and anger with, the ITD. Negative responses to the constant systems crashes and failures compounded the stress already experienced by ITD staff who were already under considerable pressure through understaffing. This precipitated more staff losses through resignations, compounding the problem further.

**Employment of KM strategy**

In many ways the two organisations exhibit polarity on the issue of KM strategy. Whereas the ABS employed KM strategy from the beginning and, indeed, chose systems and technology changes based on KM strategy, the UEA employed none and did not perceive a need for employing KM practices in a systems and technology change. However, after the first phase of the UEA restructure, the need to remedy many of the problems that arose in consequence of this lack of knowledge management during change was acknowledged and addressed in two stages. The first stage was the “Are you being served?” survey and the second was the Quality of Service campaign to address the needs and complaints expressed in response to the survey. Although the Quality of Service campaign was not begun or delivered under the banner of knowledge management the issues raised by both the survey and the campaign were all issues specifically related to knowledge management. Thus, in the second “fix-up” phase of the UEA restructure, some of the knowledge management practices that had been omitted during the systems and technology changes of the first phase were employed.

Similarly, the original vision shared publicly by the OVC was not consistent with the events being lived by individuals at an inter-subjective level of sensemaking and the tensions between the desired generic-subjective level understandings promulgated by the University Executive and the inter-subjectively created meanings common among the staff and students were a source of friction. With the passing of time since the inception of the restructure many of these frictions have faded into the past. Systems are stabilising and the generic-subjective view of the ITD has become that of a reliable department developing a good reputation since
acquiring adequate staff to meet divisional responsibilities. The ‘new’ norms and policies have become the everyday norm of generic-subjective understanding and intra-subjective and inter-subjective sensemaking is developed within the referential framework of the newly emergent culture of a University that has been unified for over three years. There has been both purposeful and incidental employment of knowledge management practices such as rebranding with new logo and signage, new website and intranet, damage control on negative press and a proactive publicity campaign airing UEA successes and triumphs, improved internal communication processes including better streamlining of email systems and new internal publications, recognition awards for staff and established protocols clarifying norms and policies for the University. The employment of these knowledge management practices (although not acknowledged as KM) has had significant effect on the UEA as a whole and across all sensemaking levels. Unambiguous protocols, clear communication and reliable systems have begun to develop a stability within the organisation that is reflected in intra-subjective and inter-subjective sensemaking based on expectations of stability and consistency within the newly established norms of the now three year old generic-subjective and extra-subjective environment.

While the ABS Executive consider their knowledge management initiative to be an important component in their ongoing excellence, the perception of the UEA Executive is that knowledge management practices were unnecessary to the restructure and that events have fallen as prophesied, including the disruptions and difficulties and the need for “fixes” which were then instituted: “it’s turned out better than could be expected – it could have been far worse” (Senior Exec#1). What is overlooked in this perspective is that the “fix-up” phase employed what are essentially knowledge management practices to remedy the problems caused in the earlier phase and that the fixing of these generic-subjective and extra-subjective areas of organisational need was more difficult and costly than they would have been had these practices been instituted at the beginning of the changes instead of at the end.
SUMMARY OF PARALLELS

It is evident that, despite the strong contrasts in approaches to knowledge management approaches in these two disparate organisations, the very fact that commonality of issues raised in each demonstrates that some aspects of knowledge management are relevant to systems and technology changes even in dissimilar organisations. The critical factors raised include the approach to systems change; leadership, vision and objectives for the organisation and communication of that vision to the organisation; the culture in which the changes are instituted; and the strategy employed, and the relationship between technology and strategy. It is particularly seen that in each of these issues, a key factor to be considered is the reconciling of the tension between the generic-subjective needs of the organisation and the intra-subjective and inter-subjective needs of the personnel affected as these will significantly affect the extra-subjective environment of the entire organisation.

KNOWLEDGE MANAGEMENT METHODOLOGY

How then do these aspects of leadership, culture, strategy and technology relate to knowledge management methodology? In the first half of the chapter, these issues have been inspected in an overview of the parallels arising from the two case studies. At this point, the matters discussed are examined in finer detail to consider them not as overarching issues but in detail as the workings of knowledge management methodology. This can most clearly be seen in tabulated format (cf: table 7-2 and table 7-3) and will be discussed in each case separately then together.

In table 7-2 (below), the knowledge management issues identified at each sense-making level are supported strategically, tactically and pragmatically by IT. At all four levels of sense making in the ABS there is a consistent and coherent unity of approach or KM methodology to support the central mission and core business processes of the organisation. The IT chosen to support the KMI is the same at all levels and supports the management, encouragement and development of knowledge workers and the collaborative creation, management and dissemination of knowledge and information. Despite some tensions observed at the intra-subjective and occasionally on the inter-subjective level in resistance to the rigid
<table>
<thead>
<tr>
<th>SM Level</th>
<th>KM Issues at ABS</th>
<th>IT in Support of KM at ABS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra-subjective sensemaking</td>
<td>Foundation: an established, cohesive culture&lt;br&gt;Values: organisation as a family-community&lt;br&gt;stability and continuity&lt;br&gt;individuals are important&lt;br&gt;mutual trust&lt;br&gt;national and international reputation&lt;br&gt;Norms: equal access to knowledge&lt;br&gt;organisation loyal to staff&lt;br&gt;documenting and sharing knowledge&lt;br&gt;Work practices: work ethics&lt;br&gt;excellence in work practices&lt;br&gt;friendly, cooperative &amp; collaborative work environment</td>
<td>IT embedded in work practices becoming part of organisation culture&lt;br&gt;IT as a contributor to organisational culture reproduction</td>
</tr>
<tr>
<td>Organisational generic-subjective sensemaking</td>
<td>KM as a strategic issue for the organisation&lt;br&gt;Leadership role in KM&lt;br KM as an element of social integration&lt;br&gt;Flexibility and mobility of workforce</td>
<td>IT as enabler of KM (KMI in ABS) serving core business&lt;br&gt;IT/KM strategy central to organisation strategy&lt;br&gt;IT/KM systems congruent with open social structure&lt;br&gt;IT/KM supporting social relationships (both internal and external)&lt;br&gt;IT providing consistency across whole organisation</td>
</tr>
<tr>
<td>Intra-group and inter-group</td>
<td>Cooperative and collaborative work practices&lt;br&gt;Group co-creation of knowledge&lt;br&gt;Effective knowledge sharing&lt;br&gt;Access to organisational knowledge</td>
<td>IT providing wide and efficient access to information and knowledge repositories&lt;br&gt;IT providing shared workspace&lt;br&gt;IT enabling transparency of work processes&lt;br&gt;IT assisting cooperative and collaborative work practices, co-creation and sharing of knowledge&lt;br&gt;IT limitations on personal desktops and in external collaboration with Microsoft products</td>
</tr>
<tr>
<td>Inter-subjective sensemaking</td>
<td>Identity: pride in organisation, work and membership&lt;br&gt;Individual commitment and loyalty&lt;br&gt;Personal security in stable tenured workforce&lt;br&gt;Individual contribution/benefit&lt;br&gt;Personal responsibility</td>
<td>IT providing access to repositories and other knowledge workers&lt;br&gt;IT providing personalised (individual) workspace and personalised interface to IT systems (Grapevine; Lotus Notes)&lt;br&gt;IT supplying updates and alerts re new documents (Newspoint, Grapevine)&lt;br&gt;IT limitations to personalised customisation and creativity&lt;br&gt;IT incompatibility with external systems using Microsoft</td>
</tr>
</tbody>
</table>

*Table 7-2 KM Issues and IT Support in the ABS*
technical demands and limitations on personal freedom in the technical dimensions that support the KMI, there is nevertheless a unity or harmony of vision and mission that is apparent at each of the four levels of sense making and is reflected in the consistency that can be observed between the levels and in the interaction between levels. The overall theme that transpires throughout each and all of the levels in the ABS is that it is a holistic approach strategically designed and evenly balanced to build upon, respond to and cater for each dimension of organisational need and purpose. The KMI is firmly established upon an extra-subjective culture that is embedded in and sympathetic to the organisational mission. The Executive, although a top-down bureaucracy, nevertheless invests in consultative and collaborative practices when determining and implementing generic-subjective policies or systems that impact upon the inter-subjective and intra-subjective levels of the organisation. The generic-subjective level is also kept carefully consistent with the extra-subjective culture in which it is embedded, and with itself. Although forward-looking and innovative, new moves, new policies and new systems are not permitted to be contradictory or conflicting with established policies, norms or values. Consistency is maintained.

The stability thus provided from both the extra-subjective and the generic-subjective levels provides an environment in which inter-subjective social interaction is nurtured and in which intra-subjective individual and team creativity, collaboration, innovation, and knowledge sharing can flourish. Such stability necessarily determines a degree of inflexibility which can be difficult for individuals to work within but at the same time also provides an environment that grants compensations such as pride in identity, personal security and responsibility, awareness of social benefits and the personal rewards of collaborative team-work. Some tensions are inevitably created and aggravated by the very systems that produce some of the greatest benefits to the organisation yet the overall consistency and harmony of KM methodology promote success and permit ongoing growth and development. In summary, the key KMI methodology in the ABS is one of strategic planning that is consistent with the established mission and culture of the organisation and carefully developed and nurtured in a collaborative fashion at all levels of sensemaking within the organisation.

