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# An heuristically critical reflective practititioner researches the explication of tacit knowledge in three case studies investigating a Web-based knowledge management system and in professional academic practice

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# Copyright Warning

An Heuristically Critical Reflective Practitioner Researches the
Explication of Tacit Knowledge in Three Case Studies Investigating a
Web-based Knowledge Management System and in Professional
Academic Practice


by
Edward Sek Wong


A Thesis Submitted in Fulfilment of the Requirements for the Award of
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2003

Know thyself.

Socrates, 458BC, quoting inscription on Gateway to Temple at Delphi

The Truth will set you free

Jesus as quoted in John's Gospel, 35AD

To thine own self be true,
and it must follow,
as the night the day,
thou can not then be false to any man.

William Shakespeare, 1658, Hamlet

$E=MC^2$

Albert Einstein, 1940, Theory of Relativity

Like a bird on the wire,
like a drunk in a midnight choir,
I have tried in my way to be free.
Like a worm on a hook,
like a knight from some old fashioned book,
I have saved all my ribbons for thee.
If I,
if I have been unkind,
I hope that you can just let it go by.
If I,
if I have been untrue
I hope you know it was never to you.
. . . . . . . . . .
But I swear,
by this song,
and by all that I have done wrong,
I will,
make it all,
all up to thee.

Excerpts from Leonard Cohen, 1969, Bird on a Wire

$E = A_a C^2$

Mark Williams, original statement of theory of ethical action, 2002

# USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

# ABSTRACT[Ψ]

In this thesis, I report on a critical and reflective practitioner heuristic inquiry investigating three case studies on the adoption and use of a Web-based knowledge management system. In addition, I investigate the research process itself and my own professional academic practices. Of particular interest is the conversion of group's, individual's, and eventually my own tacit knowledge into explicit knowledge, whether in the organisational or personal domains. In this thesis, I seek to explain why the explication of tacit knowledge is important for individuals, organisations, and me, with a potential to motivate efficiency and effectiveness and especially empowerment within an ethical emergence.

The theoretical perspective adopted in this study draws from several sources. Critical theory, especially Habermas' *theory of communicative action*, numerous other theoretical frameworks and models from information systems research, with a touch of Derrida's postmodernist tool of deconstruction, and also some theoretical underpinnings of heuristic inquiry with ethnographic elements. The study aims to bring out inner dialogue and open discourse responses in one-on-one interviews within a phenomenological, reflective practitioner methodology. This approach is to encourage inner growth and development of both the interviewer and the interviewed that can be part of an emerging balanced wholeness within the individuals and organisations involved. Using such an approach has resulted in challenges to not only the positivist and interpretative perspectives, but also suggestions to deepen critical perspectives and reflective practitioner approaches. To explore these themes, I employ three approaches: the first case study uses a largely positivist approach, the second a largely interpretative approach, and the

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[Ψ] Important Note: All names and some inconsequential details have been changed to ensure adequate anonymity and care for all persons and all organisations concerned, which were researched as part of my original doctoral programme in a state of Australia. My supervisor and I subsequently decided to pursue an heuristic critical reflective practitioner research inquiry in which we were actively challenged by several academics and were working in an environment restricting our full academic, cultural, and political freedoms.

third a largely critical approach. This use of these approaches is to deepen my understanding of both the explications of tacit knowledge and of my own research.

I use a largely positivist approach by way of Moody and Shanks' (1999) *model for analysing success for knowledge management systems,* to describe and to analyse WebAccounting's use in an organisation named Organisation A. I employ a largely interpretative approach to investigate Organisation B using Porter's (1986) *traditional supply chain model* and Papazoglou and Yang's (2000) *integrated value chain analysis model.* The third case study uses a largely critical approach especially Habermas' theory of Communicative Action to provide insights for my overall thesis, to demonstrate the strengths and weaknesses of the alternative research approaches, and to chart my emerging research practice. This study reveals that while using Critical Theory as a guiding framework, this approach may allow the researcher to understand organisational change in broad social, political, psychological, and ethical contexts. This is because heuristic inquiry has the potential to deepen positivist, interpretivist, critical, and reflective practitioner theory and practice.

Out of this process emerges my research practice informed by Williams' (2002, 2003) notions of *heuristically critical self reflective practitioner research.* This developing approach merges the rigour of positivism with Interpretivism's depth combined with the ethico-socio-political imperatives of critical theory, joined with the transformative subject-object merging insights of reflective practice. The intuitive-emotional-artistic-depth psychology fires lit by heuristic inquiry provide the necessary illumination for all of this.

On one level, I research the impacts of the organisational adoption and use of a knowledge-management information system in three case studies. The general issues addressed here are firstly, how the WebAccounting package may enhance the environment that creates and manages knowledge artefacts. Secondly, is how the organisational tacit knowledge repository in which WebAccounting systems function may enhance the processes of learning and behaviour of practitioners. In particular, in the understanding of the nature and interaction of the social (the

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inter-subjectively shared world), human (the subjective world), and technical (the objective world) dimensions.

To these ends, the research participants were expected and allowed to express their generally constructive thoughts and reflections concerning their day to day common organisational and technical problems as workers, managers, and members of an organisation. Here are used discourse-based research methods in an endeavour to foster focussed learning in all participants. The hope is a move towards a better understanding of the various forms of surrounding knowledge, its creation, and application, for both individuals and organisations. I thus investigate both the potential impact on organisational performance and the developing of a knowledge sharing culture through a system that is guided by the primary tacit knowledge repositories of any organisation, its knowledge workers.

On another level, I use a deeper reading of the same heuristically critical reflective practitioner research methodology to investigate how the explication of tacit knowledge in my own personal knowledge management systems resulted in changes to my research and academic professional practice. Using action research professional practice methods such as dialogical interviews and open and inner discourses, I was able to raise my own tacit knowledge into consciousness and hence to become explicit knowledge. This process has, and is having, far reaching effects not only this thesis, but on my life and work in general.

This thesis is thus an interweaving and, sometimes, a juxtaposition of research exploring knowledge management tacit knowledge explication in both business and academic, organisational and personal environments. In the business area, I report on three case studies, which include my reflective practitioner research material and analysis as an information systems consultant. In the academic environment, I report on a self-study of my own professional practices as an academic researcher in this area, and it is here, where the heart of critical theory is revealed to me as I took ethico-socio-political action for empowerment within a situation of oppression, domination, and distorted communication.

Thus, the research questions emerge as follows:

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1. For managing organisational and individual knowledge, arising from the adoption and use of WebAccounting, what issues, especially regarding the conversation of tacit knowledge to explicit knowledge, emerge as important?

   1.1 In the context of making knowledge sharing possible, how successful is WebAccounting as a knowledge management system, when judged in accordance with Moody and Shanks' (1999) success factor model for analysing knowledge management systems, and researched using a largely positivist approach?

   1.2 What insights, especially those regarding competitive advantage and the management of knowledge in an organisation in the context of the adoption and use of WebAccounting, can be gained by using Porter's value chain model (1986) and Papazoglou & Yang's (2000) value chain integration model, largely researched using an interpretivist approach?

   1.3 What advanced insights evolve regarding knowledge management, in the contexts of the adoption and the use of WebAccounting, and within my own practices, by employing a largely critical research approach?

2. In the context of my researching the explication of tacit knowledge, what insights can be gained from a postmodern inspired rendering of the case study that uses my own practices as an heuristically critical reflective practitioner, and also drawing upon Williams' and Wong's (2003) theory of ethical action?

The self-study research approach has resulted in a thesis, which combines my own personal and largely subjective life with the outer and largely objective organisational case studies. Based on my empirical research on the explication of tacit knowledge in three cases studies, and the case study of my own personal explication of tacit knowledge, I theorise in the domain of organisational ethics. The common thread is the importance of tacit knowledge explication in both a person's individual and in-group knowledge, and for organisations and departments, and individuals. Thus, while this research may result in a clearer

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understanding of knowledge management systems, I dare to hope that the major result may be more empowered and better persons. I dare to hope that I am one of those. Thus, not only logic and systems are central to this study, but also certain *critical moments of decision* which arose in response to historical-political dilemmas and actions that involved feelings and emotional intelligence, aesthetic allusiveness, questions of justice and truth, ethical imperatives, the faith dimensions of people's lives, and even the unconscious wellsprings whence come intuitions and urges, dreams, and visions.

In the tentative extended epilogue, I came to understand my final and most important research case study. Here, I use the freedom and playful creativity afforded by the more constructive of Derrida's postmodern tool of deconstruction to revisit the major themes of the research in a postmodern dialectic, heuristically intermingling my personal life with the research. Out of this thesis eventually emerges liminal conclusions based on Williams' and Wong's (2002, 2003) foundations for ethical awareness and practice.

More importantly, incorporating my self study in a dialectical discourse between inner individual and outer organisational dimensions, this thesis evolves ultimately to conclude with an empirical case study informed by Williams' and Wong's (2002) *theory of ethical action*. Indeed, this case study was the flux out of which the theory emerged.

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$$E = A_\Omega C^2$$

*if and only if occurring through reflexive decision in a locality of injustice.*

Where **E** stands for **E**normous impact, $A_\Omega$ for **A**ction ethical at a critical moment of decision $(\Omega)$ brought about by a reflexive decision in a locality of injustice, and **C** for the speed of light constant.

(Apologies to Einstein for we were inspired by the corollary formula to his theory of relativity, $E=MC^2$, from his theory of relativity, which formulates that a small amount of matter converts to an enormous amount of energy. In a similar yet metaphorical way, a small ethical action converts to a potentially enormous impact according to the above postmodern and fuzzily approximate jingle.)

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In the Postmodern Tentative Epilogue, I metaphorically restate, and then explore with fuzzy logic and non-parametrical mathematics, one outcome of the theory of ethical action. This corollary supported and expressed in mathematical form as the postmodern fuzzily approximate jingle stated above, is an initial mathematical foray into the question.

The theory challenges me to consider, the case study of my own life (and in this case, in my professional practices where I happen to be an heuristically reflective academic researcher investigating the outer world of organisational knowledge explication), and how I would I enact my findings in my inner world (in this case, my enacting the findings of the research of my own tacit knowledge explication from the unconscious to consciousness). In colloquial terms, would I "practice what I preach", "walk my talk," or, in other terms, "align my espoused theory with my theory in practice" and "inform my practice by my newly aligned living theory and practice?" I explore these questions in the Epilogue, and for me one personal question remains, that is, "How long will I continue to experience the enormous benefit referred to in Williams' and Wong's jingle?"

## DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i)     incorporate without acknowledgment any material previously submitted for
         a degree or diploma in any institution of higher education;

(ii)    contain any material previously published or written by another person
         except where due reference is made in the text; or

(iii)   contain any defamatory material.


Signature

Date

$21/08/03$

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Dr Mark Campbell Williams, my principal supervisor, who practices what he advocate about reflexive professional practice and reform, for his scholarly contributions to my work, and for providing a reliable and constant source of inspiration. I am grateful for his advice, support, and companionship and for his encouragement through many difficult times.

To staff members of the Faculty of Business and Public Management and the Graduate School at Edith Cowan University, my fellow doctoral students in both my doctoral programs, and especially colleagues in the ECU Reflective Practitioner Research Group: my thanks for your leadership, encouragement and compassionate, but relentless demands that I complete the task:

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# GLOSSARY OF IMPORTANT TERMS

The source of the contributions below is mainly from Van Manen (2000).
However, as noted, some are para-phrased from various sources, especially from:
(On-line) Available WWW: http://www.phenomenologyonline.com [Sept.20,
2002]

## Communicative action

Communicative action, according to Habermas (1987), is oriented to reaching
inter-subjective understanding, mainly in the practical and emancipatory interests
and springing from communicative rationality. It involves inter-subjective and
cooperative reflexivity in building mutual understanding (one person coming to
understand what another person means) and cooperation towards that which is
true, free and just (Pusey, 1987, p. 81).

## Critical theory

Critical theory is recognised as a substantial contribution to philosophy over the
last eighty years beginning in the 1920s with the representatives of the *Institut fur
Socialforschung* at Frankfurt (often called the Frankfurt School), and the work of
Jurgen Habermas (Arato and Gebhardt, 1978). Critical theory involved the attempt
to forge a dialectical synthesis of philosophy and a scientific understanding of
society (Van Manen, 2000).

## Critical social theory

Critical Social theory refers to about the social philosophy emerging from Critical
theory, particularly regarding the nature and interaction of the social (the inter-
subjectively shared world), the human (the subjective world), and the technical
(the objective world) aspects of reality (Ngwenyama & Lee, 1997, p. 5).

## Explicit knowledge

Explicit knowledge can be expressed formally using a system of symbols, which
are easy to transmit between individuals and groups (Choo, 1998). It is what we
can easily communicate as our knowledge. Explicit knowledge is codified and
transmittable in formal, systematic language (eg. knowledge of facts, truths, or

events), and easily shared with others (Nonaka et al, 1995; Nonaka, 1994). From this we can see that it is transparent and can be codified into rules, routines, or standard operating procedures.

## Epistemology

Epistemology is concerned with the nature of knowledge and proper methods of inquiry. It concentrates on how knowledge is obtained, where as ontology deals with the reality of knowledge. In other words, epistemology is concerned with the ways and means by which we can obtain knowledge (Orlikowski & Baroudi, 1991; Chua, 1986).

## Ethnography

Adopted form the field of anthropology, ethnography is a research approach that recognises the culturally shared, common sense perceptions of everyday experiences. Ethnography involves the task of describing a particular culture from within the culture, from the inside, as it were, with the researcher(s) either being part of the culture as a member of the tribe or group, or having lived with or entered into the culture. For example research could be conducted by a researcher writing the form of life of a legal practice, the culture of knowledge learning in an organisation, a particular out-sourcing environment, or a faculty department in a university, and so forth (Van Manen, 2000).

## Ethnographers

Ethnographers use an informant or participant-observation approach to study cultural "scenes" or cultural settings. They ask questions such as: "What do people do here? What kind of people are here?" Social situations are seen as places where human beings recurrently interact in particular ways (eg. the staff room, locker room, library desk, principal's office, etc.) and where people hold certain kinds of knowledge, ways of doing things, and perceptions that belong to those places (Van Manen, 2000).

## Ethnomethodology

Ethnomethodology studies the methods that people employ to accomplish or constitute a sense of objective or social reality. The purpose is to elucidate how

taken-for-granted or seen-but-unnoticed *rules* lie at the basis of everyday communications and interactions among social actors (Van Manen, 2000).

### Hermeneutic phenomenology

Hermeneutic phenomenology endeavours to be attentive to both terms of its methodology: it is a descriptive (phenomenological) methodology because it strives to be attentive to how things appear, to let things speak for themselves; it also is an interpretive (hermeneutic) methodology because it claims that there are no such things us uninterpreted phenomena (Van Manen, 2000).

### Hermeneutics

Hermeneutics is the theory and practice of interpretation. The word derives from the Greek god, Hermes, whose task it was to communicate messages from the gods to the ordinary mortals. Hermeneutics is necessary when there is possibility for misunderstanding, said the founding philosopher Schleiermacher. He opened the idea of hermeneutics as a theory or "technology" of interpretation, especially with respect to the study of sacred (biblical) and classical texts. Schleiermacher's program was critical (as the struggle against misunderstanding) and romantic (in the desire to recover the particularity, or the animating genius or notion of an author's thoughts). Schleiermacher's aim was to understand an author as well or even better than he or she understands himself or herself (Van Manen, 2000).

### Heuristic Inquiry

Heuristic inquiry involves the researcher to engage in self-reflection, since personal understandings and interpretations from the researcher's experience contribute to the inquiry of a research question. As Clark Moustakas (1990, p. 43) states, the heuristic researcher is not only intimately and autobiographically related to the question but learns to live with, indeed to *love* the question. It becomes a kind of song into which the researcher breathes life not only because the question *may* lead to an answer, but also because the question itself is infused in the researcher's being. It creates a thirst to discover, to clarify, and to understand the crucial dimensions of knowledge and experience (Shelef, 1994, p. 2).

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## Knowledge management

Knowledge management refers to organising and structuring institutional processes, mechanisms, and infrastructures to create, store, and reuse organisational knowledge (Huang et al, 1999). As such, knowledge management is concerned with the collective knowledge of the company and it's suppliers and customers, regarding its products, services, processes, markets, operations and so forth.

## Knowledge worker

Knowledge workers are professional or technical workers with high expertise (Remenyi, 1999a, 1999b).

## Lifeworld

One of the founding notions of the current use of the term lifeworld *(Lebenswelt)*, as the world of lived experience, derives from Husserl's last and largely posthumously published text *The Crisis of European Sciences and Transcendental Phenomenology* .He described the lifeworld as the "world of immediate experience," the world as "already there," "pregiven," the world as experienced in the "natural, primordial attitude," that of "original natural life." Husserl makes a critical historical and phenomenological distinction between (1) our theoretical attitude to life, borrowed from the Greeks, and (2) our natural pre-theoretical attitude to life on which all theorising is based and from which all theorising is ultimately derived. Husserl uses the term "natural" for what is original and naive, prior to critical or theoretical reflection (Van Manen, 2000).

## Narrative Inquiry

Narrative inquiry refers to a powerful, naturalistic style of inquiry that thoroughly grounds every element of the research project in human activity. The purpose of the narrative inquiry is that it explicates our very being as individuals in an educating society: who we are, where we are and where we are going (Richardson, 1995, p. 200).

### Ontological

Ontological aspects of inquiry are concerned with what it means to *be*, with the being of things or entities. Heidegger (1962) calls ontology the phenomenology of Being, with a capital B (Van Manen, 2000).

### Phenomenology

Phenomenology is the study of phenomena, the way things appear to us in experience or consciousness. Hegel used the term "phenomenology" to describe the science in which the thinker comes to know *mind*, as it is in itself through the study of the ways in which it appears to us (Van Manen, 2000).

### Problem solving

Polanyi's (1962) concept of research as problem solving as cited by Shelef (1994) refers to as a means finding one's way. Like swimming, skiing, or playing the piano, it requires practice. To be able to swim one must enter the water, and to become problem solvers one learns to solve problems (Shelef, 1994, p. 3)

### Reflexive practice research

Reflexive practice research operates as a form of reflective practitioner research whereby the researcher changing their own practice based on their insights gained from reflecting on their own research. It focuses on particular contexts of current practices. It allows the concepts of reliable, useful, good, and wise to be tightly bound to the context in which the practitioner is producing that knowledge. Likewise, a claim to practice-based knowledge is an obvious example of a claim to knowledge which is context-bound, and in which the subjectivity of the producer of the knowledge cannot be eliminated. Thus, practice-based research is more than a way of bringing about cooperation between higher education and other sectors, and it is more than a manifestation of a bridge between economic activities and academic learning (Wong & Williams, 2002).

### Semiotics

Semiotics as the science of signs ("semiotics" in North America and "semiology" in France and elsewhere in Europe) is the application of structuralism to literary studies, semantic anthropology, and so on. In his major book *The New Science*,

Vico (1725) suggested that humans create themselves and their world (mythically, poetically, and symbolically) by structuring the world, society, institutions, and so on, in accordance with the mental languages of the structures of mind. The true nature of things is seen to lie not in the things themselves but in the relationships which we construct and then perceive among them (Van Manen, 2000).

### Ontology

Ontology is concerned with the structure and properties of what is assumed to exist, the basic building that make up the phenomena or objects to be investigated. Ontology refers to the nature of the world around us; in particular, that slice of reality which the researchers choose to address (Orlikowski & Baroudi, 1991; Chua, 1986).

### Tacit knowledge

Tacit knowledge is unspoken, personal, and context-specific which is hard to formalise and communicate to others (Choo, 1998). Tacit knowledge is created and organised inside human brain(s) (Dawson, 2000). It is obtained from experience (Nonaka, 1994), and includes the know-how, crafts, skills, insights, and intuitions that come to a person having experienced an activity for an extended period of time (Nonaka & Takeuchi, 1995). Tacit knowledge is deeply ingrained in peoples' brain, but is taken for granted because it is difficult to articulate (Nonaka, 1994). People learn tacit knowledge by doing as well as by thinking.

### Thick Description

Thick description may be seen as a methodological variation of ethnographic research. The term "thick description" is borrowed from the work of anthropologist Malinowski and has been made popular by Geertz. Ethnographic studies that aim for thick description tend to provide accounts not only that present and organise the "stories" as the informant(s) related them, but also that explore the deeper meaning structures which the members of the social group may not be able to consciously confirm or validate (Van Manen, 2000).

**WebAccounting**

WebAccounting is the customised product of a Western Australian website design and consultant company. It has the features and applications of both Lotus Notes™ groupware and EDI systems. However, compared to Lotus Notes, WebAccounting is more user friendly, powerful, and does not need heavy capital investment or high set up costs. WebAccounting has multiple functions:

(a) It supports collaborative work and sharing of information in the pursuit of company goals and objectives.

(b) It focuses on quality, reduced cycle time, reduced amount of paper and external filing, and assists staff to respond to clients quicker, more accurately, and more effectively.

(c) It provides a means to transfer tacit knowledge into explicit knowledge.

## INTRODUCTION[ᵞ]

## PRELIMINARY COMMENTS

### WRITING STYLE

The writing styles employed in this thesis may be surprising to some readers and an explanation is in order. Because I will use Derrida's project to support my more radical writing style in the Tentative Epilogue concluding this thesis, I quote from Derrida (1983), as did my doctoral thesis supervisor Dr Mark Campbell Williams (1996), in bringing touches of postmodernist influence to support my case:

> Because I like him, I can foresee the impatience of the *bad* reader: this is the way that I name or accuse the fearful reader, the reader in a hurry to be determined, decided upon deciding (in order to annul, in other words to bring back to oneself, one has to wish to know in advance what to expect, one wishes to expect what has happened, one wishes to expect (oneself)). Now, it is bad, to predestine one's reading, it is always bad to foretell. It is bad, reader, no longer to like retracing one's steps. (p. 4)

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[ᵞ] Important Note (repeated): All names and some inconsequential details have been changed to ensure adequate anonymity and care for all persons and all organisations concerned, which were researched as part of my original doctoral programme in a state of Australia. My supervisor and I subsequently decided to pursue an heuristic critical reflective practitioner research inquiry in which we were actively challenged by several academics and were working in an environment restricting our full academic, cultural, and political freedoms.

Not withstanding this conjectured "bad reader", Williams (1996) quotes from
Lomax and Parker (1995), alluding to Evans' (1972) semi-fictional story of her
reflective practitioner research, as "creating an account which transforms its
author's understanding and presenting an account which engages others in its
development" (p. 304). Furthermore, I would add to Barone's (1988) assertion
that "that all educational research is *fictive* [italics added], fashioned by the
researcher" and by my linking his insight with Zald's (1993) contention that in
business management studies, "intuition, allusiveness, imagery" with confessional
or impressionistic modes of writing, together these, may take us "closer to the
truth" (p. 521). Such sentiments are in line with the growing emphasis on the
importance of self-reflection (Richardson, 1990; Moustakas, 1990, 1994;
Clandinin & Connelly, 1994; Williams, 1996; Moon, 1999). Where the thrust in
the qualitative research literature is on the necessity for expression of researcher's
voice, authorial signature, bias, and their management of subjectivity (Denzin &
Lincoln, 1994, p. 424, Richardson, 1990; Clandinin & Connelly, 1994).

On citing the above authorities in radical qualitative research, I can not help but
ask "why would reliable, respected, sincere researchers and academic practitioners
state such seemingly bizarre assertions about the nature of research? Why say
research is *fictive*?" Perhaps the answer is that they are following the Socratic
project of enabling a better world using liberating human reason. Perhaps they
have understood, and possibly adopted a new paradigm of thinking and
researching. Perhaps they believe that by asserting such things they are
approaching closer to truth, fairness, empowerment, and perhaps even justice. I
am committed and have staked a lot on all the above. I am operating in this
paradigm.

Denzin (1994, p. 502) suggests that academic research writing can tend towards
one of five major paradigms:

1. Positivists styles, tightly spare and non-personal with phrases such as
   variables, experimental design, subjects, statistical significance,
   triangulated;

2. Constructivist styles, more descriptive and commonly including words like emergent, prior knowledge, culture, and participants;

3. Critical styles, with politically inclined terms such as empowerment, society, power, and ethics;

4. Interpretive or phenomenological styles, subjectively descriptive and sometimes allusive with common phrases such as personally constructed realities, cultural perspectives, interpretive knowledge, intersubjectivity, reflective, discourse;

5. Feminist styles, descriptively suggestive and aware of cultural conditioning using terms like gender, equity, and reflexivity. (source from Denzin, 1994, p. 502).

Using elements of constructivist and critical and interpretive or phenomenological and feminist writing styles, I also incorporate some phraseology compatible with heuristic inquiry. The research writing style developed, as I became aware of what Clandinin and Connelly (1994) refer to as the self-reflexive and transformational processes of self-creation, which can emerge during research. Clandinin and Connelly go on to mention that experience cannot speak for itself, but its representation can be in the form of text. That is, embedded meaning in texts. In a similar vein to Clandinin et al (1994), Parker (1992) defines text as "delimited tissues of meaning reproduced in any form that can be given an interpretive gloss" (p. 6). The general contention is that cultural and social contexts play a role in any research, but I would suggest especially in heuristic inquiry, especially through constraining and enabling roles for characters and their actions (Clandinin et al, 1994, p. 414.). Thus, heuristic inquiry enables me to find myself attending to feelings, ambiguities, temporal sequences, blurred experiences and leaves me to search for intuition and involvement of the mind and human values. Moreover, this type of research, as moments, can become highly personalised, revealing form of inquiry in which I may tell stories about my owned lived experiences. This through dramatic recall, images, characters, unusual phrasings, puns, sub-texts, poetry, and allusions (Clandinin & Connelly, 1994, p. 415). Through heuristic inquiry, I am able to construct a sequence of events, a "plot," holding back on interpretation, asking the reader to "relive" the events emotionally with the author (Richardson, 1990).

Following Williams (1996), I use reflection as a technique to solicit inner dialogue and to encourage inner growth leading to balanced wholeness within myself and perhaps in other individuals involved. In line with Schon (1993), I focus on reflective practice by using journals and other reflective documents, and by continually mulling upon the empirical data resulting from this research to illustrate and make clear the issues at hand. Through reflection, I am able to validate my finding through *crystallisation* (Richardson, 1994, p. 521). Through crystallisation I seek to discover or uncover propositions of multiple realities where these realities are largely socio-psychological constructions forming an interconnected whole (p. 521). These realities allow me to understand aspects of the research within an holistic relationship between humans and their environment, and allows my experience to become an integral part of the mental processes of reflection (Tesch, 1990).

It should be noted that my writing style has evolved over the course of this research. This was due to both my increasing sophistication of the use of English as my second language, and also due to my increasing awareness of the importance of a writing style for enacting the themes of the research itself. (Epilogue foretaste: to give an idea of my extended postmodern epilogue, the development of my writing style incorporate Derridean postmodern deconstruction proves to be an example of Williams's (2002, 2003) theory of ethical action. My writing style climaxed and then blossomed into a postmodern style, which can be seen as part of what Williams' (2002, 2003) theory of ethical action terms the *enormous impact (E)*. This is what results from an *ethical action (A)* in accord with our theory of ethical action (Williams & Wong, 2002), and is discussed more fully in the epilogue.

## A Significant Event Impacting this Thesis

Here I break new ground for myself in presenting how I might share my learning by communicating my values in my professional practice. My overriding concern is "How can I improve my professional practices, as an information systems and accounting professional and as an academic, as being part of what my supervisor calls 'the Socratic project of creating a better world through the use of liberating human reasoning'."

In this section I use the headings: My Development; My Description; My Explanation; and My Comment. In the first section, I include an account of the development of my writing style and my personal experience as an heuristically critical reflective practitioner learning to use what Jack Whitehead, the "authority of my lived experience" in a "living thesis paradigm". In the My Description section, I describe my ethical and academic context of what I consider to be my then University School's systematic differences of research paradigm. Thirdly, in the My Explanation section, I respond to hold myself to account in the sense of testing the validity of my claims to achieve the embodied knowledge as a doctorate educator in my dissertation. In the final section, I comment on empowerment, my beliefs, and my justification of my ethical conduct.

## My development

I note the developments in what Jack Whitehead terms the "living thesis paradigm" (1993, p 69) at the ECU Reflective Practitioner Research Group (Wong & Williams, 2002) and at the University of Bath's Centre for Action Research Professional Practice (Whitehead 1998, 2002; Reason 1999). Whitehead argues that these dialogues are a new way in which action researchers represent the living aspect of their theories about practice and that this approach celebrates a living form of educational theory, which is open-ended and contains an intention to create something better. Whitehead (1998) asserts that including the "I" and embracing subjectivity is essential to research within this paradigm. Furthermore, Whitehead (2002) exhorts individuals to not be silent, or hold back their perspective or try to struggle dishonestly in order to fit their private world with their public face through the process of denying or by inauthentically conforming to oppressive domination concerning gender, race, or differently cultured selves.

In this, my study, I present an account of my personal experience, a personal story of my development as an heuristically critical reflective practitioner, both as an information systems consultant in business, and as an academic teacher and researcher. In order to examine my development, I felt it necessary to search into my past so that I can account for my values and actions in the present. The research paradigm compels me to document any conflicts that I experience, especially when the values I hold internally are not reflected in the way I behave externally, and the satisfaction I feel when my values and actions are in harmony. Put in different words, Whitehead's (1993, 1996) comments that one's espoused theory ideally should be consistent with one's lived theory. He further argues that living theory refers to the explanations that are not embodied in the individual's life forces, but contained in an intention to create something for the future based on that person's goals or values and is controlled within an intention based action plan. Hence, this theory is an explanation, which makes sense of the present in terms of an evaluation of the past, with an intention to change some aspect of one's own practice, or the world in the future.

After keeping an inauthentic silence within personal ethical dilemmas and traumas that I had experienced due to certain academics' reluctance in accepting a postmodern conceptual framework, I seriously considered writing my thesis in a

modernist style. The source of these problems was the new ECU Reflective Practitioner Research Group which promotes academic teaching and research practice which maintains the "I" in researching one's own practice (Whitehead, 1996, 2002).

My choice of pursuing writing this thesis as an inquiry that is not in principle governed by pre-established rules, was a deliberate attempt to place my research in a setting where participative, collaborative, action-oriented, critical, heuristic, and reflective phenomenological forms of inquiry can be fostered (Lyotard, 1986). As will be discussed in the Tentative Epilogue, such inquiry allows for many important dimensions of research, not only formal communication, but personal accounts of what Williams' (2002, 2003) terms *critical moments of decision*. Such moments can emerge as part of historical-political dilemmas and actions, feelings and emotional intelligence, asthetic allusiveness, questions of justice and truth, ethical imperatives, faith dimensions of people's lives, and even the unconscious wellsprings whence come intuitions and urges and dreams and visions.

## My description

I began to see my ethical context and locality as a dimension of my then University School's systematic reluctance in accepting a postmodern conceptual framework. I become very aware of the material and psychological hardships faced by my supervisor because of pressure from administrative academics.

Nevertheless, I accepted their proposal of staying in the previous university doctoral programme, feeling I had little power to do otherwise. However, as my thesis progressed, I felt compelled, from insights gained from my research itself, to take ethical action. My determination was empowered through the process and engagement of critical theory as a reference for my practice. I see that my stories of experiences were part the process by which I was compelled to take ethical action during a moment of decision, knowing that I would have to bear a price.

It seems to me that my supervisor was compelled to restrict his academic freedom so as to justify and answer to the terms and conditions set. There are no doubts in my mind that these terms and condition are in direct opposition to my supervisor views of the Socratic project. What are these administrators trying to do? Perhaps they want to squash the self-study and reflective practitioner methodology itself.

There was even more pressure to come before our final action. The following extract gives an indication of the locality of injustice, which compelled us, within our emerging ethical framework, to make a reflexive decision leading to ethical action. Reflexive it was because we were enacting the very insights that we were gaining from our practice (see chapter 8).

As part of another distressing pressure, the previous *Senior Administrator* of research in my Faculty appoints the Third assessor without my supervisor consultation. My supervisor protested that the Third assessor, who knew very little about the methodology, but due to threats of expulsion and termination of employment, the situation remained in place.