At the intra-subjective level of sensemaking the ABS knowledge management methodology addresses, identifies and supports five key factors. These include the
support of individual identity with an organisation where a successful image and reputable integrity contributes to a sense of shared success and pride of membership and a consequent commitment and loyalty to the organisation, its values and mission. There is also a personal security exhibited based on trust in the organisation’s loyalty to individuals who are consistently seen to enjoy long term employment and life-long careers within the organisation. These engender a sense of personal responsibility for and to the organization in response to the trust and as an outwarding of the commitment and loyalty mentioned above. This personal responsibility further develops a sense of individual contribution and mutual benefit through knowledge co-creation and knowledge sharing. Information technology supports these knowledge management issues through providing access to information repositories and other knowledge workers, providing personalised workspace and interface to the supporting technology particularly through the shared workgroup databases of LotusNotes™ and Grapevine and supplying updates and alerts through programs such as Grapevine and Newspoint. It is at this level, however, that tension is reflected in the IT limitations imposed for generic-subjective need that affect individuals on the intra-subjective level with restrictions on freedom of choice in office software such as word processors and freedom of creativity in customisation of desk-tops.

At the intra- and inter-group inter-subjective levels knowledge management methodology by the ABS’ KMI team facilitates core KM concerns. Cooperative and collaborative work practices are the norm at both intra- and inter-group levels and group creativity is evident within the intra-group processes particularly in group co-creation of knowledge. This is stimulated through effective knowledge sharing on an intra-group level and access to organisational knowledge on an inter-group level. These are all daily practices at the ABS and are supported technologically by IT providing wide and efficient access to information and knowledge repositories, providing shared workspaces, enabling transparency of work processes and assisting cooperative and collaborative work practices, particularly the co-creation and sharing of knowledge. At this level, too, tension originating at intra-subjective level in reaction against the IT limitations imposed for generic-subjective need is echoed in inter-subjective sensemaking in shared resentment against restrictions imposed for generic-subjective needs.
The generic-subjective level of sensemaking demonstrates, particularly through the Executive, a high degree of knowledge management awareness and practice. Fundamentally, knowledge management is regarded as a strategic issue for the organisation, and members of the senior Executive take a leadership role in the KMI. There is a transparency and openness in the social structure of the organisation with a productive set of power relations within the hierarchy and at different levels of the Executive. Knowledge management is used purposefully as a means of social integration generating a flexibility and mobility of workforce that works very much to the organisation’s as well as the individuals’ advantage. At this generic-subjective level IT is an enabler of the KMI specifically geared to serve core business and it is central to organisational and knowledge management strategy which are integrally linked; therefore the IT is also planned and implemented strategically.

At the extra-subjective level of sensemaking it is clear that knowledge management is built upon and is itself a solid foundation to an established and cohesive culture. The KMI also builds strongly upon the values that are a highly visible aspect of the organisational culture. These incorporate the organisation as a family/community; stability and continuity; a recognition of individuals as important to the organisation; mutual trust at all four levels; and a national and international reputation. Norms are also strongly established, part of the foundation upon which the KMI builds and partly consequent to knowledge management work. Visible norms include equal access to knowledge; organisational loyalty to staff; and both habitual and conscious documenting and sharing of knowledge. The norms extend to solid work practices including work ethics; excellence in work practices; and a friendly, cooperative and collaborative work environment. Again the IT is seen to support these KM practices through having the technology completely embedded in work practices and becoming a part of the organisational culture and being a contributor to the reproduction of organisational culture.

In table 7-3 (below), a different overall picture emerges, and this table outlines some of the critical results of deficits in knowledge management planning at the UEA. Knowledge management methodology, as applied by the Executive at the generic-subjective level of the process of the restructure, was piecemeal and ad hoc. Decision-making was based primarily upon unexamined assumptions including the key
assumption that disruption and dysfunctionality were inevitable consequences of phase one of the restructure and that there was little that could be done to ameliorate or alleviate the painful consequences. The methodological approach to systems change by the UEA structural or executive level was essentially one of crisis management. This necessitated a long and expensive “fix-up” period in the second phase of the restructure to undo damage caused and establish strategic planning, knowledge and information management.

The assumptions underlying the approaches made by each organisation were probably the most significant differences between the methodological approach of the UEA and that of the ABS. In the ABS each new change or challenge is addressed as part of an ongoing process of maintaining the vision and mission of the organisation. New challenges are recognised as requiring special effort to make them as painless and effective as possible. In the UEA it was assumed that change would inevitably be painful and that little could be done to prevent that, so the basic plan was to implement change and then fix up the “inevitable mess” afterwards (Senior Exec #1). Based upon an assumption that change would be messy and painful and that nothing could be done to prevent it, it is therefore logical that no steps were taken in information or knowledge management to minimise the pain or reduce the potential damage of the systems change events. The UEA approached their information systems change in two phases, both of which can be examined for KM methodology. The first is the original IS change in which knowledge management is not employed and the second is the “fix-up phase” in which KM practices are engaged although not specifically planned as a KM methodology.

In the first phase the findings are largely negative. At the intra-subjective level low morale was evident, linked to poor identity and image. There were disrupted social ties in which information chains and knowledge flows had been interrupted and broken and personal insecurity caused by job losses and relocations, uncertainty and anxiety which were extended in many cases over several months. Individuals believed that their contribution was devalued; particularly when former jobs were removed or replaced with no knowledge sharing arranged. Goodwill was exhausted where employees believed their commitment and loyalty to the UEA had been taken for granted on a long-term basis. Finally, individuals had little or no confidence in (or knowledge of) the
<table>
<thead>
<tr>
<th>Sense making Level</th>
<th>KM Issues at UEA</th>
<th>IT in Support of KM at UEA</th>
</tr>
</thead>
</table>
| Extra-subjective sense making | Foundation of 3 conflicting and antagonistic cultures  
Values: espoused values do not match reality: teaching (students) is important  
research is important  
Norms: top-down bottleneck decision-making  
bureaucratization prevents timeliness  
Work practices: ongoing harmonisation of formal practices  
disjunction between desired culture and current reality. | IT embedded in work practices becoming part of organisation culture  
IT failures cause major frustration at all levels  
ITD understaffed and overworked  
ITD become common “whipping boy” |
| Organisational generic-subjective sense making | KM not implemented.  
No strategic planning at UEA structural level  
Strategic planning at sub-structural level mostly unsupported.  
Policies in flux  
Leadership ambiguous  
Decision-making and policy setting deferred or untimely.  
Communications disabled  
KM now needed but starting from negative position | IT serving core business in provision of teaching space and tools  
IT providing deficient and defective information systems (Callista, TimPlus, Platform Web)  
IT providing effective teaching platform (WebCT) |
| Intra-group and inter-group inter-subjective sense making | Cooperative and collaborative work practices in isolated small intra-groups  
Group co-creation of knowledge in isolated small intra-groups  
Effective knowledge sharing sporadic, limited to small intra-groups  
Erratic access to organisational knowledge | IT support for communications limited  
IT usage unmonitored and lacks protocols  
IT providing an un navigable website  
IT providing erratic access to information and knowledge repositories |
| Intra-subjective sense making | Low morale (poor identity and image)  
Disrupted social ties  
Exhausted goodwill & abused loyalty  
Personal insecurity  
Individual contribution/benefit devalued  
Unclear boundaries or chains of authority | IT providing erratic and inconsistent access to computing needs  
IT providing individual workspace  
IT providing dysfunctional systems  
IT supplying staff mass updates and alerts  
IT providing access to research tools  
IT perceived as incompetent and unhelpful |

*Table 7-3 KM Issues and IT support in the UEA*
chain of authority or responsibility and did not know the parameters for acceptable
decision-making or action.

Simultaneously with these negative consequences at intra-subjective level the IT support
was also perceived in a negative light. Individuals found that IT was providing erratic
and inconsistent access to desktop and intranet repositories, colleagues, administrative
services and students. Although IT was providing individual workspace it was also
providing the interface to dysfunctional systems such as Callista, TimsPlus, and
Platform Web. The ITD did provide updates and alerts on a daily basis through the
Mailboss and UEA-all emailing systems, however interviews suggested that these were
mostly deleted unread by many of the staff. On the whole, although IT successfully
provided access to research tools such as the libraries and the Internet, IT was perceived
as unhelpful and ineffective delivering uncoordinated, unmonitored information
overload and not providing the support services desired.

At the intra- and inter-group inter-subjective level the results were less negative. There
were cooperative and collaborative work practices occurring in isolated small intra-
group situations and group co-creation of knowledge in those same intra-groups. There
was also effective knowledge sharing happening in a sporadic fashion within intra-group
situations and although access to organisational procedures and policies was limited and
unreliable it began to improve through the intranet and email. The IT support, however,
was still not geared to knowledge management practices. IT provided only limited and
unreliable access to information and knowledge repositories and had limited support for
communications, restricted to emails without protocols and unmonitored web forums.
IT was also commonly held responsible for a vital website that was largely un navigable
although this was not actually under the ITD domain of responsibility but was the
responsibility of the Office of Marketing and Communications.