## My explanation

In this section, I respond to comments about my thesis by a reader I name the *Third Assessor*. This person was an internal assessor nominated by the *Senior Administrator* in my then Faculty to assess the transferring of my candidateship from DBA to Ph.D. The Third Assessor suggested that my thesis is of not a Ph.D. standard. I needed to draw on a range of literature and theory to effectively rebut such comments. Most importantly, I would like to stress that I was honoured that the third assessor spent considerable time to produce a detailed report. I also note that he honestly acknowledged that such approach could be appropriate within some fields such as professional practice, which my thesis appears to target. He was concerned with the non-conventional nature of the thesis, questioning how it would be credible to others and how tenable it was to him. He singled out that in his opinion, the thesis is very poorly written and contains too many colloquial expressions and many of the observations appear to be superfluous to the research that is being addressed. He expressed "*The thesis reads like a piece of 'fiction'- there is simply no evidence of data collection and the analysis of the data does not appear to relate to the research instruments that have been developed.*" The thesis appeared to be "gibberish" to him and that the uses of alternative perspectives to examine the case studies is rather novel and that the justification for using these approaches is lacking. He also considers that the research approach and methodology to be rather confusing.

I am aware that as a postmodern writer, my writing, as part of my professional practitioner discourse, is one of the ways that I review the truth that creates my own living theory (Whitehead, 2000). Hence, the nature of Postmodernism is such that truth is revealed in ways often strange, especially to those to those emerging from a restrictive modernist paradigm. In forming my living theory, I am working without rules. However, I need to draw on the traditional forms of theory (positivist, interpretive and critical social theory) and use some of their analytic nature. In my epilogue I am working in an unorthodox manner where I am able to transcend some of the traditional analytic nature during the creation of my living theory (Whitehead, 2000). I am aware that my epilogue is going to be construed by some as being "*anti-establishment, using a personal self-confessive nature.*"

What I want to do in my research is to communicate my living experience both as an information systems consultant in business and as an academic teacher and researcher. I want to do this in a way that my living experiences are also the living standards of the judgement I use to in validating the claims of my research findings (Whitehead, 2000).

First, I would like to define my research approach. This approach is an heuristic autobiographical self-study with a reflexively phenomenological approach influenced by analytical psychology and uses a writing style influenced by postmodernist perspectives. In heuristic inquiry, the emphasis is on conducting in-depth and wide ranging reflection of the empirical material in order to glean heuristic impressions or insights that impact upon my personal relationships with all involved in this research. Through the stages of heuristic inquiry, deep understandings are sought which can illuminate the situation, thus providing meaningful communication and inspiring appropriate actions (Williams, 1996). It should be noted that the marshalling of evidence to prove or disprove hypotheses or assertions is not in the spirit of heuristic inquiry.

I note that the Third assessor did not mention the words heuristic inquiry, living theory, autobiography, or reflective phenomenology. Although his comments are deeply insightful and helpful in many areas, he seemed not to appreciate the strengths of the declared heuristic research within and using, postmodernist perspectives. (He did mention that he was not familiar with the methodology used in the dissertation, and in his opinion, the discourse as presented would not be acceptable in the mainstream information systems field. At one point, he considers it alarming that such research be even considered for a Ph.D.) I obviously do not agree with his comments, and I learned from my supervisor that he has recently graduated four MIS Ph.D. candidates who were using such an approach.

The Third assessor outlined his concerns that the empirical part of the thesis was weak. (He outlined that the candidate has not demonstrated how his approaches using Sekaran's (1992) and Moody and Shanks' (1996) analysis framework, function (Chapter 3 and 4) in tandem within the research that has been undertaken.) However, it is my understanding that the Third assessor considers the above analysis framework to be my major mainstream approach for the thesis. I take it that he was referring to the empirical material gathered was too weak to provide the research findings through the first case employing the positivist approach (Chapter 3), and in the second case employing the interpretative approach (Chapter 4). It is clear that my major research approach was described in Chapters 6 and 7. The Third assessor was silent in providing a reflectively heuristic description of my major research findings and insights (chapter 6 and 7) where I transcend some of the traditional analytic character (Critical theory with hermeneutic-dialectic approach) in the creation of my living theory. So how did I maintain the essence of my insights related to tacit knowledge in my research? My response to this question is that I am supporting the mode of presentation in the framework of the text that also supports the theme of the dialogue. In so doing, I trust that I am endeavouring to enact wisdom in the sense in which Mahoney comments: "wisdom consists of the ability to sustain a conversation" (1990, p. 185). Such wisdom, I consider to be tacit knowledge. My understanding is that a conversation can occur between people and also between the inner characters which make up any person's psyche. As I explain in Chapter Five and Six, I base this understanding on several sources such as Critical theory, especially Habermas' theory of communicative action, numerous other theoretical frameworks and models from information research, with a touch of Derrida's postmodernist tool of

deconstruction, and noting Moustakas' (1990) injunction to carry out heuristic research including self-dialogue (Pp. 16-20).

For the major impression of the thesis, particularly that concerning the Theory of Ethical Action, the Third assessor commented that this is an irrelevance to the thesis. The essence of the Theory of Ethical Action was not so much a description of unethical behaviour as such, but rather that of ethico-socio-political action for empowerment within a situation of oppression, domination and distorted communication. As I explain in my tentative epilogue, I base this understanding on Derrida's postmodern tool of deconstruction to revisit the major themes of the research in a postmodern dialectic, heuristically intermingling my personal life with the research.

## My Comment

Thinking of the last question, perhaps for me the most existentially important aspect of the theory of ethical action for me at the moment, I quote from the renowned psychiatrist-psychologist-philosopher Carl Jung. Speaking of empowerment of one's belief in order to justify one's value, Carl Jung (1975) writes:

> Too many men and women reach middle age without achieving psychological maturity and it is therefore necessary to help them through the neglected phases of their development. If a person is afraid of life and finds it hard to adjust to reality, he might prefer to dwell in his fantasies or to remain a child. In such a person (especially if he is introverted) one can sometimes discover unexpected treasures in the unconscious, and by bringing them to consciousness strengthen his ego and give him the psychic energy he needs to grow into a mature person. This constitutes the neglected phase.
>
> Carl Jung (1975, p. 325)

It could just be that that I am just such a person, that the ethical impact that accrues to me is my maturity. The question still remains, though; will the conditions be right for a *human ethical chain reaction* wherein my ethical action ignites a *human chain reaction of ethical action* that creates a *chain reaction of ethical impacts?* Such a chain reaction could lead to people influencing each other to take ethical decisions at their moments of decision in the locality of injustice. The extent of any human ethical chain reaction depends on a minimal condition of a critical mass of humans in the locality of major injustice. In other words there would be enough humans being receptive to being influenced. This would need the condition of appropriate human communication channels.

Would a human ethical chain reaction be a desirable occurrence? We would suggest that it depend upon whether you are a perpetrator, or a victim, or a beneficiary, or a witness, of injustice. Remember, if you are the perpetrator of injustice, you too can respond by making an ethical action in the locality of injustice just as well as a victim of your injustice. One thinks of the response of Zacharias, the Jewish tax collector for the oppressive Roman colonialists during

the time of Jesus of Nazareth, who responded by an ethical action when he realised his moment of decision in the locality of the injustice he was perpetrating.

## OVERVIEW OF THE CHAPTER

The initial aim of this research was to investigate the organisational impacts of the adoption of the WebAccounting package, particularly in the conversation of tacit knowledge into explicit knowledge. This introductory chapter over-views the study, defines some key terms, and provides an insight into the adoption of my major theoretical references. In particular, Habermas' critical social theory within the heuristically critical reflective practitioner research approach, to illustrate and explain the knowledge management issues at hand. This chapter also addresses the purpose of the research, as well as outlining the main research questions, the significance and purpose of the study and the structure of the thesis.

This study adopts an heuristically critical reflective practitioner approach. The aim is to elicit inner dialogue and open discourse responses in one-on-one interviews within a phenomenological, reflective practitioner methodology (Moustakas, 1990; Tesch, 1990).

In line with Schon (1993), I employed the use of reflective practice in the research of web-based knowledge management systems. For this, I kept reflective journals (Clegg, 1996; Ballantyne & Packer, 1995) and authored and published academic papers as the research progressed, while keeping relevant notes and documents, and I continually reflected upon the empirical data resulting from this research. Furthermore, I followed Williams (1996) lead by incorporating heuristic inquiry (Moustakas, 1990; Tesch, 1990) and reflective phenomenology (Moustakas, 1990; Tesch, 1990) into the research approach. As a reflective practitioner, I the researcher present examples and vignettes to illustrate and elucidate the issues at hand as described in Chapter Six.

My decision to investigate seriously Schon's (1983) admonition to become a reflective practitioner was a result of reflecting on some methodological and

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ethical considerations, based mainly on Moustakas's (1990, Pp. 32-34) notion of validity in heuristic research. This, I will discuss in detail in Chapter 5.

This study also describes epistemology, ontology, and axiology. It then gives an autobiographical account of my own theoretical and philosophical journey towards the acceptance of the philosophical foundations that led to my adoption of the Habermas' critical social theory employing an heuristic inquiry approach. The accounts of my adoption of these underlying philosophies, (which I describe in detail in Chapter 3, 4 and 5), reveals an engagement with previous research in this area. In particular, the work of Williams (1996, 2000a, 2000b) and Taylor (1993) at ECU and Curtin universities, and the on-line works available at the University of Bath. This engagement with other researchers then enlightened my journey of researching the WebAccounting projects. By inter-weaving WebAccounting with my journey in literature, theory, and scholarship, I hope that I have begun a continuing transformation of myself into a better manager of knowledge management processes, a better citizen, a better leader, and a scholar.

## A BRIEF OVERVIEW OF KNOWLEDGE MANAGEMENT

Knowledge management has increasingly become an important topic in the decision support mechanisms that create value for both the strategic and structural policies that meet the organisational challenges of the information age (Smith, 2001; Standing, 2000; Burn, 2000; Williams, 2000a). Knowledge is information combined with experience, context, interpretation, and reflection (Williams, 2000a) and knowledge management enables improvement of knowledge work processes (Nonaka et al, 1994).

Knowledge management systems allow a new employee to learn an organisation's current processes from that organisation's history through its explicit knowledge base (eg. menus, documents, manual, and databases and so on.). These can explain the evolutionary processes that have hopefully led to current best practices and improved business processes over time (Garvin, 1993; Nonaka et al, 1994). Gunther (1994) and Schein (1999) argue that knowledge management systems can transform organisational learning processes. These processes involve managing

knowledge by understanding its dependent qualities (eg. fitness for purpose) and its knowledge context (eg. environment) (Schein, 1999, p. 164). The Centre for Electronic Commerce Projects, a research project funded by Monash University has demonstrated the ways knowledge management system can shorten information movement time for multilevel supply chains (Centre for Electronic Commerce, 1996).

Government and industry are beginning to realise the need to reuse their existing resources to develop best knowledge management practices. This includes learning from past experience and the experience of others (Garvin, 1993; Davenport, Jarvenpaa & Beers, 1996;The IMPACT Programme, 1998). The creation of organisational best practice is dependent on both the tangible and intangible assets that evolve during normal business processes (The IMPACT Programme, 1998). From this, we can say that an organisation striving for best practice should be able to locate its tacit knowledge and convert it into explicit knowledge as part of its strategic resource reserves.

By developing a tool to understand the process of knowledge creation, both tacit and explicit could assist this process. Knowledge management systems are cited as tools to accomplish this increase in efficiency (Sarvary, 1999).

Remenyi (1999a) describes a tool that may focus and develop organisational core competencies, and this tool is a knowledge management system. He identifies that a knowledge management system is concerned with decision support systems, data warehousing, and data mining. Such a system is usually closely associated with Intranet applications.

Hauben and Hauben (1997) suggest considering knowledge management systems as an extension of information system management, which utilises the exchange of business information through an information technology network. Such an exchange of information electronically between separate organisations, or between an organisation and its customers can be crucial to support successful business partnerships.

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WebAccounting Electronic Data Interchange GroupWare (WebAccounting) is a knowledge management and groupware software application (Org B Training manual, 2001). WebAccounting allows company executives to use computers to access internal and external information for enhancing their decision making in order to maximise productivity and increase profits from the combination of human and IS information gathering, processing, retrieval and accessing. A Western Australian website design and consultant company created WebAccounting, and it has the features and applications of Lotus Notes$^{TM}$ groupware, and EDI systems. Lotus Notes$^{TM}$ groupware allows organisation to facilitate communication and collaboration among team members within the organisation. Electronic Data Interchange EDI system allows organisation to use standardised, agreed formats for electronic message to create cost-efficient handling of transactions such as product re-ordering by individual outlets in retail auto supermarket chains (Gunther, 1994). As of March 2002, WebAccounting operates in ten sites in Western Australia.

## THE RESEARCH ROLE

A focus of this research is to describe and explain the importance of knowledge management in an information-driven society (Davenport, 1998; Moody et al, 1999; Fink, 2000; Smith, 2001; Standing, 2000; Williams 2000a). The study documents the processes of managing organisational tacit knowledge of Organisations A, B, and C via WebAccounting. As described in subsequent chapters the primary focus is to provide an explanation of the development of organisational, individual, and personal tacit knowledge, rather than a description of that knowledge. This aim has led to the use of philosophical argument and rational thought, particularly within Habermas' critical social theory, aided by reflexive practitioner practices.

Moody and Shanks (1999) point out that companies in Australia are investing heavily into knowledge management systems without fully understanding the context and requisites. By undertaking a detailed study of a knowledge management systems at work, this study also intends to provide better understanding of these systems particularly, their merits and limitations. From

this, we wish to reduce unnecessary financial outlays for companies contemplating the adoption of these knowledge systems.

This study is both a journey and a mission. By investigating the philosophy of Habermas' critical social theory, I am travelling within the social sciences and recognising the development of knowledge management systems within a social environment. The mission was to take this discovery, knowledge, and theory and from that, to build an in-depth understanding of the socio-cultural context of knowledge management systems researches. The journey was the first stage in understanding the process of emancipation – the main metaphor for critical research (Mezirow, 1999; Whitehead, 1996, 2002).

By employing the critical social theory approach, I strive to employ an open discourse followed by a critical discourse that should result in some form of positive political action (Taylor & Williams, 1993; Mezirow, 1999; Whitehead, 2002). For example, from a critical social theory perspective, the critical discourse conceptualises the role of social cues such as facial expressions, body language, and the tone of voice in a way different from the positivist or interpretative perspective (Moustakas, 1990, 1994; Tesch, 1990).

This study also gave *me* an opportunity to develop an in-depth understanding, and broaden my knowledge in connecting my own explication of tacit knowledge with the research process. Within the spirit of heuristic inquiry, I was actually *living out* the knowledge management process I was researching. This new work is autobiographical and describes how I retrace my steps and describe my previous engagement with theory and philosophy in researching the adoption of WebAccounting.

## THE RESEARCH APPROACH

The aim of this study is not only to research the organisational impacts of WebAccounting, but also to document and describe the associated research processes. In addition, there is a need to examine the practical implications of using Habermas' critical social theory and reflective phenomenology as

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underlying philosophies for information system research. Ngwenyama (1991) and Lee (1994), who argue that Habermas' framework has had a greater impact on the information systems research discipline than any other critical social theory school of thought support these aims.

By adopting Habermas' critical social theory, I am able to build on a foundation that has already gained recognition among IS scholars (Mingers, 1981; Lyytinen & Klein, 1985; Lyytinen & Hirschheim, 1988; Ngwenyama, 1991; Lyytinen, 1992; Hirschheim & Klein, 1994; Lee, 1994 and Ngwenyama & Lyytinen 1997). However, I came to feel that, despite my intrinsic interest of Habermas' critical social theory, I wanted to know where to start and where should I go? I then began to explore previous empirical research in investigating the implications of knowledge management.

After reading past empirical research papers investigating of the impact of knowledge management systems on business performance (for example, see (Nonaka, 1995; Davenport et al, 1996; The IMPACT Programme, 1998; Daniel et al, 1999; Remenyi, 1999a; Hansen, 1999; Zack, 1999; Standing, 2000; Smith, 2001; Burn, 2000; Williams, 2000; Fink, 2000), I found that the research carried out from an Australian perspective could be augmented, and that most studies originated in the United States (see particularly Davenport et al, 1998a; Daniel et al, 1999). These studies have found that knowledge management systems have made significant positive changes to organisations by helping to accomplish organisational objectives through the structuring of people, technology, and available knowledge.

I began to realise that increased competitiveness through knowledge management has increasingly led companies to include the analysis of available knowledge into business practices (Davenport et al, 1998b). From this, another question arises: 'For managing organisational and individual knowledge, what are the impacts of the adoption and use of WebAccounting, in the conversion of tacit knowledge to explicit knowledge?'

I began to conduct rigorous research into how organisations can exploit knowledge more effectively in its business practices. I then viewed the situation from a different perspective, one that differed from my 5 years consulting in information systems. I began to see the 'how' and the 'why' of the importance for organisations to develop feasible approaches to improve knowledge management processes. Table 1.1 below identifies some of the critical areas regarding the improvement of these processes and associated research.

| Critical areas regarding the improvement of knowledge work processes. | Research |
|---|---|
| Best practice for KM process | (The IMPACT Programme, 1998) |
| The reflection of knowledge work processes, the organisational culture, and the project's business requirements. | (T.H. Davenport, S. Jarvenpaa, and M. Beers, 1996; Williams & Taylor, 1993, 1996) |
| The social-technical view of knowledge management supports a close and technology relationship | (Pan and Scarbrough, 1999) |
| Using Knowledge Management and the Internet to Support Evidence Based Practice | (Daniel & Graeme, 1999) |
| Role of organisational Culture & Trust in helping to maximise the effectiveness of organisations | (Standing, 2000; Burn, 2000; Smith, 2001; Nonaka, 1995) |
| The context of using heuristic self-study and analysis of soft system methodology in encouraging creativity for attempting to improve knowledge work process | (Williams, & Taylor, 1993, 1996) |
| Role of developing trust in leveraging knowledge resources for value creation | (Fink, 2000; Burn, 2000; Meyer & Zack, 1996) |
| Managing the knowledge of the Organisation | (Davenport & Prusak, 1998; Meyer & Zack, 1996) |
| Gaps in the Literature | Related Research |
| Impact of knowledge management systems as: An agent in converting tacit knowledge to explicit knowledge and how such system can provide frameworks and architectures needed for managing explicit knowledge; A model for analysing success of knowledge management systems and what factors, strategies, indicators, and barriers encountered; Insight into the adoption and uses of WebAccounting in the domain of supply chain management and resulting issues of new intermediation forms. | External Website Consultants: (Daniel & Graeme, 1999; Davenport, 1998a; Hansen et al, 1999; Zack, 1999a, 1999b; Remenyi, 2000; Williams, 2000; Burn, 2000; Smith, 2001; Standing, 2000; Yap, 1992; Meyer & Zack, 1996; Hirschheim & Klein 1994; Lyytinen 1992; Lyytinen & Hirschheim 1988; Lyytinen & Klein 1985; Mingers 1981; Ngwenyama 1991; Ngwenyama & Lyytinen 1997). |

*Table 1.1.* Research areas reflecting type of knowledge work, organisational culture, and the improvement of knowledge work process to realise value to organisations.

While existing studies have identified critical areas that address the organisational impacts of improving knowledge work processes (Nonaka, 1995; Davenport et al, 1996; The IMPACT Programme, 1998; Daniel et al, 1999; Remenyi, 1999a; Hansen, 1999; Zack, 1999; Standing, 2000; Smith, 2001; Bum, 2000; Williams, 2000; Fink, 2000), table 1.1 highlights gaps in the literature. Based on the above studies and identified gaps, I then began to investigate the possible role of using WebAccounting as an agent in converting tacit knowledge to explicit knowledge to better support effective and efficient knowledge management.

### EXPLICATING TACIT KNOWLEDGE USING THE WEBACCOUNTING KNOWLEDGE MANAGEMENT SYSTEM

One of the purposes of this research study was to determine ways in which WebAccounting operates as an agent in converting tacit knowledge to explicit knowledge within an organisation. Here I describe the areas of investigation:

1. The architecture model of knowledge products by Meyer and Zack (1996) incorporates five stages: acquisition, refinement, storage & retrieval, distribution and presentation. This model is used as a design framework to analyse the way in which WebAccounting operates as an agent in converting tacit knowledge to explicit knowledge (see figure 2.2 and Ch. 2).

2. An understanding of knowledge management and the frameworks or architectures needed for managing both tacit and explicit knowledge through the adoption of WebAccounting, and how this assists organisations in the following areas:

(a) An understanding of how the knowledge management supported by WebAccounting systems can enhance the environment in which knowledge artefacts are created and managed (Meyer et al, 1996; Davenport, 1998; Hansen, 1999 and Zack, 1999a).

(b)     An understanding of the features and functions of WebAccounting in supporting knowledge management to help organisations to maximise the efficiency and effectiveness of adopting knowledge management tools (Daniel et al, 1999).

(c)     An understanding of the development of critical strategies for a knowledge management tool that allow organisations to identify, improve, protect and exploit the value of knowledge and to establish how well that knowledge is being applied (Remenyi, 1999a).

The above are some considerations when organisations plan to establish effective, efficient, and empowering strategies for managing and exploiting both forms of knowledge.

## THE RESEARCH QUESTIONS

On one level the basis of this study initially responded to the following research question, founded on the objectives described in the previous section:

1.  For managing organisational and individual knowledge, arising of the adoption and use of WebAccounting, what issues, especially regarding the conversion of tacit knowledge to explicit knowledge, emerge as important?

On this level of the research, as part of the reading and the maturing of the research, I developed three subsidiary research questions. The first being investigated largely using positivist approaches, and the second being investigated largely using interpretative approaches, including the use of reflection and investigating my reflective practice as an information systems consultant, with the third being investigated largely using Habermas's critical social theory. These questions are:

1.1   In the context of making possible knowledge sharing, how successful is WebAccounting as a knowledge management system, judged in accordance with Moody and Shanks' (1999) success factor model for

analysing knowledge management systems, and researched using a largely positivist approach?

1.2    What insights, especially regarding competitive advantage and the management of knowledge in an organisation in the context of the adoption and use of WebAccounting, can be gained by using Porter's value chain model (1986) and Papazoglou & Yang (2000) value chain integration model, researched using a largely interpretivist approach?

1.3    What insights, regarding knowledge management in the context of the adoption and use of WebAccounting, can be gained using Habermas's critical social theory, researched using a largely critical approach?

My reading and the research itself led me to understand that the positivist approach (first case study), the interpretivist (second case study), and indeed the critical (from the third case study), can be inconsistent with individual, social, cultural, economic, psychological, and organisational reality (Walsham, 1993; Ngwenyama & Lee, 1997, Lyytinen & Hirschheim, 1988; Ngwenyama, 1991; Lyytinen, 1992; Hirschheim & Klein, 1994; Lee, 1994; Ngwenyama & Lyytinen 1997; Williams, 1996, 2000, 2002; Taylor, 1993; Moustakas, 1990, 1994).

Having addressed the findings and limitations resulting from the positivist and interpretative and critical perspectives, I was then better able to revisit the above research questions within an heuristically critical (including phenomenologically reflective) reflective practitioner research methodology (Moon, 1999, Williams, 2000a; Whitehead, 2002). Indeed, a new research question emerged from this juxtaposition:

2.    In the context of my researching the explication of tacit knowledge, what insights can be gained from a postmodern inspired rendering of the case study of my own practice as an heuristically critical reflective practitioner, which resulted in and was informed by Williams' and Wong's (2003) theory of ethical action?

## MY RESEARCH METAPHORS OF THE STUDY

While my focus is on the discipline of managing organisational tacit knowledge, I initially drew upon the work of Jurgen Habermas' critical social theory for assistance in creating an appropriate guiding framework. That is, Habermas' work constantly advocates critical self-examination, evaluation of social importance, and the foundation of everyday language. (Habermas, 1972, 1974, 1979, 1984, 1987; Ngwenyama 1991; Alversson et al, 1999c; Lee, 1994). Guba (1994) contends that critical social theory attempts to understand the social contradictions and conflicts inherent in the existing social structures of organisations and society by self-reflection, while holding to a non-objectivist understanding of ontology and epistemology. Habermas' theory demands that the researcher seek to discover or uncover propositions of multiple realities where these realities are socio-psychological constructions forming an interconnected whole (Ngwenyama & Lee, 1997). These realities can only be understood as an aspect of the holistic relationship between man and the environment, and form an integral part of the mental process of reflection (Moon, 1999). Tesch (1990), and Moon (1999), both of whom I take as authoritative researchers in reflection and professional development, agree that such reflection "involves the process of thinking and may be aided by the process of articulation of that thinking orally or in written form (Moon, 1999, p. 64)."

While using Critical Theory as a guiding framework, I am able to understand organisational change in broad social, political, psychological, and ethical contexts. This is because heuristic inquiry has the potential to deepen positivist, interpretivist, critical, and reflective practitioner theory and practice.

I decided to employ Habermas' Theory of Communicative Action to investigate the research subject (refer to chapter 6), the development and practice of knowledge management systems (which I regard as a component of information systems), for the following reasons:

(a)    Firstly, according to Ngwenyama & Lee (1997) and Hirschheim & Klein (1992, 1994), Habermas' Critical theory has been more popular in conducting information

systems research than any other critical school of social theory. This approach is able to serve as a powerful framework to understand organisational knowledge management change within a context of human relationships within an organisation (Lyytinen, 1988; Lee, 1997).

(b) Secondly, as argued by Markus (1994a, p. 120), Habermas' theory provides details of the processes of understanding information systems research from the context of a social perspective. That is, Habermas' concept can explain how the interaction of social, human, and technical systems provokes changes in the context of information systems research. These include the individual human (subjective world), the social (inter-subjectively shared world), and the technical (objective world), which are all interrelated (Chua, 1986; Laughlin, 1987, 1988; Guba, 1994; Ngwenyama & Lee, 1997).

(c) Thirdly, Habermas' theory provokes open discussion (dialogue) on ways in which critical evaluation can be applied (Lyytinen, 1985; Habermas, 1987; Taylor & Williams, 1993; Denzin et al, 1994; Myers, 1995). As argued by Moustakas (1990, 1994), Tesch (1990) and Maxwell (1992), a more clearly focussed problem-solving scenario through Habermas' thinking on cultural background and political interest development is possible.

However, I also begin to notice that I need to develop an approach that merges the rigour of positivism with interpretivism's depth combined with the ethico-socio-political imperatives of critical theory, joined with the transformative subject-object merging insights of reflective practice. In explaining my practice as a reflexive practitioner practice (refer to chapter 7 and 8), I draw on the heuristic inquiry to provide the intuitive-emotional-artistic-depth psychology that illuminates my life and learning. I also need to touch of Derrida's postmodernist tool of deconstruction, and some theoretical underpinning of heuristic inquiry with ethnographic elements. As cited in Lyotard's book on The Postmodern Condition: A report on Knowledge, p. 81, he contends:

> *A postmodern artist or writer is in position of a philosopher: the text he writes, the work he produces are not in principle*

> *governed by pre-established rules, and they cannot be judged according to a determining judgement, by applying familiar categories to the text or to the work. Those rules and categories are what the work of art itself is looking for. The artist and the writer, then, are working without rules in order to formulate the rules of what will have been done (Lyotard, p.81, 1986).*

What I want to do in my research is to find an approach of challenging to not only the positivist and interpretative perspectives, but also suggestions to deepen critical perspectives and reflective practitioner approaches. These constitute the clarification and explanatory power of my living theories (Whitehead, 2000).

My self-study research approach (refer to chapter 7 and 8) that resulted from my living theories, which combines my own personal and largely subjective life with the outer and largely objective organisational case studies would be sufficient to explain the complexity of my practices. Based on my empirical research on the explication of tacit knowledge in three cases studies, and the case study of my own personal explication of tacit knowledge, I theorise within the domain of organisational ethics. The common thread is the importance of tacit knowledge explication in both a person's individual and in-group knowledge, and for organisations and departments, and individuals. Thus, while this research may result in a clearer understanding of knowledge management systems, I dare to hope that the major result may be more empowered and better persons. I dare to hope that I am one of those. Thus, not only logic and systems are central to this study, but also certain *critical moments of decision* which arose in response to historical-political dilemmas and actions that involved feelings and emotional intelligence, aesthetic allusiveness, questions of justice and truth, ethical imperatives, the faith dimensions of people's lives, and even the unconscious wellsprings whence come intuitions and urges, dreams and visions.

In the tentative extended epilogue, I came to understand my final and most important research case study. Here, I use the freedom and playful creativity afforded by the more constructive of Derrida's postmodern tool of deconstruction to revisit the major themes of the research in a postmodern dialectic, heuristically intermingling my personal life with the research. Out of this thesis eventually emerges liminal conclusions based on Williams' and Wong's (2002, 2003) foundations for ethical awareness and practice.

More importantly, incorporating my self study in a dialectical discourse between inner individual and outer organisational dimensions, this thesis evolves ultimately to conclude with an empirical case study informed by Williams' and Wong's (2002) *theory of ethical action*. Indeed, this case study was the flux out of which the theory emerged.

$$E = A_\Omega C^2$$

*if and only if occurring through reflexive decision in a locality of injustice*

Where E stands for Enormous Impact, $A_\Omega$ for Action ethical at a critical moment of decision ($\Omega$) brought about by a reflexive decision in a locality of injustice, and C for the speed of light constant.

In the Postmodern Tentative Epilogue, I metaphorically restate, and then explore with fuzzy logic and using non-parametrical mathematics, one outcome of the theory of ethical action. This corollary supported and expressed in mathematical form as the postmodern fuzzily approximate jingle stated above, is an initial mathematical foray into the question.

The theory challenges me to consider, the case study of my own life (and in this case, in my professional practices where I happen to be an heuristically reflective academic researcher investigating the outer world of organisational knowledge explication), and how I would I enact my findings in my inner world (in this case, my enacting the findings of the research of my own tacit knowledge explication from the unconscious to consciousness). In colloquial terms, would I "practice what I preach", "walk my talk," or, in other terms, "align my espoused theory with my theory in practice" and "inform my practice by my newly aligned living theory and practice?" I explore these questions in the Epilogue (chapter 8), and for me one personal question remains, that is, "How long will I continue to experience the enormous benefit referred to in Williams' and Wong's jingle?"

## STRUCTURE OF THE THESIS

This study comprises eight chapters that trace the course of the research journey. Together with an examination of the purpose, structure and methodology of the study, and a review of the major thinkers for assistance in devising an appropriate

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theoretical framework (Markus, 1994; Ngwenyama & Lee, 1997; Hirschheim & Klein, 1992, 1994; Lee, 1997).

**Chapter One:** provides an overview of the research, including the background to the research, a summary of the key areas of the rest of the study and definition of key terms.

**Chapter Two:** provides a literature review exploring insights into the context of knowledge management, and provides a source of literature for this study. The general literature relevant to this study covers various aspects of the development of knowledge management and the role of both tacit and explicit knowledge in organisational learning. Material relating to the knowledge management processes and uses of knowledge management systems is also described, showing the importance of such material to the research question, which I repeat here for emphasis: "For managing organisational knowledge, how does WebAccounting successfully convert tacit knowledge to explicit knowledge?"

**Chapter Three:** describes and analyses my first pilot study providing initial background and help for the overall thesis. I realised at that time that I needed an approach that combined my beliefs and values with an indepth understanding of what I actually did when I worked as a part-time consultant with Organisation A. At this time, I saw myself as needing to develop the research capabilities in order to properly research the area. From this decision, I conducted my first empirical study, involving Organisation A in the beginning of Jun 2001. This study charted my early experience using elements of positivist research on my journey towards what I came to consider as the more appropriate research approach of reflective practitioner ethnography.

In this third chapter, I also describe what the literature presents for the commonly occurring ontology, epistemology, theory, and practice usual for the positivist approach.     In describing and analysing the WebAccounting knowledge management case study of Organisation A, I employed Moody and Shanks' (1999) model for analysing success for knowledge management systems. WebAccounting is consequently investigated within a largely positivist context to

provide insights for the thesis overall and to highlight the strengths and weaknesses of the positivist research approach as applied to this study.