On the generic-subjective level, as KM was not implemented and there was no strategic
planning to support systems change, there were no standardised norms to facilitate the
systems changes as they occurred. Uncertainty was common with policies in flux, with
the three different sets of “old ways we did things” discontinued but no “new ways to
do things” in place. Ambiguous leadership and leadership communication with no clear
path of delegation or authority was also unsettling, as was the resultant deferring and
untimeliness of decision-making and policy-setting. With no common lexicon and limited communications technology there were no open channels for communication between levels. Finally, toward the end of phase one it became clear that KM had been neglected as a strategic issue for the UEA and now needed to be implemented. At this generic-subjective level IT was serving core business in their provision of teaching space and tools and was particularly effective in delivery of the WebCT learning platform despite inadequate servers in the first year. Unfortunately, other than WebCT, IT was regularly seen as providing ineffective information systems, particularly Callista, TimsPlus, Platform Web and the UEA intranet.

Finally, at the extra-subjective level UEA had a foundation of three antagonistic cultures with no immediate means or plans to merge them into a unified culture. The values espoused by the UEA did not match the reality thereby both losing credibility and also leaving staff with difficult choices as to which set of values they should work toward. The norms that were practiced and encouraged also conflicted with stated expectations and promises. Staff members were expected to meet challenging deadlines in teaching and research yet the daily situation of top-down decision-making and bureaucratisation prevented timeliness. And despite an ongoing harmonisation of formal practices there was considerable disjunction between the desired culture and the current reality. Systems crashes provoked great frustration at all levels. The understaffed and overworked ITD became the “whipping boy” for many and was blamed for problems and inconveniences for which it was not responsible such as the UEA website. However IT was slowly becoming embedded in work practices to become a part of the organisational culture. While this was not healthy while IT was ineffective and an ongoing cause of much of the dysfunction of the new UEA systems it did mean that as IT gained adequate staffing levels and freedom to make decisions and provide proper practice the improved service would be quickly implemented and integrated as an embedded part of the organisation and the systems. This happened within four years once the ITD was staffed to meet ITD strategic planning needs and accomplish divisional objectives (see Appendix 11).

This summary paints a negative picture of the UEA information systems change and the failure to implement necessary KM planning or practices for the change but in the second “fix-up” phase much of this is being addressed while some aspects have
improved or developed over the three to four years since implementation. The scope of this study did not include a comprehensive examination of the second phase but inquiry into the conduct and analysis of the “Are you being served?” survey and resultant knowledge management planning for the Quality of Service project combined with information from UEA-all emails distributed from the various departments of the Executive have provided evidence for a new approach to the KM and IT issues at UEA that are much more reflective of knowledge management practices.

At the extra-subjective level of sensemaking (see Table 7-4 below) the most significant change is that three years of being a single organisation have been experienced and a single culture has had the opportunity to develop. Active steps are also being taken including the accumulation of new norms, values and practices becoming embedded as new policies and procedures are introduced and become the norm. Particular measures have been taken to publish new university, college and school magazines and to hold special annual events such as school retreats to develop and strengthen the new culture. Again IT has contributed to this development.

<table>
<thead>
<tr>
<th>KM and IT Issues at UEA after Phase 1 of the systems change: extra-subjective level.</th>
<th>Phase 2: addressing the issues from Phase 1: extra-subjective level.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundation. 3 conflicting and antagonistic cultures</td>
<td>Three years of being one university</td>
</tr>
<tr>
<td>Values: espoused values do not match reality teaching (students) is important research is important</td>
<td>Starting to develop one culture</td>
</tr>
<tr>
<td>Norms: top-down bottleneck decision-making bureaucratisation prevents timeliness</td>
<td>New norms accumulating</td>
</tr>
<tr>
<td>Work practices: ongoing harmonisation of formal practices disjunction between desired culture and current reality. IT embedded in work practices part of culture IT understaffed and overworked IT failures cause major frustration at all levels IT become common ‘whipping boy’</td>
<td>New magazines and e-zines published at university and college levels</td>
</tr>
<tr>
<td>Annual or seasonal events Clear delineation of responsibilities and transparency of processes in IT Fast and effective IT help-desk response times Stable IT work platform</td>
<td></td>
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</tbody>
</table>

Table 7-4 Comparing phases for KM Issues and IT support in the UEA: extra-subjective level

The most significant contribution has been that the expectations and norms established by the newly responsive and efficient ITD have significantly changed engrained attitudes toward and expectations of the ITD. Old assumptions that “ITD never come and take forever to fix anything” (Admin Officer #12) have changed to a new assumption that “it will be fixed as soon as” (Academic #25). Similarly, the generic assumption that everything that goes wrong with any information system ‘is ITD’s fault’ no longer
applies. The transparency of organisation, the clear delineation of responsibilities and rapid response times to help-desk calls has changed the engrained attitudes and deepest assumptions that had created such a negative climate during the original systems change and now engenders a positive expectation in its stead. It has also ensured that there is a steady and reliable platform supporting and providing stability to daily work practices.

At the generic-subjective level of sensemaking (see Table 7-5 below) much progress has been made in the 2-3 years since the original systems changes.

<table>
<thead>
<tr>
<th>KM and IT Issues at UEA after Phase 1 of the systems change: generic-subjective level.</th>
<th>Phase 2: addressing the issues from Phase 1: generic-subjective level.</th>
</tr>
</thead>
<tbody>
<tr>
<td>KM not implemented.</td>
<td></td>
</tr>
<tr>
<td>No strategic planning at UEA structural level</td>
<td></td>
</tr>
<tr>
<td>Strategic planning at sub-structural level mostly unsupported</td>
<td></td>
</tr>
<tr>
<td>Policies in flux</td>
<td></td>
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<tr>
<td>Leadership ambiguous</td>
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<tr>
<td>Decision-making and policy setting deferred or untimely</td>
<td></td>
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<tr>
<td>Communications disabled</td>
<td></td>
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<tr>
<td>KM now needed but starting from negative position</td>
<td></td>
</tr>
<tr>
<td>IT serving core business in provision of teaching space and tools</td>
<td></td>
</tr>
<tr>
<td>IT providing deficient and defective IS (Callista, TimsPlus, Platform Web)</td>
<td></td>
</tr>
<tr>
<td>IT providing effective teaching platform (WebCT)</td>
<td></td>
</tr>
<tr>
<td>KM practices being implemented.</td>
<td></td>
</tr>
<tr>
<td>Consultation with staff</td>
<td></td>
</tr>
<tr>
<td>“Are you being served?” survey</td>
<td></td>
</tr>
<tr>
<td>Quality of Service project</td>
<td></td>
</tr>
<tr>
<td>Strategic planning short- and long-term</td>
<td></td>
</tr>
<tr>
<td>‘Quick wins’ improvements for morale</td>
<td></td>
</tr>
<tr>
<td>Three years of being one university</td>
<td></td>
</tr>
<tr>
<td>New policies, norms and values</td>
<td></td>
</tr>
<tr>
<td>Delegation</td>
<td></td>
</tr>
<tr>
<td>Allocation of decision-making responsibilities</td>
<td></td>
</tr>
<tr>
<td>IT dissemination of new policies and procedures</td>
<td></td>
</tr>
<tr>
<td>IT Help-desk effective and timely</td>
<td></td>
</tr>
<tr>
<td>Regular upgrades by IT all major information systems</td>
<td></td>
</tr>
<tr>
<td>‘New roles’ now 3 years old</td>
<td></td>
</tr>
<tr>
<td>Regular upgrades of WebCT</td>
<td></td>
</tr>
<tr>
<td>New larger servers</td>
<td></td>
</tr>
<tr>
<td>Regular IT training</td>
<td></td>
</tr>
<tr>
<td>Various IS located in independent departments</td>
<td></td>
</tr>
</tbody>
</table>

Table 7-5 Comparing phases for KM Issues and IT support in the UEA: generic-subjective level

The most significant progress was the recognition of the need for knowledge management practices and consultation with stakeholders and implementation of the results through the Quality of Service (QoS) project. Delegation is occurring as the Executive more frequently give individuals the authority needed to fulfil their responsibilities. In three years of being a single institution new policies and norms have been established, reducing ambiguity and confusion. Information Technology has provided support to these practices, most conspicuously in the regular delivery of emails announcing new policies and procedures as they are developed. ITD have also developed a fast and efficient help-desk that fields a rapid response time to any occasion of computer or system failure. New norms and expectations have emerged from these developments. Regular training is also offered to the personnel who need to use the upgraded systems. Certain systems like the WebCT learning platform have received
specialised attention and upgrades and these upgrades are consistently advertised with accompanying offers of training and assistance. The various IS are now visibly located in independent authorities like the Timetabling Office that is no longer even a part of the ITD or in specific departments within ITD such as client services, infrastructure and business information systems. This development has again removed ambiguity and provided transparency and ease of communications particularly in crisis (and when something goes wrong with IT it is almost invariably regarded as a crisis).