**Chapter Four:** is written in a manner, which allows immersion in the interpretative research paradigm while experiencing the background and context of WebAccounting for my overall thesis. Firstly, I present the research approach, based around ethnography and interpretivism, and then consider its suitability for my purposes and for the research area. I came to realise that I did not need to attempt to predict human behaviour, as in my first empirical study researching Organisation A from a largely positivism. I was searching for an authentic means of conducting, investigating, and recording my experience in the research field, and ethnography employing interpretative qualitative fieldwork emerged as the method that I considered I needed to investigate.

Secondly, in the fourth chapter I discuss what the literature presents as a common ontology, epistemology, theory, and practice related to the interpretative approach. Thirdly, in describing and analysing WebAccounting as a knowledge management systems which has been adopted by Organisation B, I used Porter's (2000) traditional model of Supply Chain Model and Papazoglou and Yang's (2000) Integrated Value Chain Analysis Model to investigate the management of shared knowledge. Within Organisation B, the investigation of WebAccounting was conducted using a largely interpretative paradigm to provide insights for my overall thesis and to demonstrate the strengths and weaknesses of an interpretative research approach applied to this study.

**Chapter Five:** examines the philosophical and guiding frameworks and discusses my mature research methodology in detail, examining the analytical processes of using both transcript analysis and reflection, and the reflexive practitioner practice approach.

Firstly, I describe the development of my theoretical framework including a detailed justification of using my various writing styles. I further describe the evolution of my approach to the research, which includes an initial dialogue with what I term my inner self. In this process, I disclose relevant aspects of my

personality type and my world-view concerning tacit knowledge and the communication process. In this chapter, I also describe in more detail some relevant insights from critical social theory.

**Chapter Six:** takes a broad ranging reflective consideration of all the case studies involved in the research. The use of a cross-case analysis involving reflection and reflexive practitioner practice enriches this analysis.

**Chapter Seven:** provides a summary and discusses various conclusions gained from the study. Included in this chapter are the implications of this research in answering the research questions and emergent research issues relating to the adoption and use of WebAccounting. The chapter concludes with a discussion of pointers for further research.

**Chapter Eight:** provides a tentative epilogue inspired by the more constructive elements of Derrida's (1983) postmodern tool of deconstruction. I present an outline of the theory of ethical action that has directly resulted from this research and Williams (1996-2002) post doctoral research and practice. Moreover, I use my knowledge of fuzzy logic and non-parametric mathematics to explore the theory. An heuristically confessional and poetic reflections are the final words.

**THOUGHTS ON SELF REFLECTION**

In recent years there has been an increase interest in the nature of critical information systems research and the development of methodologies to explore this subject ((Markus, 1994; Ngwenyama & Lee, 1997; Hirschheim & Klein, 1992, 1994; Lee, 1997). One area of controversy between critical information systems research and the traditional information systems research is the role of "reflective practice," which remains under-developed (Moon, 1999). In this section, I shall explore the importance of reflective practice as a means of developing expert research methods.

Although the issue of reflective practice is becoming a major subject involving both academic and professional information systems consultants, it is important

that we do not under estimate the power of employing "reflexive practitioner practice" (Wong and Williams, 2002). As argued by Williams (2000), a critical scholar of the reflective practice paradigm:

> The notion of reflective practice describes a different way of thinking about professional knowledge and professional education from traditional approaches. It is about creating a different kind of knowledge from the rule-based knowledge, which is created and transmitted in the doctorate level of research education. It involves a challenge to both skills and knowledge together with academic and vocational divides. (Personal interview, February 2002)

In a similar vein to Schön's philosophy, Williams (2000, 2002) comments that in employing the practices of a reflective practitioner one needs to construct a professional knowledge base through the integration of one's rule-based knowledge with one's "know-how", which derives from a range of personalised skills, strategies and values acquired through experience. He agrees with Schön's ideal that it is not possible to acquire such techniques and skills merely through a "technical-rational" education (Schön 1983, 1987, Wong & Williams, 2002). He further mention that "reflective practice" is a process with which increasing numbers of professionals are engaging in order to better understand, take full ownership of, and enhance the work that they do (Williams, 2000a). It expresses the thoughts and reflections from a personal point of view. As Williams, cited in Wong and Williams (2002), states:

> The Reflective Practitioner style of writing was first introduced by Donald Schön in 1983 and others have built on his work (eg. Pribbenow, 2000; Overmeer et al, 1998). This style has been widely accepted and there are even university courses specifically dealing with the reflective practitioner style (see, for example, Griffith University (2001) and George Mason University (2001)).

According to Williams (2001, 2002), action research professional practice and reflective practitioner research is usually written in distinctive reflective practitioner styles, as individuals' confidence and abilities evolving as they find their own voice and distinctive authorial style through the reflective practice of practice-based reflective practitioner research. This evolution occurred in the

writing style used by Donald Schön from 1983 (Schön, 1983 & 1987). Moon (1999) has developed notions regarding the function of reflective thought in learning from experience relating to this concept of reflective practice. She further indicates that the desirability of the integration of researcher's notes, reflections, and insights with the empirical data from interviews with colleagues, supervisors, mentors, and clients. The research material can then be analysed using a reflective practitioner methodology as originally identified by Schön (1983). Additional seminal work in the reflective practitioner research approach was contributed by Outhwaite (1987), especially methods that allow researchers or co-researchers to give accounts of how they applied knowledge in their workplaces. Such research encourages participants to reflect on their experiences and then comment on what they believed the learning from those experiences contributed to, or hindered, organisational or personal agendas, for better or worse (Williams, 2001, Wong & Williams 2002).

Similarly, Proctor (1993, p. 18) states that "reflective practice is the process of looking back in a critical way at what has occurred and using the results of this process, together with professional knowledge, (both technical and ethical aspects), to tackle new situations". Aspects associated with Critical theory, such as empowerment or communicative action or the distortion of these, have been widely associated with reflective practice and are often taken to be the main purpose of reflection (Smyth, 1989, Van Manen, 1997, 2000, Whitehead, 2002).

Williams (2000, 2002) also similarly states that in a reflective professional education, the activities of teaching often need to be set in their historical, political, theoretical and moral context, because removal from these contexts can reduce reflective teaching into a merely technical process. Reflection is the "active and militant" tool that can enable insightful and practical contextualisation of knowledge (Smyth, 1989; Van Manen, 1997, 2000). Wong and Williams conclude that "technical-rational" education usually fails to provide the elements necessary to enable researcher, teachers and learners to develop the knowledge, skills, and heuristics needed to deal with the unpredictability and chaos found in most real world issues (Wong & Williams, 2002).

Employing reflective practice in analysing problems usually includes the study of cognitive processes in some way. According to Hamm (1989) and Van Manen (1997), in order to solve problems, the practitioner needs to draw on both analytical thought and the levels of his/her professional experience. Schön suggests that how reflective practitioners think about problem solving largely depend upon not only on what type of problem is presented but also how is it presented. From this perspective, well-defined problems are generally resolved by analytical, or 'technical rational' problem solving techniques, whereas an ill-defined problem require a form of reasoning that is far more intuitive. In discussing different experience a researcher may have in problem solving, Williams cited in Wong and Williams (2002) states:

> Professional practitioners operate as a form of practice-based research and resource. While they may not be doing professional practice research degrees or papers, as Winter, Griffiths and Green comment "there is a clear link with industry, professions, and other workplaces. In addition, the focus on particular contexts of practice means that the concepts of 'reliable', 'useful', 'good', and 'wise' are all tightly bound to the context in which the practitioner is producing knowledge. A claim to practice-based knowledge is an obvious example of a claim to knowledge which is context-bound, and in which the subjectivity of the producer of the knowledge cannot be eliminated. Thus, practice-based research is more than a way of bringing about cooperation between higher education and other sectors, and they are more than a manifestation of a bridge between economic activities and academic learning"(p. 2).

Schön (1983,1987) distinguishes between two reflective processes: (1) reflection-on-action and, (2) reflection-in-action. Reflection-on-action refers to the form of reflection that occurs after action and relates, via verbalised or non-verbalised thought, to the action that the practitioner has taken. In other words, it describes the process of reflection, which takes place after the event where the practitioner makes explicit and evaluates the theories of action used to solve a problem. On the other hand, reflection-in-action occurs in association with current action and guides the process of action via knowledge in use, which is derived from theory (Schön, 1983,1987; Hamm, 1989; Van Manen, 1997; Moon, 1999).

Thus, in this context, the interaction of "lived" experience through reflective practice can be seen as the "reflective cognitive model" (Van Manen, 1997; Moon, 1999). In Chapter Five, I describe the concept of reflexive professional practice and it's role in developing critical thinking in information systems research

## AN INITIAL SELF REFLECTIVE PRACTITIONER DIALOGUE RELATING TO ETHICS

I felt compelled, early on in this thesis, to address the crucial issues of ethics both in research practice and in professional consulting practice. In this section, I present a dialogue I used to wrestle with the implications of corporate moral and ethical issues through cooperative strategies of managing tacit knowledge. I thus endeavoured to re-evaluate and re-understand my career as a professional practitioner-consultant for Organisations A, B and C over the previous four years, but especially the way I had altered my insights concerning my being an instrument of corporate policy and organisational knowledge.

The semi-fictional conversation in the following section is based upon an actual self-reflective dialogue spanning about two years concerning my impressions of sharing tacit knowledge among my ex-colleagues and the pursuit of moral issues in achieving corporate conscience. It represents a collection of thoughts and notions that describe and project the direction of my journey and can, therefore, be considered as an heuristic inquiry (Tesch, 1990; Moustakas, 1990, 1994; Maxwell, 1992; Van Manen, 1997).

### Time for Some Resolutionary Thinking: Can organisational tacit knowledge be viewed as an invisible hand that has a potential to transform corporation to have a conscience?

Resolutionary thinking is a term employed by Duczynski (2001), in his reflective practitioner doctoral thesis, to describe his process of resolving defence force issues through integrating communicative action with revolutionary ideas in group dialogues. I extend his notions by presenting the reflexive revolutionary issues that emerge through the critical reflection of my personal worldview (Taylor & Williams, 1993; Williams, 1996; Van Manen, 1997, Duczynski, 2001; Whitehead,

2002). I use the following quotation from Chryssides et al (1993) as an epistemology referent for my resolutionary thinking practice:

> As individuals we can exercise what influence we may have as citizens, James Weston said, "but for a corporation to attempt to exert any kind of economic compulsion to achieve a particular end in a social area seems to me to be quite beyond what a corporation should do and quite beyond what a corporation can do. I believe that while government may seek to compel social reforms, any attempt by a private organisation like Southern Steel Company (SSC) to impose its views, its beliefs, and its will upon the community would be repugnant to our American constitutional concepts and that appropriate steps to correct this abuse of corporate power would be universally demanded by public opinion. (Adapted from Goodpaster & Matthews, cited in Chryssides & Kaler, 1993, p. 266)

From the above quotation, Weston's words echo with the need for social justice, and his theme might be environmental protection, product safety, marketing practice, or international bribery. His statement for the American Southern Steel Company raises the important issues of corporate responsibility. That is, can a corporation have a conscience?

In view of the above, I believe that peoples' responsibilities go beyond those of corporations. As mentioned by Goodpaster et al, (1993. p. 267), "people ought to care not only about themselves but also the well being of those around them, and ought not only to care but also to act in a manner that fosters mutual benefits for all."

In addition, history records that organisations are creatures of the economic incentive and political sanction systems that provide them the reality in which they exist (Goodpaster et al, 1993). Therefore, it is reasonable to expect that they should display the same moral attributes that we expect of persons (Chryssides & Kaler, 1993, p. 266). The public demands certain moral obligations and responsibilities from corporations, and I believe we are entering a new phase in their display by both the business and political spheres of influence.

In spite of this serious suggestion, John Ladd (Goodpaster & Matthews cited in Chryssides & Kaler, 1993, p. 266) states: "We cannot and must not expect formal organisations, or their representatives acting in their official capacities, to be honest, courageous, considerate, sympathetic, or to have any kind of moral integrity."

Does this represent a new form of organisation that we really want? Are we allowing our executives to develop barriers to the development of business ethics that allows inquiry and uses this as a practical force in their decision making? Will these new developments allow us to express that corporations should have a conscience? Is this something I must concern myself? Must we then re-examine our values to examine whether or not corporations should be no more, and no less, morally responsible (rational, self-interested, altruistic) than ordinary persons?

This section aims to address these questions, but in a novel way. Firstly, as mentioned by McWhinney (1992, p.120) "revolutionary thinking refers to the province of those who felt themselves powerful enough to make changes in the affairs of man." I felt a need, as inherent in the ethical imperative interwoven in the research, to look into these matters through revolutionary and resolutionary thinking as a form of problem solving.

## A NEED TO LOOK FURTHER AHEAD

> A morality is a normative system in which judgments are made, more or less consciously, [out of a] consideration of the effects of actions...on the lives of persons...including the lives of persons... including the lives of others besides the person acting.... David Hume took a similar position when he argued that what speaks in a moral judgement is a kind of sympathy... A little time later Kant put the matter somewhat better by characterising morality as the business of respecting persons as ends and not as means or as a thing...." (adapted from Frankena Williams, cited in Chryssides and Kaler, 1993, p. 267).

The above quotation reviews certain moral responsibilities that I felt compelled to address more fully in the research. According to Chryssides and Kaler (1993, p. 267), the ethical responsibility of individuals involved with unethical activities

includes at least three things-- someone is to blame, something has to be done, or some kind of trustworthiness can be expected.

The above discussion attempts to recognise that organisational tacit knowledge and the moral responsibility of individuals are part of the process of building a corporate conscience. It attempts to understand how staff of an organisation, through their participation in the sharing of tacit knowledge, can provide themselves with greater personal meaning. These meanings, beliefs, and intentions can help them to establish their social action in the process of building a corporate conscience.

The above quote led me to think about another important issue: can moral issues (largely organisational tacit knowledge) be involved in the process of building a corporation's conscience? Self-reflection in a dialogue using self-reproach (see McWhinney, 1992; Van Manen, 1997; Duczynski, 2001), allowed me to personally examine the adoption of organisational tacit knowledge as part of the process of ensuring corporations having a conscience

I came to a tentative conclusion that ethical principles can be conceptualised under the term I refer to as *responsibility*. From Chryssides and Kaler's (1993, p. 268) perspectives, responsibilities mean "rule following, and can lead to contexts where individuals are subject to externally imposed norms often associated with some social role that people play." For example, I was taught in school to respect my elders and to be a responsible person. Other specific examples are the responsibilities of parents to children, of doctor to patients, of lawyers to clients, of executives to company's shareholders, and of citizens to the law of the land. As such, I say that individuals are responsible if they are trustworthy and reliable. However, I notice that I seem to hesitate in characterising a person as 'morally responsible' as this may seem rather subjective. (Chryssides & Kaler's, 1993: p. 269). Should I take a moment to consider my notion of subjectivity? In doing so, I must consider whether my worldview is consistent with my inner values, for here resides a great potential for ethical development both as a researcher and as a professional practitioner (Van Manen, 1997; Duczynski, 2001). In this light, I undertook the following self-reflective personal dialogue.

## THE BEGINNINGS OF OBSERVANCE AND SELF-REFLECTION

This research attempts to explain the reasons behind my adoption of Habermas' critical social theory as the underlying philosophy for my thesis. The world of self-reflection and heuristic inquiry embodied within the following dialogue may seem strange to some people, as will perhaps my writing style. However, as with other some other reflective practitioner scholars (Moustakas, 1990; Tesch, 1990; Maxwell, 1992; Denzin, 1994; Clandinin & Connelly, 1994; Ballantyne & Packer, 1995; Clegg, 1996; Van Manen, 1997, 2000; Whitehead, 2002), I have come to the conclusion that such approaches are necessary for me to maintain the depth and richness of the exchange as a vocalised explanation of purpose.

To protect my ex-colleagues, and in a similar fashion that Williams (1996) used in his doctoral thesis (and drawing courage from his pioneering work), I use the names Thales, Plato, Sophia, and myself for the participants. Thales (around sixth century BC.) was "one of the Seven Wise Men of ancient Greece," and Plato (around 500 BC.), was a founding and major philosopher of the Western philosophical tradition. Sophia, refers to the Greek word for Wisdom (Encyclopaedia of Greek Mythology, 2002). These participants from mythology and philosophy take on roles and conflicting views to enable me to heuristically and self-reflectively explore what I consider to be major elements of the research, as well as enriching the research story (Clandinin and Connelly, 1994).