<table>
<thead>
<tr>
<th>KM and IT Issues at UEA after Phase 1 of the systems change: inter-subjective level.</th>
<th>Phase 2: addressing the issues from Phase 1: inter-subjective level.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative and collaborative work practices in isolated small intra-groups</td>
<td>New grants available to support and fund research groups and other collaborative efforts.</td>
</tr>
<tr>
<td>Group co-creation of knowledge in isolated small intra-groups</td>
<td>School retreats for information sharing and mutual planning.</td>
</tr>
<tr>
<td>Effective knowledge sharing sporadic and limited to small intra-groups</td>
<td>New 4 terabyte servers to support the systems and the 30,000+ user workload.</td>
</tr>
<tr>
<td>Erratic access to organisational knowledge</td>
<td>IT upgrades continuing.</td>
</tr>
<tr>
<td>IT support for communications limited</td>
<td>Announcements of upgrades by email.</td>
</tr>
<tr>
<td>IT usage unmonitored and lacks protocols</td>
<td>New website offering spaces to groups</td>
</tr>
<tr>
<td>IT providing an un navigable website</td>
<td>New website officer/webmaster to maintain quality</td>
</tr>
<tr>
<td>IT providing erratic access to information and knowledge repositories</td>
<td></td>
</tr>
</tbody>
</table>

*Table 7-6 Comparing phases for KM Issues and IT support in the UEA: inter-subjective level*

New support, particularly in funding, is available for group research or other group activities seeking resources. School retreats are becoming annual events in which joint planning can take place and smaller discipline groups within the schools can share their work with each other. Otherwise little has been added specifically to contribute to the knowledge sharing and collaborative work environment required at the intra- and inter-group inter-subjective level of sensemaking at the UEA (see table 7-6 above). The continuing IT upgrades including new 4-terabyte servers to cope with the workload of over 30,000 students have benefited groups as they support the individuals who participate in the social interaction of this level. Plans for the new website which is now a joint ITD and OMC venture include domain space for groups to advertise their presence and publish their work. Direct inquiry to the ITD requesting a list of their accomplishments from 1999 to the end of 2003 was responded to with an impressive and verifiable list which has been appended in Appendix 11. These accomplishments became possible when the ITD became an adequately staffed and smoothly functioning Division. The irony is that many of the items may well have been accomplished in phase one, had the ITD been staffed adequately according to its strategic plan.
At the intra-subjective level (see table 7-7 below) there is a significant shift to reflect some concern with stakeholders – particularly the people involved in the systems – and not merely the technology although that, too, is addressed.

<table>
<thead>
<tr>
<th>KM and IT Issues at UEA after Phase 1 of the systems change: intra-subjective level.</th>
<th>Phase 2: addressing the issues from Phase 1: intra-subjective level.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low morale (poor identity and image)</td>
<td>Rebranding project (image &amp; identity):</td>
</tr>
<tr>
<td>Disrupted social ties</td>
<td>Delegation of authority from OVC to colleges &amp; schools</td>
</tr>
<tr>
<td>Exhausted goodwill &amp; abused loyalty</td>
<td>New awards to acknowledge and honour staff</td>
</tr>
<tr>
<td>Personal insecurity</td>
<td>New grants to support and fund research</td>
</tr>
<tr>
<td>Individual contribution/benefit devalued</td>
<td>‘New’ jobs 3 years old &amp; now familiar</td>
</tr>
<tr>
<td>Unclear boundaries or chains of authority</td>
<td>Regular upgrades by IT in all major IS</td>
</tr>
<tr>
<td>IT providing erratic and inconsistent access to computing needs</td>
<td>IT upgrades continuing,</td>
</tr>
<tr>
<td>IT providing individual workspace</td>
<td>Announcements of upgrades by email,</td>
</tr>
<tr>
<td>IT providing dysfunctional systems</td>
<td>Different IS allocated dedicated operations staff</td>
</tr>
<tr>
<td>IT supplying staff mass updates and alerts</td>
<td>IS now familiar after 2 – 3 years</td>
</tr>
<tr>
<td>IT providing access to research tools</td>
<td>New website</td>
</tr>
<tr>
<td>IT perceived as incompetent and unhelpful</td>
<td>ITD help-desk offers timely individual support</td>
</tr>
</tbody>
</table>

Table 7-7 Comparing phases for KM Issues and IT support in the UEA: intra-subjective level

This is evidenced in the new teaching, research and administrative awards being offered and funds being made available to support and acknowledge individual and collaborative group work. Delegation is increasing the span of control with more managers having the authority to back up their responsibilities. The rebranding project with new logo, new signage and constant positive media is working towards positive changes in public image and the UEA corporate identity. Improvement is also seen in the IT support offered as the ITD upgrade systems, improve the website, allocate dedicated staff to separate information systems and operate the newly efficient help-desk with prompt responses by email, telephone and personal visits to assist staff.

The key differences, then, in methodological approach as demonstrated by the ABS and the UEA originate in pre-emptive assumptions (and self-fulfilling prophecies) about the value and probable success of planning for minimal pain in implementation of new policies or systems. Other key aspects are the differences between unified or fractured cultures; strategic planning compared to crisis management; the deliberate implementation or neglect of information and knowledge management practices; and the difference between an holistic and a piecemeal approach to shaping the organisation. The ABS is a flexible organisation that maximises organisational learning through strategic development and is managed by leaders who use and encourage open
communication through implementation of groupware utilised with a high degree of trust thus empowering staff members. Core competencies and business processes drive product development and technological development and knowledge sharing is a critical function and attribute of successful teamwork and business production. In the UEA, on the other hand, we observe management concerned with financial administration rather than leadership, with a lack of delegation that creates an inflexible organisational structure and is reflective of and contributes to lack of trust. Communication is distorted without adequate communication processes and insufficient protocols to overcome the distortion. Consequently many staff members feel disempowered. Knowledge sharing is not considered important and tacit and local knowledge are discarded as insignificant. Each case takes a different approach to knowledge management in change processes and knowledge management practices.

**SUMMARY OF KNOWLEDGE MANAGEMENT METHODOLOGY IN CASES**

This chapter examined each of the two cases of the ABS and the UEA comparatively, to consider their methodological approach to the implementation of new information systems to support the core business processes. In particular this chapter has examined how that methodological approach impacted upon the knowledge management and IT in the organisation at each of the four levels of sense making. It is seen that where the awareness and support of knowledge and key knowledge processes are neglected corporate memory loss, dysfunction and staff dissatisfaction result while the strategically planned implementation of knowledge management processes support core business processes and smooth the path of information systems changeovers. Strategic planning for the development, growth and success of an organisation must focus upon and include critical knowledge management processes at all levels of the organisation including cultural, organisational, social and individual levels of knowledge and knowledge management. Whatever method is used it is necessary to approach business processes, systems and technology change and systems implementation with a methodology that encompasses knowledge management processes, particularly those that focus on understanding the roles of knowledge workers within the systems.

The last part of this chapter will look at the methodological tool of the sensemaking framework, as developed in Chapter 3, and how it has contributed methodologically to knowledge management in the interpretation of these two cases.
SENSEMAKING AS KM METHODOLOGY

The use of the sensemaking framework to analyse the planning, actions, tensions and relationships within the two organisations studied contributes empirical testing to the theoretical model and helps to differentiate approaches, understandings and methodologies (Cecez-Kecmanovic 2004, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002). When the organisation is understood to be a distributed knowledge system (Tsoukas, 1996) the sensemaking framework confers the ability to decipher much that happens in the organisation through extra-subjective/cultural, generic-subjective/structural, inter-subjective/social interactional and intra-subjective/individual lenses (Wiley, 1994; Weick, 1995) identifying the distributed knowledge and knowledge processes through these categories. Many of the theories of knowledge, knowledge management and organisation can be seen as conflicting or contradictory as they address different aspects of organisational life and the knowledge processes that take place in organisations. Using the four levels of sensemaking within an organisation it becomes apparent that such theories only seem to conflict because they each address different aspects of levels of sensemaking within the organisation. Therefore many such theories are actually complementary rather than conflicting, developing a broader understanding of knowledge processes and knowledge management as it is shaped and altered by the different levels of sensemaking. Thus we see in the ABS that although an holistic approach is taken to knowledge management in the organisation and structural and cognitive changes are carefully recognised and developed (Orlikowski, 1992) tension arises between the individual and generic-subjective levels as individual preferences and habitus conflict against normative expectations (Tsoukas 1996) and personal practical knowledge and worldview (Edwards 1994) resist against the abstract rules and authoritarian impositions required for corporate unity.

Examining the ABS case, a synthesised view of the different theories aligned against the four sensemaking levels demonstrates an holistic approach to knowledge management methodology that is people-centric, focused on core business processes and is basically, though not perfectly, harmonious across all levels of sensemaking within the organisation. Analysis has demonstrated that strategic planning pre-established that one of the organisational goals for implementation of the KMI and roll-out of new systems was to ensure a harmonious result at all levels of the organisation. The resulting attitude of heedful interrelating (Ryle, 1949; Weick & Roberts, 1993) by the Executive level
toward the social interaction level of sensemaking predominantly promoted a lack of conflict and tension when implementing change. Use of the four sensemaking levels demonstrates that this has, for the most part, been successfully achieved. It also allows the pinpointing of sources and causes of tension and disruption, such as the tension between generic-subjective desire for collaborative groupware and individual desire for control over the personal environment, when such goals have not been achieved. A concomitant of the high levels of trust within the organisation and the commitment to integrity of information, knowledge and product, is that the culture of the ABS is essentially focused on high reliability (Weick & Roberts, 1993). Mission statement, policies and daily anecdote all describe an organisational commitment to the ABS vision and maintaining its reputation for trustworthy, reliable information and knowledge output. Within the context of an organisation such as the ABS which has a coherent and unified culture that is reflected at all four levels of sensemaking the ramifications of this reverberate at all levels and influence behaviour at each of the other three levels of sensemaking within the organisation.

Similarly, in the study of the UEA use of the four sensemaking levels synthesised with understandings provided by other theories helps to highlight the specific sources of tension and conflict resulting from systems changes and new management processes. The overall management approach was one that did not include knowledge management and overlooked the knowledge worker and, indeed, most aspects of the human factor. Despite an approach specifically billed as 'consultative' and 'bottom-up' there was a significant lack of heed taken by the Executive and a lack of awareness of how decisions impact upon both the individual intra-subjective and inter-subjective social interaction level (Weick & Roberts, 1993). This lack of awareness or heed meant that well-meaning efforts to accomplish a consultative or bottom-up process were frequently unsuccessful as that lack of generic-subjective level facilitation and Executive lack of awareness incapacitated any opportunity to facilitate inter-level communications at the inter-subjective social interaction level or, even more crucially, between the generic-subjective structural and inter-subjective social interaction levels. To this lack of heedful awareness was added a focus on high efficiency which was understandably created by the need to meet government auditing criteria and standards of governance. The consequence was a conscious deferment of reliability in order to rapidly attain efficiency (Weick & Roberts, 1993). The sense of urgency of need to align critical
systems to government auditing standards, to make fiscal accountability, documentation and records keeping suddenly efficient after a high degree of inefficiency caused a deliberate policy of sacrificing quality or high reliability of service until a later “fix-up” date so that all energy and investment could focus on what was perceived to be a greater immediate need. The consequence of this prioritising combined with lack of heed and lack of communication within an environment laden with suspicion and distrust at all levels of sensemaking was that neither efficiency nor reliability was accomplished. Indeed, the deferred “fix-up” phase became the critical point at which issues of both inefficiency and unreliability were identified, acknowledged and began to be addressed through the Quality of Service campaign. Much of the distress and conflict created by these processes are identified through an understanding of the levels of sensemaking in play.

Through use of the framework both case studies demonstrate how trust is a critical aspect of organisational life that permeates all levels of sensemaking and therefore has significant, even overriding, effect upon all other aspects at all levels. Working through the framework (see table 3:9, p.100) it is evident that on each of the four levels trust and distrust are significant factors affecting the manner in which sense is made of decisions and events. This is particularly significant as trust is not an issue given much attention in knowledge management practices, writing or research. This is a serious omission considering its importance at all levels of sensemaking within an organisation. In both case studies trust emerged as a vitally important factor affecting each organisation's ability to manage knowledge, knowledge workers and systems change.

A brief overview of some of the clearest effects each sensemaking level has upon the sensemaking and ability to function and mode of function within the organisation is summarised in table 7:8 (below). It summarises and draws attention to the fact that each level of sensemaking does not occur in isolation from the others but is always intertwined and inter-related with every other level of sensemaking having a profound effect upon the other levels of sensemaking. Many of the difficulties inherent in managing organisations and systems and technology change are revealed as intrinsic to the tensions between sensemaking levels and their predisposition to different forms and approaches to understanding. Each of the aspects of sensemaking summarised in table 7:8 has been discussed in detail in this and prior chapters.
<table>
<thead>
<tr>
<th>extra-subjective</th>
<th>extra-subjective / culture</th>
<th>The <strong>generic-subjective</strong> impacts upon <em>culture</em> by shaping what is and is not acceptable, what behaviours and attitudes will be rewarded or disciplined.</th>
<th>Inter-subjective effects <em>culture</em> as the socialisation process of shared knowledge and opinions shape understandings and sympathies within the body of the organisation.</th>
<th>The <strong>intra-subjective</strong> influences <em>culture</em> as individuals make stands for what they think, feel or believe, even against the <em>cultural</em> climate or organisational norms.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>extra-subjective</strong></td>
<td><strong>extra-subjective / culture</strong></td>
<td>Culture facilitates or impedes ability to recreate <strong>generic-subjective</strong> (new policies, structures, etc). <em>Culture</em> determines the climate and environment in which policies and norms are enacted, accepted or rejected.</td>
<td><strong>generic-subjective / organisational social structure</strong></td>
<td>Inter-subjective meaning-making influences the <strong>generic-subjective</strong> when groups within an organisation deliberately seek to change the <em>organisational social structure</em>, as is seen in union action or water cooler exchanges.</td>
</tr>
<tr>
<td><strong>generic-subjective</strong></td>
<td><strong>Culture</strong> facilitates or impedes ability to recreate <strong>generic-subjective</strong> (new policies, structures, etc). <em>Culture</em> determines the climate and environment in which policies and norms are enacted, accepted or rejected.</td>
<td><strong>generic-subjective / organisational social structure</strong></td>
<td>Inter-subjective sensemaking impacts upon the <strong>generic-subjective</strong> when groups within an organisation deliberately seek to change the <em>organisational social structure</em>, as is seen in union action or water cooler exchanges.</td>
<td><strong>Inter-subjective</strong> meaning-making modifies <em>individual</em> thinking and behaviour as individuals reshape their own meaning-making to conform with the sense made of the same events by colleagues and others around them.</td>
</tr>
<tr>
<td><strong>inter-subjective</strong></td>
<td>Conflicting <em>culture</em> prohibits collaboration, communication, etc. Conducive <em>culture</em> lays common foundation for teamwork, etc.</td>
<td><strong>Generic-subjective</strong> policy setting impacts upon <em>work groups</em> and <em>communities of practice</em> as it establishes the daily norms and structures within which the groups must work, and the aims and goals toward which they must strive.</td>
<td><strong>inter-subjective / group and social interactions</strong></td>
<td><strong>Individuals</strong> affect <strong>inter-subjective</strong> meaning-making as they interact in the course of their daily work, participate in <em>communities of practice</em>, and exchange information and knowledge in formal and informal settings.</td>
</tr>
<tr>
<td><strong>intra-subjective</strong></td>
<td><em>Culture</em> impacts <em>individual</em> ability to integrate and be at ease in the environment, and the climate of the organisation in which the <em>individual</em> works. <em>Culture</em> exerts a subtle pressure on the individual to conform with “the way we do things around here”.</td>
<td><strong>Generic-subjective</strong> policy setting impacts upon <em>individuals</em> as it establishes the daily norms and structures within which the groups must work, and the aims and goals toward which they must strive.</td>
<td><strong>intra-subjective / individual</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table 7-8 Summary of affective interaction between sensemaking levels
SUMMARY: KNOWLEDGE MANAGEMENT METHODOLOGY FOR THE WHOLE ORGANISATION

The greatest value of these findings in contributing to better knowledge management methodology and practice is the degree of specificity enabled in methodological approach. Nevertheless, it is possible to condense the detailed findings for general understanding of knowledge management methodological approach. Summarising the core aspects of effective knowledge management practice and technology support from all four levels concentrates attention on the need for strategic planning aligning knowledge management planning to support core business planning and an overall focus on core business processes. There is a need to encourage and enable collaborative and cooperative work practices predominantly to foster access to information, knowledge sharing and socialisation. Emphasis on the importance and value of the stakeholders of the organisation, principally the knowledge workers, and supporting their ability to contribute to the organisation is critical. Equally vital, the organisation must provide unambiguous chains of authority and delegation, policies, procedures and protocols and transparency of social structure and processes. It is important to base all these practices on the foundation of a nurturing environment that is cohesive, positive, people-centric, and cultivates trust. The information systems and technology support base needs to be strategically aligned to support all knowledge management and core business processes and strategies; provide stable platforms and have rapid response to emergencies; provide flexible, reliable and comprehensive communications systems; and facilitate daily core business and collaborative workspaces.
CHAPTER 8 CONCLUSION

The major contributions of this dissertation are firstly an expanded theoretical model of knowledge in organisations based on which, secondly, a new approach to knowledge management methodology is developed. A sensemaking theoretical model of knowledge was developed based on Weick’s (1995) views on sensemaking in organisations which draw on Wiley’s (1988) semiotic approach to self, and the sensemaking framework for knowledge in organisations (Cecez-Kecmanovic, 2004, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002). The sensemaking theoretical model of knowledge identifies four distinct types of knowledge: individual or intra-subjective, collective or inter-subjective, organisational or generic subjective and cultural or extra-subjective contributing to and resulting from four different levels of sensemaking in organisations. This provides new insights into the specific nature of different types of knowledge and how each type of knowledge influences and is influenced by other types. The sensemaking model of knowledge and knowledge management in organisations consequently is expanded in this thesis to explore how different types of knowledge, tensions between knowledge types and approaches to knowledge in organisations can be better managed. By applying this expanded sensemaking model to real life situations, as explored in the case studies, the thesis demonstrated how critical a systematic approach to knowledge management in organisations, particularly in situations of organisational change, was to these two organisations. The theory explains how, as in the case studies, the different types of knowledge and conflicts due to tensions between different sensemaking processes are inevitable but can be more effectively identified and managed.

Having laid a theoretical foundation, the thesis proposed a knowledge management methodology based on the sensemaking model. The sensemaking knowledge management methodology is the second major contribution of this thesis. The methodology provides a framework of understanding that the user can apply to explore and identify knowledge management related issues in particular when the organisation faces crises, conflicts, tensions or the challenges inherent to organisational change. In addition, the methodology guides the user in gaining insights and achieving understanding of these problems thus increasing their problem-solving capacity. Grounded in the sensemaking model the methodology enables new insights into the origins of knowledge management conflicts and problems, and assists different
participants and groups in organisations to cooperatively resolve internecine conflicts and challenges.