## CONCERNING A RE-ORIENTATION OF THOUGHT AND ACTION

THALES:    "I would like to know about your view regarding the ethical responsibility of corporations. Why are you more interested in applying ethical concepts to actors, such as corporations, who are not persons, but who are instead made up of persons? Is it advisable to do so?"

EDDIE:    "Well, if a group can act like a person in some ways, then I can expect it to behave like a person in other ways. I know that groups of people make up an organisation, and these people are able to act as a unit.

Beside, legally a corporation is considered a presumably responsible unit. To say that a person acts responsibly, that is, one who is able to turn information into effective decision-making in a real-world situation, then I would not see why organisations could not use such information to produce productive and responsible outcomes in its day-to-day activities. My framework of reference for thinking about corporate responsibility is sourced from the processes associated with the ethical responsibilities of individuals and their projections of these processes onto the organisation."

SOPHIA:    "So you are saying that ethical considerations such as justice in the community can be used as a model for ethics for the individual?"

EDDIE:    "When I look at corporations that monitor their employment practices, I expect them to demonstrate the same kind of rationality and respect that ethically responsible individuals do. I see the differences in ethical responsibility among corporations in much the same way that I see differences among persons. For example, as mentioned by Chryssides and Kaler (1993, p. 268), corporations have structured features into their management incentive systems, board structures, internal control systems, and research agendas that, if placed into a person. I would say that this person had self-control, integrity, and conscientiousness. In this manner, I realise that there are some parallels between the moral responsibility displayed by a person in much the same way that I expect to find stages of development in organisational character."

PLATO:    "What would you say to the argument that we cannot hold a corporation responsible in the same manner as we do for an individual? We can only hold individuals responsible. Corporations are not persons. They are artificial units that provide investments towards the efficient production of goods and services."

EDDIE:        "I am using the analogy that corporation can be considered, for some ethical purposes, as a person. Certain respects and features that are normally attributed to persons might also be attributed to organisations that, of course, are ultimately composed of persons. Are not the goals, economic values, or strategies ultimately created by an organisation's managers in a fundamentally similar manner to the way in which persons create their individual or family goals, economic values, or strategies. Why should we not consider the ethics of corporations in the same way? As for holding corporations responsible, the recent collapse and criminal prosecutions of Enron in the U.S. and H.I.H in Australia suggests that society is now seriously looking into these matters."

SOPHIA:        "I agree with what you say. Corporate executives should abide by the ethics that democratic societies consider appropriate for citizens. What about the ethical aspects of an organisation's knowledge management, especially regarding its tacit knowledge?

EDDIE:        "As I have previously mentioned, an organisational tacit knowledge may be viewed as an invisible hand that transforms organisational decision making via an ethical projection. That is, ethics, responsibility, and conscience largely reside in the tacit knowledge of the organisation. In this light, the suggestion is that the integration of ethical judgments with corporate strategy is possible and this is alive with possibilities. Indeed, such an integration may be seen as providing an ethical direction for corporate decision-making – a system, though, that is largely guided by the tacit knowledge repository of the corporation, its people."

THALES:        "I would like to know how integrating tacit knowledge offers a useful strategy for structuring corporate responsibility. Are ethical responsibilities at the level of the person in some sense richer than the

ethical responsibilities on the level of the organisation as a whole? What do you make of the suggestion that ethical (and dare I also include the adjective moral?) responsibility rests on the ethical stance of individuals in the business world?"

EDDIE: "Studies of management (Alvesson et al. 1992a, 1992b; McWhinney, 1992) have shown that the control of organisations rest in the hands of managers, normal men and women. It is my observation, based on my 12 years of corporate consulting that, surprisingly, an excess of intelligent people does not necessarily make for an overly intelligent organisation. I have observed that individual intelligence needs to be structured and organised, and is thus well considered as an interactive process involving problem diagnosis, action intervention, and reflective learning. Ethical responsibilities are attributes that may manifest within organisations through communications concerning personal and social meaning, purpose, orientation, values, goals, concepts, ideas, feeling, and emotions. For example, the use of tacit knowledge could occur in group discussion, human communication, human values and human purpose."

SOPHIA: "Eddie, you have raised many interesting points regarding organisational ethics, especially the role of tacit knowledge in laying ethical foundations. In doing such, you have introduced a deep philosophical and ethical dimension to this doctoral thesis. We will see where it leads."

EDDIE: "The very fact that I have introduced it and thus possibly pointed to further research in the area of the influence of tacit knowledge on organisational ethics is, in itself, I contend, sufficient for inclusion in my thesis. There is something more which I am just beginning to crystallise in my consciousness."

SOPHIA:    "Perhaps you are searching for the dialectical notion that you yourself are dealing with the same core ethical concern in the writing of your thesis. You have contended that tacit knowledge is foundationally important for organisation ethics, but do your realise that a similar notion is important for your ethical position while conducting this research?

EDDIE:    "Ah, so that is it. You lead me to realise that I, myself, have set forth on a largely ethical (and, as a Christian influenced by Buddhism, I would suggests, moral) journey to investigate the area of tacit knowledge and knowledge management through a self-disciplined, rigorous (and perhaps even virtuous) quest for knowledge in my doctoral research. On this journey, I have an opportunity to show forth the importance of tacit knowledge for knowledge management in the organisational sphere, but also in the sphere of my own professional practice as an academic in your own work."

SOPHIA:    "So you begin to realise. The very fact that you are writing this dialogue, and thus making explicit some of the tacit knowledge, you hold in your own knowledge repository, demonstrates your enacting of the very concern you are researching. Are you not undergoing a quantum ethical leap, becoming a truly a reflexive practitioner now. You are enacting, in the largely inner world of your own academic practice and indeed your life in general, the very thesis of your research, which is that value can come from making explicit that knowledge which is not explicit. Part of this process is you allowing the wellsprings of the unconscious (Taylor & Williams, 1993) to explicate elements of your tacit knowledge into consciousness.

EDDIE:    "Ah, I see even more. The knowledge management inherent in this thesis is made richer and more useful because of the largely tacit or unconscious knowledge being made explicit in this very dialogue. Thus I

am enacting the thesis of the research, partially be employing an heuristically critical self-reflective approach. In this process of more deeply investigating knowledge management we have been able to reveal deeper insights about the explication of tacit knowledge in the context of knowledge management systems. Moreover, I assert that I have been better able to research to greater depth than using either positivist, or interpretive, or critical, or even reflective practitioner research approaches by themselves. Ultimately, any research or theory approaches which ignore the realm of the tacit are inadequate to research this area involving tacit knowledge."

SOPHIA: "Can you go one step further Eddie. Can you realise that you have begun this heuristic research method, of using dialogue to make explicit that which is tacit in your own research, by discussing the vital area of ethics. You have not only interwoven the dialectic of your own personal research ethics with the issue of tacit knowledge foundations for organisational ethics. I assume you are to discuss the day-to-day ethical issues to do with your conduct of the research at a later stage.

Eddie: "This I intend to do."

Sophia: "There is more, if you can follow. You have actually, in the process of writing your doctoral thesis, engaged in political action within your University faculty to empower and thus emancipate yourself from oppression. This is the very crux and compelling culmination of the project of the Critical Theory School of philosophy."

EDDIE: "Ahhhhhh. Are your referring to the fact that I and my doctoral supervisor felt compelled to make a stand, to act against our previous what we considered to be undue interference in this research by our previous University doctoral programme? We perceived that we were

being subject to restriction of academic freedom coupled with harassment and elements of abuse. Are you referring to making our stand we were forced to move."

SOPHIA: "Yes. And yes to your second query as well."

EDDIE: "Oh my inner wisdom. My delight! My inspiration! My muse! Source of my genius! You lead me on and on and give me courage. Will you be with me in this process which I feel is developing the character and the moral fibre to use tacit knowledge in virtuous ways, and grow in moral strength to use such knowledge. Are you to lead me even to further quantum levels?

SOPHIA: "There is one more level to which I will lead you Edward, if you can follow. This will be revealed in your tentative epilogue. However, for now, if Wittgenstein's 100 line doctoral thesis (1922) is any indication, you have written enough to become a Doctor of Philosophy. As possibly one of the two greatest reflective practitioner of all once quoted from the inscription engraved onto the gateway to the Temple at Delphi: 'Know thyself' (Socrates as cited in Smyth, 1991)."

EDDIE: "But as perhaps an even greater person once said: "Let all be done as according to custom" (Jesus as quoted in the Bible, John 14:15). So I will continue to write this thesis according to expected modes of reflective practitioner research, with the additional inserts of these dialogues with you and Thales and Plato."

SOPHIA: "Jung (1975) would suggest that I am but like Thales and Plato, but one of the inner energies within your own psyche Eddie. However, for now you must write clearly and carry through your purpose. We all now act in unison."

**EDDIE:**    "Well, my conclusion, and the main theme of this discussion is to initiate this deeper dialogue between the inner world and outer worlds, the tacit and the explicit, the unconscious and the conscious. There is evidence that reflective practice expresses the thoughts and reflections from a personal point of view (Jung, 1975; Williams, 1996; 2000, 2002). Whitehead (1996) states that engaging in reflective practice enables us to understand better, take full ownership of, and enhance the work that we do. The value of a person's reflection can be greatly enhanced by a greater understanding of the processes that determine peoples' involvement in the creation and application of knowledge about them and about their worlds. In that light we continue."

## SUMMARY AND DISCUSSION

In this chapter, I have prepared the reader's mind for the next three chapters. I have provided an outline of this study that investigates the role of tacit knowledge through adoption and use of Web-based knowledge management systems. This study explores reflective practitioner dimensions in establishing the roles of tacit knowledge (Van Manen, 1997, 2000). In addition to the potential organisational impact on business performance and competitiveness, this study also endeavours to contribute to a knowledge sharing culture within the knowledge workers of Organisations A, B, and C (and within this knowledge worker himself).

*Knowledge mapping is one of the best early activities in knowledge management. Much knowledge is passed through informal networks, across networks and communities of practice. You have to facilitate the functioning of these networks if you want to manage knowledge. Once they are functioning well, you can apply technology to ease the capture and sharing of knowledge across a network.*

Tom Davenport & Larry Prusak Davenport et al (1998a, p. 10)

## OVERVIEW OF THE CHAPTER

In this chapter, I endeavour to provide insights into a choice of knowledge management and frameworks for managing explicit knowledge. This chapter reviews the literature pertaining to knowledge in general, as in the quote beginning this chapter, taxonomies of knowledge management, cooperative strategies for understanding and managing knowledge transfers, and knowledge management processes in the context of organisational learning. This chapter also serves to develop insights, in the context of knowledge management and for a general theory for this research. Also within this chapter, I provide material showing the importance of my major research question "For managing organisational and individual knowledge, what are the impacts of the adoption and use of WebAccounting, in the conversion of tacit knowledge to explicit knowledge?" I will also address the question of what I consider knowledge management is, and what it is not. I will leave detailed explanations regarding successful conversion of tacit knowledge to explicit knowledge via WebAccounting, until Chapters Six and Seven.

The concept of treating organisational knowledge as a strategic asset has been popularised by leading management and organisation theorists (Brown et al, 1991, p. 40; Davenport et al, 1996, p. 54; Zack, 1999b, p. 46.). Zack (1999b, p. 47) state that, "to remain competitive, an organisation must efficiently and effectively

create, locate, capture, and share knowledge and experience and apply that knowledge to solve problems and exploit opportunities." Davenport and Prusak (1998, p. 10.) assert that knowledge management requires the ability to capture and manage organisational learning. Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for the evaluation and incorporation of new experiences and information (Remenyi, 1999a). Sourced from within the mind of the knower, knowledge originates and is presented to the knowledge worker and then applied to a problem during or after the presentation of the problem. In organisations, knowledge often becomes embedded not only in documents and their repositories but also in organisational routines, processes, practices, and norms (Davenport & Prusak, 1998a, p. 11). These authors further identify that effective knowledge management through explicating and leveraging tacit knowledge can provide competitive benefits for an organisation. As a specific example, a leading online stockbroking company in Western Australia has created a new and now standard way to capture and share sales techniques among its market segments. Zack (1999b, p. 50) states that "by sharing tacit knowledge of how customers in different market segments used a particular service, customer relation officers in each branch were exposed to patterns and selling opportunities they might not have perceived on their own."

## THE INTERNET PHENOMENON AND KNOWLEDGE MANAGEMENT

The collapsing of time and geographical boundaries was made possible by the convergence of telecommunication and computer technologies (Rheingold, 1993). Among the considered innovations that were born out of this convergence, the Internet is the most influential of all. The Internet has provided humans with an unprecedented, global many-to-many medium for the exchange of information (Rheingold, 1993). Humans around the world are now able to broadcast their isolated opinions and gain global responses from a diversified and interested population (Hauben & Hauben, 1997, p. 5). Such empowerment has presented us with a variety of sources of information dealing with almost anything and everything. This immense information source has allowed consumers to become

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more sophisticated in their choices of goods and services, not just from a point of sale situation, but from all relevant distribution points (Offsey, 1997, p. 114).

Hauben & Hauben (1997, p. 5) argue that "since the liberation of the telecommunication policies and the commercialisation of the Internet, many organisations now also have presence in the global market. Able to communicate globally, organisations are now endowed with the ability to source for cheaper resources." Organisations are also able to structure their operations more effectively and efficiently. Expectations of substantial rewards through global ventures emphasising minimising resource costs and the use of economies of scale due to increases in market size are now realisable (Haynes et al. 1998). However, a considerable amount of marketing knowledge and expertise is also needed to implement this aspect of their operations perhaps costing more than a rapidly expanding organisation expects or can afford (Hauben & Hauben, 1997, p. 5).

The global market is sharply diversified, with distinctive tastes and preferences (Senge, 1998). Global human resources, however, are also remarkably different in terms of their cultural and educational underpinning. Recognising these differences and to be able to tap into local expertise has become increasingly important (Senge, 1998, p. 15). Hence, the increasing sophistication of consumers (business-to-business and household-to-business) has also compounded the mandatory status of high-quality knowledge sources. It is no longer acceptable to the marketplace to provide products and services that are only marginally distinct (Miller, 2000, p. 20).

Several authoritative authors (McMaster, 1995; Scarbrough, 1999a, 1999b; Hauben & Hauben, 1997; Remenyi, 1999a; Miller, 2000) suggest that knowledge management is an extension of information systems management. This is where exchanges of business information is through an IS network, that is, the electronic exchange of information between separate organisations, or between an organisation and its customers, B2C (business to consumer/customer), or B2B (business to business), and this may be used to support successful business/customer partnerships. In other words, knowledge management appears to be a tool by which an organisation's core competencies may be focussed and

developed, from sources closely associated with Intranet/Internet applications (Remenyi, 1999a; Miller, 2000).

## KNOWLEDGE MANAGEMENT ISSUES

The essence of success of an organisation lies in its ability to channel and nurture knowledge and knowledge workers (Angell, 1998, p. 365). Organisations that can master this art are able to operate under a condition of *"increasing returns"* (Anderla, 1997; Angell, 1998; Arthur, 1996, Pp. 100-101.) However, there are some serious and apparent problems.

Importantly, everyone in a modern organisation is unique, with differences in language, culture, identities, norms, values, principles, affiliations, characteristics, social classes, education, know-how and experience (Neumann, 1997; Newman, 1997). In addition, continuous advancements in science and technology have further intensified this complexity (Merry, 1995). Coping with this complexity and managing the global brain (Mayer-Kress, 1995, p. 2) requires different and very broad management skills. However, instead of improving management skills, ignorance has often reigned. Managers have conveniently overlooked the diversification of their workforces and dealt with them as if they were uniform, standardised models, as are their income producing equipment (Mayer-kress, 1995, p. 3). Individual differences were eliminated with these inherited assumptions and stereotyping (Senge, 1998, p. 16). However, in order for organisations to operate globally, a diverse and original set of policies, some for local use, some universally applied need to be identified (Newman, 1997; Senge, 1998). By involving management in the knowledge acquisition processes, new insights to the development of such needed strategies are allowed to evolve from all sources (Mayer-Kress, 1995).

Another area where ignorance prevails is the very nature of knowledge, knowledge workers, and knowledge management (Newman, 1997; Scarbrough, 1999b). To come up with clear definition for these terms is almost impossible since the background of the users of these terms determines their meaning

(Scarbrough, 1999b). However, this very mindset perpetrates many of the mistakes in knowledge management (Scarbrough, 1999b, p. 361).