Further contributions are made in the conceptual dimension for the development of the knowledge management discipline. This study offers the critical contribution of in-depth empirical testing of the sensemaking framework of knowledge in organisations. Arising from this empirical testing expansion of the sensemaking model of knowledge in organisations is possible demonstrating that knowledge management methodology contributes a theoretical understanding of changes in organisational knowledge and their implications for knowledge creation, knowledge sharing and cultural development of the organisation. Conceptual development of knowledge management methodology is also expanded as the thesis demonstrated that knowledge management can and will be applied implicitly when it is not applied explicitly and that this can have serious and far-reaching affects upon the organisation that does not specifically and purposefully manage their knowledge processes, particularly at times of organisational change. Confiming theory developed by Tsoukas (1996) and Tsoukas and Chia (2000) the thesis also demonstrated an understanding of the organisation as a distributed knowledge system that involves continuous interplay of sensemaking and knowledge creation within a cultural setting which has important implications for practice as well as research.

Moreover, this use of the sensemaking framework demonstrates that it is an effective methodology for analysis of knowledge management in organisations. This may have significant implications for both theory and practice. Analysis using the sensemaking framework can contribute verification of, or challenge to, established ways of looking at knowledge management and lead to new insights and do so from a clear conceptual framework that locates the understandings gained on a sound theoretical footing with substantiation provided by empirical testing. This study demonstrates that the theoretical lens of the sensemaking model functions effectively as an analytical tool to investigate organisational practices in a manner that not only identifies problems and weaknesses but also identifies strengths and good practice. The use of an analytical tool that can investigate an organisation at four different levels of sensemaking enables both breadth and depth of understanding and offers a range and specificity of findings that is particularly useful. Understanding developed at four levels of sensemaking endows the
user with an ability to plan strategically in a balanced fashion to allow for all four different sets of needs. This alone can afford a degree of predictive expectation that can circumvent unanticipated consequences and unexpected negative responses (Orlikowski, 1992). Contradictory understandings of singular events can be explained and reconciled by identifying specific lenses of understanding that contribute each disparate view that leads to conflict and providing insight into the specific approaches driving behaviour in such a way as to enable negotiations through understanding. Knowing of the natural tensions between levels means that inherent tensions known in advance can be anticipated and circumvented and makes it possible to identify and address tensions that have been raised at one level by action in another level. Thus use of a knowledge management methodology grounded in the four levels of sensemaking can be both a diagnostic tool when problems need to be identified and addressed and a framework for designing preventative measures to preclude problems occurring in the first place. This provides a significant contribution by recognizing that using sensemaking methodology of knowledge in organisations means that tensions can be more successfully managed within the organisation as a whole, and particularly when negotiating information systems and technology change.

**IMPLICATIONS FOR THEORY, PRACTICE AND FUTURE RESEARCH**

A major implication for knowledge management that arises from this research is the understanding that most tensions in organisations appear to reside between the understandings created at the executive level for generic-subjective purposes and the sense made of them at employee levels. It is in these frictions between sensemaking approaches that resistance to change and systems implementation failures most occur (Ceccez-Kecmanovic, 2000; Ceccez-Kecmanovic & Jerram, 2001, 2002; Lyttinen & Hirschheim, 1987). Most organisational planning, particularly in areas such as information systems changes, is done by executive leadership with the thinking, goals and understandings typical of the generic-subjective level of sensemaking producing what is seen as desirable organisational knowledge. Systems changes can, through use of the sensemaking theory, be planned with a balanced understanding of the needs of the other three levels of sensemaking in the organisation to utilise and develop collective knowledge and individual knowledge and to draw upon the cultural knowledge of the organisation to make balanced decisions. Such sensemaking-theory-informed and balanced planning can not only prevent many of the unintended consequences
(Orlikowski, 1992) that can arise from information systems changes but can also protect against much of the usual resistance to change and the high percentage of systems failures endemic in modern organisations (Checkland & Holwell, 1998; Wilson & Howcroft, 2000; Lytinen & Hirschheim, 1987). The insights into knowledge workers and the sensemaking activities in which they engage provide new understandings about the manner in which knowledge management methodology can be applied to better address the needs of knowledge workers and of the organisation, to improve knowledge sharing and knowledge creation (Zyygier et al, 2003; Thomas et al, 1993; Tissen et al, 1998). Thus a knowledge management methodology based upon the four level sensemaking model of knowledge in organisations is a comprehensive and balanced methodology, working from a solid theoretical foundation, and leading to specific understandings that allow concrete and pragmatic solutions to knowledge management problems.

Further implications arise from the thesis regarding the development of knowledge management methodology and practice. This study demonstrates the need for purposeful knowledge management methodology in organisational approaches to information systems changes and also demonstrates that using the sensemaking framework and methodology when approaching knowledge management issues thus develops new understandings of the embeddedness of technology in these processes. These findings draw attention to organisational vulnerability arising from technological changes and offer insights into better approaches to managing such change.

Implications for KM practice arise from the understanding of the organisation as a distributed knowledge system (Tsoukas, 1996, 2003) as this awareness reshapes understanding of the location of knowledge and therefore the necessary approach to knowledge management that occurs in an organisation. Current knowledge management methodologies often focus on the technology and consider knowledge workers unimportant in the functioning of the information systems that are the technological foundation of their KM Initiative (Burton-Jones, 1999). This study demonstrates the dangers of such an approach and raises the need for organisations to consider strategically designed people-centric methodologies that recognise that the knowledge worker is the key component to organisational success if that success is in any way linked to knowledge, knowledge sharing, innovation or creativity.
The study draws attention to the tension that has yet to be resolved successfully in organisational environments between the individual knowledge worker's need for a flexible creative environment and the collective need of collaborative knowledge workers to have a flexible, creative and harmonious shared work environment against the organisation's need to organise, standardise and regularise. There is also tension in the individual's and group's intra-subjective and inter-subjective needs for freedom of creativity and clear boundaries within which to work, and guidelines and policies for direction. The intra- and inter- level tensions created by these conflicting needs must be addressed by organisations that are serious about promoting knowledge creation and sharing for innovation within the organisational setting. The study highlights the need for organisations to seek answers to these challenges within their own cultural setting. Solutions to knowledge management methodological challenges must be compatible with the organisational culture or extra-subjective level of understanding just as the culture needs to be conducive to knowledge management methodology for effective implementation to take place (Weick, 1995; Cecez-Kecmanovic, 2000; Cecez-Kecmanovic & Jerram, 2001, 2002). At this stage the needs have been highlighted but there are more questions than answers. Much research needs to be done before answers can be found to these complex serious of interrelated questions such as how to balance internal tensions and inter-level tensions and how to integrate cultural considerations into knowledge management methodology, or change an inappropriate culture to become a more conducive culture for knowledge management approaches. There is a critical need to shift understanding and methodology from techno-centric to people-centric and from tactically-planned to strategically-planned methodologies which will result in considerable changes in pragmatic methods and designs for knowledge management initiatives and practices. The parallel need to resolve intra- and inter-level tensions is important for knowledge management methodology but first must be addressed by extensive future research.

The implications for KM practice that arise from this study go beyond that of information systems change. The focus of the empirical studies in this thesis was on information systems change and the investigation of knowledge management methodology was concerned primarily with such kind of change. However, the nature of sensemaking theory as an analytical tool: that it offers a breadth of understanding ranging from culture through social structure, social interaction to individual
sensemaking and a depth of specificity able to provide detailed understandings at and between each of the four levels, has implications of much wider use than knowledge management methodology in organisations.

Using sensemaking theory to analyse the knowledge management methodology applied in a systems and technology change highlighted the need for, and critical elements of, strategic planning in the organisations involved. One of the strengths exhibited by the sensemaking theory through its use in this thesis is the manner in which it identifies and draws in overlapping concerns and disciplines. Using sensemaking theory to analyse the knowledge management approach applied in information systems changes also highlighted many aspects of systems change and revealed many important implications for systems change and information systems management beyond the immediate concerns of knowledge management methodology. Should a study be made specifically focusing the lens of sensemaking theory upon learning more deeply about managing information systems, or upon organisational change, for instance, much could be gained by the analysis achieved at four levels of sensemaking within these domains of investigation.

Further time needs to be spent looking specifically, through a sensemaking lens, at a broader picture of systems and technology change than the knowledge management approach. Within the knowledge management domain much work remains to be done on developing understandings of how to reduce the natural tensions inherent in the conflict between the normative needs of the generic-subjective level of organisations and the intra- and inter-subjective needs of the individuals and groups who work within the organisation. Organisations need to reconcile the conflict between knowledge workers’ needs to express individual creativity if they are to be innovative and creative for organisational purposes against the need for organisational norms and standardisation at the generic-subjective level. Industry has been urgently calling for answers to this question and sensemaking theory offers a potentially fruitful means of conducting research into this area of need. The role of knowledge management in culture change is another issue of constant debate and need in industry circles and through sensemaking methodology further research can be conducted into this question, offering a new approach and potentially new answers. Similar challenges on each of the four levels can be investigated offering new insights through the use of a
new theoretical lens of understanding. The application of sensemaking theory to every aspect of knowledge management methodology and practice offers a wealth of new research possibilities.
APPENDICES
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APPENDIX 1: INTERVIEW QUESTIONS FOR KNOWLEDGE WORKERS [ABS]

1. What is your role and your job function within the organisation?

2. Do you consider yourself to be a “Knowledge Worker”? In what way/s?

3. What do you think “Knowledge Worker” means?

4. What opportunities do you encounter in your daily work to collaborate with colleagues, share knowledge or co-create new knowledge? What value does this have for you?

5. What do you “Knowledge Management” and “Information Management”?

6. How do you perceive Knowledge Management happening in your organisation?

7. Is this a good / positive thing? In what way/s?

8. Is this purposefully managed or merely happenstance? How do you perceive Knowledge Management being purposefully achieved in your organisation? How do you perceive it happening by luck or circumstance?

9. Do you feel that the Knowledge Management procedures, or the organisation’s processes empower you as a worker, or as an individual?

10. What training and/or personal development do you believe you receive from or through the organisation? What value does this have for you?

11. With what methodologies and technologies are you familiar for KM? (eg: Have you worked in other organisations? Seen how other companies do similar work to yours?) How do the KM methods and methodologies (and technologies) compare between this organisation and other organisations with which you are familiar?

12. What do you most like and enjoy about the work processes in your daily work? If you left this organisation, what would you most miss?
APPENDIX 2: INTERVIEW QUESTIONS AND OBJECTIVES [UEA]

The major issues we wish to pursue in this interview include:

- your role in the process of the [UEA] restructure
- what you want/ed to achieve in / for this process
- how you pursued or plan to pursue and achieve these goals
- problems and successes you have encountered in pursuing these goals
- with whom you collaborate in this process
- your perceptions of your (and others’) personal empowerment / disempowerment in the process of the restructuring of [UEA]
- how your (and others’) concerns, issues and grievances are communicated to the relevant parties
- how you used email and the website in terms of knowledge sharing.
- What organisational learning and/or organisation changes do you perceive as happening during the restructuring process?
- Do you perceive organisational memory gain or memory loss caused by the synergy of new organisational structure?

Aims of Project:

- To identify processes of knowledge creation, knowledge sharing and organisational learning in [UEA] restructure.
- Document and interpret modes of knowledge creation, knowledge sharing and organisational learning in [UEA] restructure.
- Explore gaps, good practices, and issues in knowledge creation, knowledge sharing and organisational learning.
- Investigate the role of electronic communications (email and website) in this process.
APPENDIX 3: ORIGINAL CODING [UEA]

Accomplishments  Help-desk  Priorities (HR/stu)
Accountability  Identity  Public forum
Appropriate roles  Image  QOS
Assumptions  Improvements  Resented
Assumptions and consequ  Individuals (intra sub)  Rules unknown
Bottom up  Info org  Shared responsibilities
Bottom up mess  Info overload  Situation
Branding  Initiative  Skills drain
Buck passing - blame IT  Insecurity  SOE
Bureaucracy  Inter group  SOM /other Sch
Callista  Intra group  Specialised K
Champion  IT communic  Specialist need
Change mgmt  IT improvements  Specialist/outsource
CTT  K (doc) share  SRS
Collaboration disempow  K ignored  Strategy
Communcs  K liaison  Student view
Consult stakeholders  K share  Students unimportant
Crash bang  (timing)  K worker in action  Synergy (scattered)
Crisis  KM  (none) Systems
Crisis mgmt  KM, Plan and Strategy  Systems and Technology
Culture (extra subjective)  Kudos  Top-down
Culture (UEA)  Objectives  Transition
Cynical  Leadership  Transition phase
Data mgmt  Learning org  Trust
Decision making  Lessons learned  Tyranny of distance
Delegation  Lexicon  Understaffed
Different experiences  Loyalty  Unheard
Different members  Management style  Union
Dismplemented  More bureaucracy  Vested interests
Distributed - geog  Multi-tasking  Videoconferencing
Eliminating K  networking  Vision
Email  New start  Website
Emotional decisions  No contingency plan  Y2K
Exceptions to norms  No K planning
Expectations  No one knows
Facilities  No Strategic Planning
Facilities ($) lacking  Non-malicious
Fake consultation  Objectives
Fiscal focus  One stop flop
Fiscal (acc’ability)  One-way loyalty
Fix it year  Opportunities
Focus  Org memory loss
Frustration  Organisation (gen subj)
Frustration/anger  Overload
Future ambitions  People focus
Goodwill (lost)  People in systems
Governability  Platform Web
Groups (inter subj)  Politics and power
Hard – (personally)  Portability
Heard not understood  Priorities
**APPENDIX 4: 2ND PHASE CODING [UEA]**

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# Appendix D: 3rd Phase Coding [UEA]

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<td>Opportunities</td>
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<tr>
<td>KM, Planning and Strategy</td>
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</table>

| Champion                  |                         |             |
| Communications (non-exist)|                         |             |
| Focus                     |                         |             |
| Improvements / Fix it year|                         |             |
| KMI                       |                         |             |

| NO Strategic or K Planning|                         |             |
| Assumptions (no use)     |                         |             |
| Crisis management        |                         |             |
| Info management (none)   |                         |             |
| K workers and KM         |                         |             |
| No contingency plan      |                         |             |

| No one knows             |                         |             |
| Communications           |                         |             |
| Frustration              |                         |             |
| Org memory loss          |                         |             |
| Understaffed             |                         |             |

Opportunities (lost)  
People focus (needed)  
Strategy (nil and overridden)  
Technical issues (email etc)  
Trust – see credibility

| Leadership               |                         |             |
| Assumptions and         |                         |             |
| consequences            |                         |             |

| Champion                 |                         |             |
| Objectives (because     |                         |             |
| Lacking):               |                         |             |

| Accountab’y/Governab’y  |                         |             |
| Branding                |                         |             |

| Identity and Image      |                         |             |
| Communications          |                         |             |
| Email (protocols)       |                         |             |
| Email (as medium)       |                         |             |
| Consult stakeholders    |                         |             |
| Fix it year             |                         |             |

| KM, Plan and Strategy   |                         |             |
| (see separate)          |                         |             |

| Management / style      |                         |             |

| Systems breakdown       |                         |             |
| Videoconferencing       |                         |             |

| Sensemaking             |                         |             |

| Individuals (intra sub) |                         |             |
| Champion                |                         |             |
| Cynical                 |                         |             |

| Assumptions             |                         |             |

| Expectations            |                         |             |
| Goodwill (lost)         |                         |             |

| Politics and power      |                         |             |
| Initiative / Delegation |                         |             |
| Vested interests        |                         |             |

| Hard – (personally)    |                         |             |

| Disempowered           |                         |             |
| Frustration and Insecurity |                     |
| Goodwill (lost)        |                         |             |
| Identity and Image     |                         |             |
| Overload                |                         |             |

Unheard / Heard not understood

| Organisation (gen sub) |                         |             |

| Champion               |                         |             |
| Distributed - geo      |                         |             |
| Email                  |                         |             |

| Exceptions to norms    |                         |             |
| Fiscal                 |                         |             |
| Improvements           |                         |             |


| Acceptability and Gov’ability |                         |
| Branding                       |                         |

| Identity and Image |                         |             |

| Communications      |                         |             |
| Consult stakeholders|                         |             |
| Fiscal (accountability) |                     |
| Fix it year         |                         |             |

| KM, Plan and Strategy |                         |             |
| (see separate)        |                         |             |

| Lexicon               |                         |             |

| Management / style    |                         |             |

| Change mgmt (nil)     |                         |             |
| Crash bang (timing)   |                         |             |
| Crisis                |                         |             |
| Crisis management     |                         |             |
| Delegation and D-making |                     |
| Non-malicious         |                         |             |

Politics and power  
QOS – KM recovery

| Resented              |                         |             |

| Bureaucracy           |                         |             |
| Goodwill (lost)       |                         |             |

| One-way loyalty       |                         |             |
| Specialist/outsource  |                         |             |
| Understaffed          |                         |             |
| Rules unknown         |                         |             |

Trust – see credibility

| Culture (culture)     |                         |             |

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|                         |                         |             |

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Change mgmt (nil)
Crash bang (timing) and
Overload
Crisis
Crisis management

**Trust / Credibility Issues**
Bottom up
Decision making
Delegation
Fake consultation
Heard not understood
Incompetence
Non-malicious
Vision
Opportunities

Loyalty (and one way)
Multi-tasking
Objectives
*Trust – see credibility*

**Group (inter sub)**
Assumptions and Expectations
*Champion*

**Different members/cultures**
Different experiences
Distributed - geog
*Identity and Image*
Politics and power
SOM / Other schools

**Frustration/anger**
*Communications*
*Email for commuc*

Buck passing
*Different members/cultures*
Different experiences
Distributed - geog
*Identity and Image*
Politics and power
SOM / Other schools

Delegation/ *Disempowered*
*Goodwill (lost)*
No one knows / no KM
Understaffed
*Trust – see credibility*
**APPENDIX 6: 4TH PHASE CODING [UEA]**

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APPENDIX 7: ORIGINAL CODING [ABS]

#1 Internationally
"Bloody Notes"
"Influence and encourage"
"Part and Parcel"

Accessibility of info
Amenable Culture
APS
Assumptions
Balance Trust vs Privacy
Behaviour Changes
Career longevity
Career mobility
CEO knowledgeable
Champions
CIO/KD hierarchy
Clear goals
Collaboration
Common platform
Context and History
Core History
Culture
Data and Idea Capture
Delphi Audit
Documenting attitude
Email
Excel wanted
External liaisons
Freedom of Access
Family/Friendly
Good workplace
Grads and Non-grads
Grapevine
IE wanted
Individual Desktops
Individuals vs Collaboration
Information Flow
Info-sharing
Innovation and Creativity
KM within IT
KMI
KMI famous outside ABS
KMI unknown within ABS
Knowledge Director
Knowledge Workers