For example and firstly, in many organisations, "knowledge management" is merely a buzzword (Scarbrough, 1999b, p. 362). Hi-tech firms and software companies are already cashing in on this ambiguity, by selling off-the-shelf knowledge management packages that are full of promise, but fail to match the expectations of the purchaser (Newman, 1997, p. 124).

Secondly, some organisations perceive that technology alone will control and resolve their knowledge management questions and are investing heavily on technologies like document management systems, workgroup system, workflow tracking systems and data warehousing (Hildebrand, 1999, p. 12). Resolution of knowledge management problems is not a technology problem, as technology can only augment good management policies and practices (Blake, 2000a, p. 25.). Even then, this relies on the assumption that knowledge is explicit and can be readily packaged, transferred, retrieved, objectively analysed and universally applied. However, there are the questions concerning tacit knowledge, the generative and creative part of knowledge, which pose far greater management challenges. Tacit knowledge issues are difficult because this knowledge links directly to people and people are the only true knowledge assets in any organisation. However, positive results can be exceptionally valuable to all concerned (Blake, 2000a, p. 26). Or, as Churchman (1971) puts it,

> To conceive of knowledge as a collection of information seems to rob the concept of all its life.... Knowledge resides in the user and not in the collection. It is how the user reacts to a collection of information that matters. (p. 10.)

Thirdly, these ambiguities concerning knowledge management may also deter the development of knowledge management (Alter, 2000, p. 33). In a recent survey of 158 of the Fortune 1000 companies, about 80% of them had a knowledge management programme, but only half of them have knowledge management staff and only 13% gained pro-active support from the top management (Alter, 2000, p.

33.). Apparently, the "concept of knowledge is not credible in the boardroom." (Taft, 2000, p. 59)

## KNOWLEDGE MANAGEMENT AND MANAGEMENT CONTROL.

Another problem lies in the traditional management structures that bind the organisation together (Nonaka, 1998). Traditional management structures were built on the foundations of scientific rationality, which offers the tenets of cause and effect, with calculated predicability and in the case of knowledge management, controllability (Scarbrough, 1999b, p. 359; Merry, 1995, in Chapter 4; Stacey, 1996, p. 8; Lewin, 1998; Nonaka, 1998; Tetenbaum, 1998, p. 21; Wah, 1998, p. 25; Mycek, 1999; Zimmerman, 1999, p. 44). This resulted in, the apparent ability to control the environment in a predictable manner and gave the illusion of power: the power, that is, to manipulate other individuals and where applicable the power to achieve personal selfish agendas (Merry, 1995; Scarbrough, 1999b, p. 359).

With the onset of the information era, the evolution of the decentralised model of organisational structure and function commanded a dramatic change in management approaches. Power, leadership and formation, all are now being questioned (Mento et al 1992, p. 24.). In many cases, to support these approaches, cultivating leadership in others flattened hierarchical power structures. In addition, diversified and autonomous teams replaced homogeneous and controllable teams. However, in spite of all of this, it appears that the influence of the old management model is still with us (Mento et al 1992, p. 25.). Power struggles within the lateral structures emerged. Management and interest groups that control information control power as "knowledge is power," (Fitzsimmons, 2000, p. 16), also there is often an assumption that the higher one's seniority, the more knowledge one has acquired (Kanter, 2000, p. 15). As control of information on a need-to-know basis seems to be crucial to the sustainability of management structures (Zimmerman, 1999, p. 46), knowledge, and information hoarding between and within departments, teams, and employees is a common organisational phenomenon. This allows management embedding of ideology and

information into knowledge to achieve personal goals and added power, and is a frequent organisational practice.

On the other hand, management controls not only have negative effects on the internalising of knowledge; they also have negative effects on the organisation's knowledge generation and creativity processes. Knowledge management, even if implemented, tends to be overly structured or overly restrictive as regulatory management styles inevitably stifle creativity (Blazzard & Hasenauer, 2000, p. 22).

To management's general surprise, creativity has a tendency to emerge beyond strategic planning and often without the knowledge and support of management (Miller, 2000, p. 20). However, if management were to impose a certain structure into the creative process, management then becomes the *creative gatekeeper*, (Berbacki, 2000, p. 20) and contributions from inspired employees can be hindered as there are too many bureaucratic restrictions that the employee has to overcome in order to present an idea to senior management. Employees are also fearful of speaking and sharing with management, fearful of the substantiation to their ideas, and fearful of the organisational implications if an idea fails (Kanter, 2000, p. 16). The requirements for creativity are simple but not always present even in the largest organisations.

Having identified some of the knowledge management and management control issues in an organisational context, the relationship of the Internet Phenomenon with knowledge management, the following sections describe some strategies for development of knowledge exchanges.

### TAXONOMY OF KNOWLEDGE MANAGEMENT

Knowledge is commonly distinguished from data and information (Remenyi, 1999b). Although data represents 'raw' observations or facts, and are therefore not directly meaningful, data that can be manipulated into information. Information is the product of placing data within some meaningful context (Remenyi, 1999b, Pp. 146-148).

One authoritative author in the field of knowledge management, Zack (1999b, p. 47) describes "knowledge is that which we come to believe and value based on meaningful organised accumulation of information through experience, communication and inference. Knowledge can be viewed both as something to be stored and manipulated and as a process of simultaneously knowing and acting - that is, applying expertise." (p. 48)

Knowledge can be explicit or tacit (Nonaka, 1998; Remenyi, 1999a). Explicit knowledge is knowledge that can be precisely and formally articulated, codified, documented, transferred and shared. Tacit knowledge on the other hand, is highly organisation-specific and resides within individuals and their social interactions within the organisation (Remenyi, 1999a). Tacit knowledge is understood subconsciously and applied, difficult to articulate, and develops from direct experience and action (Zack, 1999b, p. 47).

The essential concern for organisations then becomes how to manage and then distribute both the tacit and explicit knowledge (Nonaka et al, 1994, p. 14). The basic elements of knowledge management, specifically the management of explicit knowledge, would include accessing, evaluating, managing, organising, filtering and distributing information in a manner that is useful to recipients (Remenyi, 1999b, p. 150). Zack (1999a) argues that tacit knowledge management would also require a mechanism to understand and explain tacit knowledge to allow meaningful sharing and application. However, explanations of tacit knowledge are also an area that is becoming more complex and less easily understood (Malhotra, 2000, p. 5).

## INDIVIDUAL'S INFORMATION AND KNOWLEDGE.

Henry Mintzberg, a leading thinker in managing knowledge, suggests that the distinction between knowledge, information, and data as: "How much does anyone who reads and writes on pieces of paper really know? Not much, I suspect, because there is another kind of knowing, ie, information rich in detail and colour, beyond what can be quantified and aggregated; the will of a customer,

the mood of the factory, the intricacies of a technology change, etc.... Soft information is a manager's power-- senior mangers are the best-informed people in an organisation. It can also be a prison" (Mintzberg cited in The Impact Programme, 1998, p. 61). He furthers relates that soft information is difficult to articulate and time-consuming to share, but unless it is shared, most tasks are impossible to delegate (Mintzberg cited in The Impact Programme, 1998, p. 62; Mintzberg & Westley, 2001).

Knowledge represents a split between information, facts, numbers and words that Mintzberg refers to as "hard," while he refers to understanding as "soft." (Mintzberg et al, 2001). He then further postulates that knowledge is split again between formulated (written down in whatever medium) and tacit (in people's heads) information. All hard knowledge is explicit and formulated, although understanding (soft knowledge) is mostly tacit, sometimes, though, it will probably be formulated. Figure 2.1 describes the distinction between an individual's information and his or her knowledge.
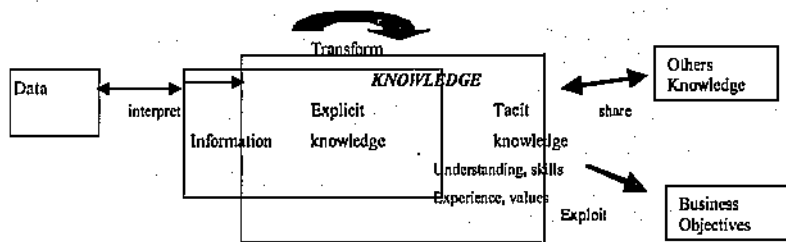


*Figure2.1*: Map of the personal Knowledge Domain (Adapted from The Impact Programme 1998)

*Figure 2.1.*   Map of personal knowledge domain.

An organisation's knowledge, as distinct from an individual's, is similar in principle, but an organisation's knowledge assets are more widely dispersed and probably not too well coordinated (Nonaka, 1998).   An organisation's tacit knowledge resides in the heads of many intelligent and aware people, with allowances for differences of opinion and interpretation (Mintzberg & Westley,

2001). Similarly, an organisation's explicit knowledge resides on many documents (paper and electronic), which also may not all agree. Nevertheless, this array of people and documents can be thought of as the "company intellectual assets," and may be exploited to achieve the company's business objectives (Mintzberg cited in The Impact Programme, 1998, p. 62).

As argued by Nonaka et al (1994, p. 15), creating knowledge is a process of providing objective information by explaining the tacit knowledge base, which is often subjective insights, intuitions, hunches of individuals who daily deal with problems needing solutions. Table 2.1 illustrates how the operation of sharing and transformation relate to explicit and tacit knowledge: how each is shared, and how either one can be transformed into the other.

| Transformation | To Tacit | To Explicit |
|---|---|---|
| From tacit | Share: Personal interaction (Social processes, Training) | Transform: Formalisation (Documentation, Electronic memory) |
| From Explicit | Transform: Internalisation (Practising, Learning) | Share:Integration |

*Table 2.1.* A table showing knowledge transformation and sharing (Adapted from The Impact Programme, 1998, p. 62.)

**EXPLICATING KNOWLEDGE**

Nonaka (1994), Grant (1996), and Zack (1999b, p. 47) assert that effective performance and growth in knowledge-intensive organisations requires integrating and sharing distributed knowledge. By allowing others to add vicariously to their experience base, an efficient and appropriate transformation of shared tacit knowledge to a shared knowledge base is the result. Nonaka (1994) and Zack (1999a, 1999b) suggest that explicit knowledge is playing an increasingly larger role in organisations as it is more precisely and formally articulated and easier to retrieve electronically and can then be applied to solving problems and exploiting opportunities that "are on the table" awaiting resolution. In contrast, tacit knowledge is subconsciously understood and applied, difficult to articulate,

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developed from direct experience and action, and usually shared through highly interactive conversation, storytelling, and experience (Brown et al, 1991, p. 40; Davenport et al, 1996, p. 54; Zack, 1999b, p. 46). There are other forms of tacit knowledge easily converted into explicit knowledge identified here:

1. Declarative knowledge is about describing something. A shared, explicit understanding of concepts, categories, and descriptors that lays the foundation for effective communication and knowledge sharing in organisations.

2. Procedural knowledge is about the performance or occurrence of something. Shared explicit procedural knowledge lays a foundation for efficiently coordinated action in organisations.

3. Causal knowledge is about why something occurs. Shared explicit causal knowledge (eg. in the form of organisational stories) enables organisations to coordinate strategies for achieving goals (adapted from Zack, 1999b, p. 46.).

## KNOWLEDGE MANAGEMENT ARCHITECTURE

According to Meyer and Zack (1996, p. 46), a model based upon a knowledge architecture framework is needed in order to manage the transformation of tacit knowledge into explicit knowledge. Meyer and Zack (1996, p. 47) claim that knowledge architecture utilises four primary resources. They are:

1. *Repositories of explicit knowledge (knowledge repositories platform).*
2. *Refineries for accumulating, refining, managing, and distributing the knowledge (knowledge refineries platform).*
3. *Information technologies to support the repositories and processes (Technology infrastructure platform).*
4. *Organisation roles to execute and manage the refining process (Organisational Infrastructure platform) (source: Meyer & Zack, 1996, p. 47).*

| Source Tacit Knowledge | Knowledge Platform          Knowledge Views | Users Explicit knowledge |
|---|---|---|
| | Acquisition → Refinement → Storage Retrieval → Distribution → Presentation | |
| | Knowledge Repository Platform | |
| | Knowledge Refinery Platform | |
| | Technology Infrastructure | |
| | Organisational Infrastructure | |

Figure 2.2: Architecture of Knowledge Products (Meyer & Zack, 1996)

*Figure 2.2.*     A diagram displaces the architecture of knowledge products.

## PROPOSED THEORETICAL MODEL IN MANAGING EXPLICIT KNOWLEDGE

In this section, I discuss a review of past empirical research by Meyer & Zack (1996), and Zack (1999b) in managing explicit knowledge. Their model of architectural of knowledge framework (Fig.2.2) was used to research two US based companies in managing explicit knowledge. These two companies were: -

1. Technology Research Inc, a leading international provider of market information and industry analysis to information technology vendors, and;

2. Buckman Laboratories, a $300 million international specialty chemical company with more than 1,200 employees operating in more than 80 countries and is a recognised leader in knowledge management (source: Zack, 1999b, p. 50).

Zack (1999b, p. 48) claims that knowledge refinery platforms comprise five stages. There are:

1. *Acquisition. This refers to an organisation that either creates information and knowledge or acquires it from various internal and external sources.*

2. *Refinement. Before adding captured knowledge to a repository, an organisation subjects it to several value-adding processes (refining).*

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*such as cleansing, labelling, indexing, sorting, abstracting, standardising, integrating, and re-categorising.*

3. **Storage and retrieval.** *This stage bridges upstream repository creation and the downstream knowledge distribution.*

4. **Distribution.** *This stage comprises the mechanisms an organisation uses to make repository content accessible to its users.*

5. **Presentation.** *The context in which an organisation uses knowledge to influence its values (source: Zack, 1999b, p. 48).*

As mentioned by Zack (1999b, p. 49), the processes of acquisition, refinement, and storage of knowledge would create and update the knowledge platform. On the other hand, the processes of retrieval, distribution, and presentation would give various views of that knowledge (p. 50).

Knowledge repository platform consists of two components: (1) The Knowledge Platform and, (2) The Knowledge View. According to Zack (1999b, p. 49), " ...a knowledge platform provides the context for interpreting knowledge content. These interpretations may derive many views of that content and each view may vary depending on the type of explicit knowledge being stored."

For successful knowledge management, the information technology platform enables knowledge communication to build a shared interpretive context for an organisation (Meyer & Zack, 1996; Zack 1999b). An effective interpretive context allows staff to communicate with a minimum of misunderstanding. For example, Zack (1999b) suggest that the World Wide Web with GroupWare applications allow companies to build a multimedia repository for rich and explicit knowledge. By using such a facility, communicators may share their similar knowledge, backgrounds, and experiences among themselves (Zack, 1999b, p. 51).

The following section discusses the two classes of knowledge management applications: integrative and interactive. This means that an organisation can segment its knowledge processing into integrative and interactive. Each of these

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applications addresses different knowledge management objectives, and enables an interaction with tacit knowledge (Meyer & Zack, 1996; Zack 1999b).

## INTEGRATIVE KNOWLEDGE APPLICATION

Meyer & Zack (1996) and Zack (1999) state that integrative applications enable communicators to interact with each other, to request and subsequently retrieve specific information from each other. As for Organisation A, the WebAccounting Forum facilitates the knowledge processes of two broad classes of knowledge management. Firstly, the direct and emergent exchange of knowledge through the interactive aspect of the Forum knowledge architecture. Secondly, the Forum's ability to support the refining, archiving, and recording of knowledge exchanges for future use (see fig 2.3).

Org A's Knowledge Repository Platform

1.Acquire stage
Customers comments
& replies

WebLegacy Application is interacted via Internet, Intranet, and Extranet. Interactive aspect of the Forum knowledge architecture

5. Presentation stage
-Help audience comprehends and retains information via 1 .topic contents/. author contents

2.Refine stage
-Index by contents
-review, edit & redevelopment

4. Distribution stage
Delivery the convey of intended message
-Retain information

3. Storage stage
-Storage process of knowledge modules for future use

*Figure 2.3.*    An example of integrative aspect of the knowledge management architecture model, (Adapted from Meyer and Zack, 1996, p. 47).