KPMG model
K-sharing
Leadership-driven
Licence for MS
Lotus Notes vs Microsoft
Lotus Platform
Loyalty 2-Way
Methodology
Newspoint
Non-Knowledge Workers
Non-trust / Paranoia
Not Bleeding Edge
Office Suite - MS
People Focus Vs Tech
Personal Holdings
Pervasive KMI
Pilots and Roll-outs
PowerPoint wanted
Pride
Pride in Org
Privacy a Non-Issue
Reinventing the Wheel
Resentment
ROI
Stable employment
Strategic goals
Strategic goals and Tech
Strategy to Technology
Success
Support vs Core
Tailor / customise
Teams and Groups
Technology to Strategy
The Aust Statistician
Top-down
Trust
TSD
TSD Agenda
TSD Leeches
Upgrade Problems
Vision and Strategy
Word wanted
Workgroup Databases
Written Culture
**APPENDIX 8: 2ND PHASE CODING [ABS]**

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## APPENDIX 9: 3\textsuperscript{RD} PHASE CODING [ABS]

### Context and History

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### Amenable Culture

- Friendly / Family
- Good workplace
- Information Flow
- Loyalty 2-Way
- Stable employment

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### Privacy a Non-Issue

- Personal Holdings
- “Proper” Office Suite:
  - MS wanted
  - External liaisons

### “Proper” Office Suite:

- Individual Desktops

### Tensions Betw SM levels

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<td>- Tailor / customise Individual Desktops</td>
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### Technology Support

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### KMI

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### Champions

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### Clear goals / strategy

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### Support vs Core

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### Strategy to Technology

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### Strategic goals

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### IM and KM

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</tr>
<tr>
<td>Friendly/family</td>
</tr>
<tr>
<td>- Career longevity</td>
</tr>
<tr>
<td>- Career mobility</td>
</tr>
<tr>
<td>- Good workplace</td>
</tr>
</tbody>
</table>

### Knowledge Workers

<table>
<thead>
<tr>
<th>Pride in Org</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared Vision and Mission</td>
</tr>
</tbody>
</table>

### Sensemaking

<table>
<thead>
<tr>
<th>Indiv (intra-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Bloody Notes&quot;</td>
</tr>
</tbody>
</table>

### Grads and Non-grads

<table>
<thead>
<tr>
<th>- Non-Knowledge Workers</th>
</tr>
</thead>
</table>

### Pride

<table>
<thead>
<tr>
<th>#1 Internationally</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Aust Statistician”</td>
</tr>
<tr>
<td>Family/Friendly</td>
</tr>
<tr>
<td>Org / Mission</td>
</tr>
</tbody>
</table>

### Written Culture

<table>
<thead>
<tr>
<th>- Pride</th>
</tr>
</thead>
</table>

### Info-sharing

<table>
<thead>
<tr>
<th>- Loyalty 2-Way</th>
</tr>
</thead>
</table>

### Success

<table>
<thead>
<tr>
<th>- Teams and Groups Trust</th>
</tr>
</thead>
</table>

### Vision and Strategy

<table>
<thead>
<tr>
<th>- Knowledgeable Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Leadership-driven</td>
</tr>
</tbody>
</table>

### Collectives (inter-)

<table>
<thead>
<tr>
<th>Accessibility of info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
</tr>
<tr>
<td>Friendly/family</td>
</tr>
</tbody>
</table>

### #1 Internationally

<table>
<thead>
<tr>
<th>Teams and Groups Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workgroup databases</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Written Culture</th>
</tr>
</thead>
</table>

### Written Culture

<table>
<thead>
<tr>
<th>- Pride</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>- #1 Internationally</th>
</tr>
</thead>
</table>

### Pride in Org

<table>
<thead>
<tr>
<th>Trust</th>
</tr>
</thead>
</table>

### Vision and Strategy

<table>
<thead>
<tr>
<th>- Knowledgeable Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Leadership-driven</td>
</tr>
</tbody>
</table>

### Written Culture

<table>
<thead>
<tr>
<th>- Pride</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>- #1 Internationally</th>
</tr>
</thead>
</table>

## APPENDIX 10: 4TH PHASE CODING [ABS]

**Context and History**

- #1 Internationally
  - (ORIGINS)
  - Teams and Groups
  - Trust
  - Written Culture

- Origins of KMI
  - Amenable Culture
  - Leadership-driven
  - Vision and Strategy

- KMI Plan and Strategy
  - Champions
  - Leadership Driven
  - Clear goals / strategy
  - KMI

- Strategy and Tech
  - Lotus Platform
  - People Focus Vs Tech
  - Pilots and Roll-outs
  - Strategic goals
  - Strategic goals and Tech
  - Strategy to Technology
  - Vision and Strategy

- Office Suite – MS vs Notes
  - Individual Desktops
  - Licence for MS
  - Privacy a Non-Issue

### “Proper” Office Suite:
- MS wanted
- External liaisons

### Tensions Btwn SM levels

### Individs vs Collab
- Knowledge Workers
- Tailor / customise
- Individual Desktops
- KM within IT (suspicion)
- TSD Agenda
- TSD Leeches
- (OFFICE SUITE)
- Upgrade Problems

### Office Suite – MS vs Notes
- Privacy a Non-Issue

### Collective (inter-)
- Accessibility of info
- Collaboration
- Good workplace
- Career longevity
- Career mobility
- IM and KM
- Info-sharing
- knowledge sharing

### Org Struct (generic-)
- Amenable Culture
- Info sharing
- KMI
- Leadership-driven
- Knowledgeable Leadership
- Technology Support
- Vision and Strategy
- Written Culture

### Culture (extra-)
- Amenable Culture
- Champions
  - Knowledgeable Leadership
  - Leadership-driven
- (PRIDE)
- Teams and Groups
- Trust
- Vision and Strategy
- Written Culture

### - Pride
- #1 Internationally
- Pride in Org
- Trust
- Vision / Mission
APPENDIX 11: ITD ACCOMPLISHMENTS IN 2ND PHASE OF SYSTEMS AND TECHNOLOGY CHANGE [UEA]

Responses to emails to ITD requesting updates on their accomplishments since first systems change challenges:

ITD, CLIENT SERVICES:

In my area of ITD, Client Services, I believe the staff have a great deal to be proud of. In particular the success of the Help-desk and the 2002-2003 lab environment. Also the design of the EA Desktop Services which are about to be rolled out - but I suppose we have to wait to see how successful that actually is.

Other areas in ITD have also achieved significant improvements, e.g.:
- leasing administration by ITP,
- comms upgrade to voice over IP by Networking,
- implementation of Callista.

In my opinion ITD is still understaffed in comparison with other Aust unis but this has forced us forward with the EA project. [UEA] is further advanced with the implementation of a managed operating environment than almost all other Aust unis. This still requires a titanic effort to implement but will bear fruit in about two years (but not Apples).

please find below a summary of workload/performance statistics for the Helpdesk and (2nd level) Campus Support from 2001 to date:

<table>
<thead>
<tr>
<th>Helpdesk:</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average incoming calls per month</td>
<td>3780</td>
<td>4043</td>
<td>4512</td>
</tr>
<tr>
<td>Average Resolution Rate</td>
<td>54.6%</td>
<td>65.1%</td>
<td>71.6%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Campus Support (2nd level):</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average No. of new jobs assigned per month</td>
<td>929</td>
<td>1125</td>
<td>1292</td>
</tr>
<tr>
<td>Average Team KPI (% outstanding jobs at month end)</td>
<td>18.1%</td>
<td>15.5%</td>
<td>15.1%</td>
</tr>
</tbody>
</table>
ITD accomplishments in 2nd phase of systems and technology change [UEA]...

**ITD, BUSINESS INFORMATION SYSTEMS:**

we've managed, as have many other [UEA] units: the business of internal restructuring, continuing normal operation and responding to a significantly increased workload as a result of other units re-organising to be a particular achievement.

We've done this by: internally changing our structure and focus to introduce standards and industry best practice methodologies for project management and information systems development and support. Some elements which have been developed and put into practice are:

Ensuring Client ownership of projects and work requests - to address client focussed solutions
Development of [UEA] Systems Implementation Policy (currently under revision)
Re-structuring our teams into Solutions / Data Architecture / Application Architecture and Production Delivery teams, the latter have completed over 700 work requests in the past 12 months, largely relating to the Callista implementation.
We have been involved in: planning, development, implementation and support activities for most [UEA] administration units in the last year and also undertaken projects for Enterprise Architecture under the Quality of Service Program involving a range of staff from across ITD.

Using Project Management methodologies, including the [UEA] PM, that comply with industry standards (I am a member of the Project Management Institute, on behalf of my teams to keep abreast of PM best practice and technologies)
Developing and implementing best practice procedures for software procurement and development (examples are: Request for Proposal and Evaluation of Proposal for information systems and services templates, Production Readiness process for systems implementation, Various templates for Software Development Life-Cycle activities, separation of development, quality assurance and production environments for all [UEA] corporate applications, development of application review processes to ensure legal and access compliance of [UEA] hosted web software)

BIS are one of four management teams in ITD, the other being Client Services, Infrastructure and Business Administration and we have collectively improved our internal communication and processes to improve client focus for planning and implementation of information systems.
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UEA (see Reid, J or UWS).