For example, with the interactive WebAccounting technology, the users may communicate through the Forum with their audience by means of a presentation that is an active, exciting experience. This also allows the user to interact with other software or communications technologies, such as the Internet, Intranet, and

Extranet to gather or process information. These processes are part of an integrative aspect of the knowledge management architecture model.

## INTERACTIVE APPLICATIONS

Interactive applications provide a template to support both the sharing of tacit knowledge and its interaction among people. Initially, the acquisition involves the collecting, evaluating, and interpreting research reports among internal and external analysts. That is, this data collaboration would cause people to communicate among themselves as well as sharing their tacit knowledge through their collaborative discussions in a virtual discussion platform (Zack, 1999a, 1999b). For example, Forum may serve as a tool for an employee in the sales line to interact with other sales staff to see the correct sales practice or an office employee can review an office procedure through his or her desktop computer (Zack, 1999b, p. 48).



Org B's Knowledge Repository Platform

1. Acquisation stage
-Customers comments, replies, telephone calls and surveys

WebLegacy Application is interacted via Internet Intranet Extranet

5. Presentation stage
-Help audience comprehends and retains information via 1.topic contents/. author contents

2. Refinery stage
-Analyse, interpret the research report

4. Distribution stage
Delivery the convey of intended message via posting & retain information

3. Storage stage
-Storage of knowledge for future use through index & coding

Figure 2.4. An example of interactive aspect of the knowledge management architecture model. (Adapted from Meyer and Zack. 1996, p 47)

In discussing the case of organisational infrastructure processes of integrative applications, Meyer and Zack (1996, p. 47) point out the following stages need to be followed:

1) The acquisition stage requires recruiters and facilitators to encourage participation in forums so that those with appropriate expertise may willingly contribute. Activities are posting comments and replies from customers.

2) These communicators (facilitators & customers) are often involved in the refining stage. Activities include index by topic, author, date, and by data thread.

3) The storing stage involves moderate threaded discussions.

4) The distribution stage requires information systems teams. Activity includes post on-line.

5) The presentation stage should ideally involve both customers and facilitators (Meyers and Zack, 1996, Pp. 47-48).

## ROLE OF INFORMATION TECHNOLOGY PROCESSES

Zwass (1998) identifies that knowledge management refers to the development and operation of operational methods, procedures, and information systems used to collect and share the knowledge of the members of the organisation (p. 47). For example, knowledge management helps to elaborate and disseminate external knowledge, and to bring this knowledge to bear on problems and opportunities for the organisations concerned.

Zack (1996, p. 48) asserts that knowledge management also addresses the competitiveness of an organisation's knowledge base. As a specific example, an organisation must consider the quality and strategic value of its knowledge relative to its competitors. Where the bulk of an organisation's knowledge is common and basic, that knowledge will provide lower competitive advantage value than if the organisation's knowledge is unique and innovative.

Below are examples from The IMPACT Programme report (1998, p. 63) that have been associated with knowledge transformation and how they may be relevant to knowledge management.

**Examples**

The IMPACT Program (1998) describes a gambling organisation, in the volatile betting market where the amount of money staked sometimes bears little resemblance to the odds being offered. Tacit knowledge (unwritten rules) is often applied in judging whether a financial exposure exits or not. Explicit knowledge concerning of "know-how," "know-what" and "know-who" is important in the decision-making process. Elements including trainers, jockeys, horses, etc frequently influence the necessary close-call decisions. This requires a 'nose' for knowledge management. The above example supports the Zack (1996), Brown et al (1991) and Davenport et al (1996) concepts of knowledge management where tacit knowledge is of paramount importance; as people are the only true knowledge assets in any organisation.

According to Quinn, Anderson and Finkelstein (1996, Pp. 7-10), there are four distinctions between types of knowledge. There are:

1) Know-what relates to the discipline of knowledge through training (declarative knowledge)
2) Know-how refers to the ability to apply to complex real problems (procedural knowledge)
3) Know-why relates to the deep knowledge of cause and effect (mental models)
4) Care-why refers to the will, motivation and adaptability.

Hence, in order to transform tacit knowledge into explicit knowledge, the following procedures need to be followed:

The IMPACT Programme (1998, Pp. 67-68) describes that there are five procedures to determine the knowledge that an organisation needs to has and requires, both tacit and explicit. There are as follows:

1) the core skills and knowledge for the business;
2) those skills and knowledge most effectively built up in-house, and which contracted out;
3) the current market and the trends that will affect future markets involving demographic trends and socio-economic forecasts;
4) the competencies required of employees to perform their work and;
5) the core values of brands.

The IMPACT Programme (1998, Pp. 67-68) describes that there are three procedures to determine the knowledge that an organisation needs to be classified and recorded which involves compiling a knowledge register. There are as follows:

1) Where does key knowledge resides?
2) Who should have access to it?
3) Who is responsible for accuracy and security?

The register should include tacit as well as explicit knowledge. Who knows about what, whom needs to know, and used as an indication of the importance of the knowledge to the organisation and risks attached?

The IMPACT Programme (1998, Pp. 67-68) describes that there are eight procedures to determine the communicating knowledge within the organisation. There are:

1) There should Mentoring – to pass tacit knowledge from experiences staff to trainees;
2) Encouraging personal networking;

3) Pairing an employee with an external consultant; this is increasingly important, as the rapid rate of change makes it too expensive to develop knowledge in-house;

4) Being seen to value individuals' knowledge and skills (particularly difficult in a virtual environment);

5) Rewarding knowledge sharing within the organisation;

6) Encouraging staff to contribute to expert publications, assisting new employees to import their knowledge into the organisation;

7) Using exit interviews and succession planning to retain knowledge when someone leaves.

(The IMPACT Programme, 1998, Pp. 64-65)


## COOPERATIVE STRATEGIES FOR UNDERSTANDING AND MANAGING KNOWLEDGE

In this section, the literature of cooperative strategies for understanding and managing knowledge transfer is discussed and analysed (Aadne, Krogh & Roos, 1996; Krogh, 1998, Pp. 133-138).

Amid the transition from the industry era to the information era, organisations are facing the problem of keeping in pace with technology (Krogh, 1998, p. 133). A changing business environment and increase in sophistication of consumer markets forces organisations to reflect on the sustainability of their competitive advantages. Organisations soon came to realise that the task of coping with such dynamism cannot be achieved alone, and would depend not only on their internal capabilities, but also on the way they willingly cooperate with other companies (Aadne, Krogh & Roos, 1996). As such, cooperative strategies are translated into common ventures, alliances, mergers, acquisitions and virtual enterprising. As information and knowledge emerge as the important factors to the fitness of an organisation as a 'partner', cooperative strategies began to include the provision for knowledge links in order to develop mutual knowledge (Badaracco, 1991 cited in Aadne, Krogh & Roos, 1996). Such mutual developments show a powerful way of accessing and transferring organisationally embedded knowledge. However, such activities are only limited to explicit knowledge transfers between

organisations. Tacit knowledge on the other hand, is less accessible and would require the establishments of closer and more interactive relationship with the carriers in order to solicit that hidden know-how (Aadne et al., 1996; Krogh, 1998, p. 135).

As the economic values of information and knowledge continue to grow, knowledge management is one area of promise for further research and development (Prahalad & Hamal, 1994, p. 6). Four important issues stem out from the literature of cooperative strategies seem important to the understanding and managing knowledge transfer. There are: (1) motive, (2) openness, (3) prior experience, and (4) internalisation.

## Motives

Understandings and specifications of motives have significant implication of the choices of partnership and development activities for sharing knowledge within an organisation (Badaracco, 1991 cited in Aadne, Krogh & Roos, 1996). There are various literatures on the different type of motives. For example, Kogut (1988, p. 39) identified three types of motive for joint ventures: transaction costs, competitive positioning, and organisational learning. With the onset of the knowledge-intensive society, persuasive attention towards the gaining of knowledge and organisation learning and away from financial motives is now seriously considered.

## Openness

The second factor that determines the success of knowledge transfer is the "openness" of the partnering organisations in question. Openness in this context means the willingness to share knowledge assets ranging from statistical data, technologies, and research, to libraries, facilities, and so forth. Openness is paramount, as much of the organisational knowledge is embedded in organisational culture and practices (Hamel, 1991, p. 83). Only through a co-operative working relationship are the sourcing of this knowledge possible, and thus its sharing. Several authors also argue that such openness should be located in the on-going interaction between individuals and small groups rather than on a

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firm-to-firm level (Hamel, 1991, p. 83; Badaracco, 1991, Pp. 10-17; Ring et al. 1994; Roos and von Krogh, 1996 cited in Aadne, Krogh & Roos, 1996). Thus, openness and trust are two of the main accessories in the field of successful knowledge transfers.

### Prior experience

The third factor is prior experience. The assumption is that organisations utilise past experiences in their on-going decision making and this is exhibited in various literatures on cooperative strategy (Huber, 1991; Lyles and Schwenk, 1992, Pp. 155-158). Stored into the organisational memory, experiences transformed into knowledge in all of its diversity and depth, this knowledge memory is what has the greatest influence knowledge transfers. Learning requires diversity as this enhances the probability that incoming information may relate to the known, but may need additional confirmation to establish the utility of that knowledge. The depth of knowledge on the other hand, influences the ability to acquire and exploit new knowledge. The depth of knowledge also has impacts on the ability to discriminate between different decision situations, and to select the actions that might be most appropriate (Lyles and Schwenk, 1992, Pp. 155-158).

Prior experiences in terms of prior relationships in other contexts may also influence the success of knowledge transfers between organisations. The replacing of uncertainty by trust by building a store of valuable prior relationships can contribute to a faster and more efficient cooperative knowledge development. The resulting trust therefore increases the likelihood of involving parties who are more willing to make more significant and risky investments (Ring & Van de Ven, 1994 cited in Aadne, Krogh & Roos, 1996).

### Internalisation

The fourth and last factor that determines the success of knowledge transfers between organisations is Internalisation. Internalisation refers to the organisational ability or capacity to learn (Hamel, 1991, p. 84). In an organisational context, Internalisation has two aspects: (1) receptivity and (2) dissemination.

1) Existing organisational memory and prior related experiences mainly influence receptivity. If receptivity is low, an organisation not only has problems in understanding what the partner is doing, but in understanding or tracing the processes leading to the partner's knowledge development. Thus the ability to absorb knowledge depends on both the process of altering existing perceptual maps and replacing the old behaviour with a new improved knowledge seeking behaviour (Hamel, 1991, p. 88).

2) Dissemination on the other hand deals with the distribution of relevant knowledge throughout the organisation. To this, Hamel suggested putting mechanisms in place integrating fragmented knowledge gained by single individuals and distributing it to all that benefit from it. Such mechanisms can be in the form of cross-functional teamwork and inter-business coordination (Hamel, 1991, p. 88).

The above four issues (motives, openness, prior experience, and Internalisation) that stemmed out from the literature of cooperative strategies can be seen as important to the understanding and managing knowledge transfer.

## INTER-ORGANISATIONAL KNOWLEDGE FLOW

Having identified the knowledge-related concepts seen in the cooperative strategy literature, the following sections describe the inter-organisational knowledge flow, individual knowledge flow, and individual learning. Aadne et al (1996, p. 68) state that motive is mainly concerned with the information flow between a firm and its partners.

It influences the knowledge transferred to the cooperative context, and the type and amount of knowledge expected to be transferred (Aadne et al, 1996, p. 69). Openness directs a focus towards specific cooperation, and the manner in which this continuous interchange of knowledge takes place between the partners. Internalization addresses the flow of knowledge within the organisation.
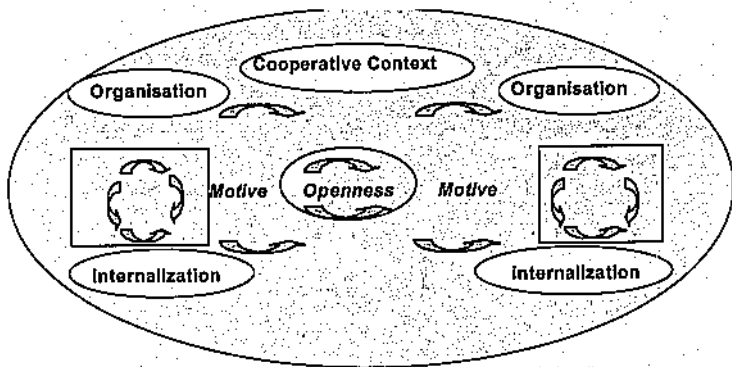
*Figure 2.5.* A diagram shows the flows of inter-organisational knowledge.

As shown in figure 2.5, the purposes of inter-organisational knowledge flow are not only to impart a grasp on the reasons, areas and factors affecting knowledge management, but also to highlight the strong strategic intent and foundation behind knowledge management. Such foundation and intent focus mainly on the inter-organisational mutual and beneficial inter-organisational gains. As such, knowledge management in this context tends to emphasise inter-organisational learning rather than organisational and individual learning. However, organisational and individual learning are critical factors to the success of knowledge management (Aadne et al., 1996, p. 69).

### INDIVIDUAL KNOWLEDGE FLOW

Aadne et al. (1996, p. 70) asserts that the motive, openness, prior experiences and internalisation (or reflection for the case of individual) will have an effect on organisational and individual learning. To analyse the effects of these factors, one has to consider how the individual learns. Individual learning is the fundamental building block for group learning and consequently, organisational learning.
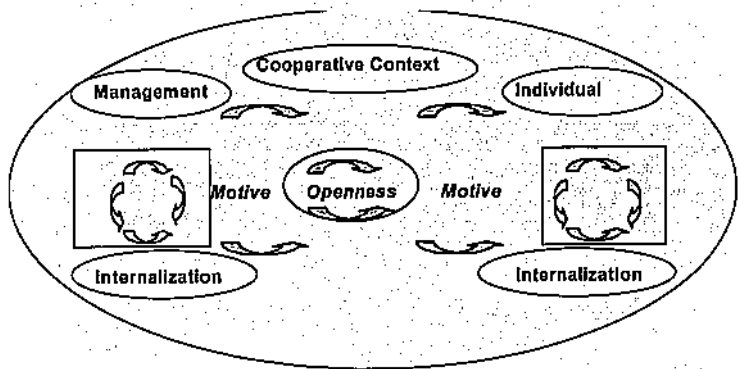
*Figure 2.6* illustrates the knowledge flow between an organisation and individual
worker of the organisation.

## INDIVIDUAL LEARNING

The individual, through various learning processes, develops new understandings
from the acquisitions and interpretation of information (Lindsay & Norman, 1977,
p. 28). Learning can be gain through practical consciousness or discursive
consciousness. Learning does not always results in measurable increase in
individual effectiveness or observable changes in individual behaviours (Coghlan,
2002, p. 117), rather, learning through the process of information interpretation
defines the boundaries of an individual's potential understandings and behaviour
change. As mention by Brooke (2001a, 2002b), an entity learns if, through its
processing of information, the range of its potential behaviours change. The
suggested interpretation of information by some; is the process through which
people give meaning to information (Daft and Weick, 1984, p. 74). Individuals
frequently learn from past events and experiences, using past situations or cases as
models when learning to solve problems.

When individuals interact within groups within the organisation, information and knowledge are shared and discussed (Brooke, 2001a, p. 41). Such interaction will depend on the degree of openness and willingness between individuals to explicate their tacit knowledge. The quality of the knowledge exchange will also have to depend on the diversity of the interacting groups (Brown & Dugid, 1991b, p. 156). With enough trust and enough interactions, a social structure based on common belief will emerge. As this social structure continues to grow, it will evolve to become the dominant logic (Prahalad and Bettis, 1986, p. 17). By institutionalising this logic, the resulting knowledge structures become the basis of an organisational learning system (Argyris, 1976, p. 123). Argyris further mentions that there are three variables in the individual learning process:

1.) Prior experiences that are codified and stored,
2.) Openness, trust and interactions where tacit knowledge can be exchanged,
3.) Individual's ability to reflect on information and assign meaning to it.

## ORGANISATION MEMORY

The term 'organisation memory' refers to the organisational knowledge stored in the organisation knowledge repositories for making decisions (Argyris, 1976). Argyris states that organisation memory has become one of the essential factors that affect organisational and individual learning. It stores an organisation's historical information that an organisation can seek and use for present decision making. It contains successful programs for dealing with frequent situational contexts. These successful programs eventually become the standard methods for handling repetitive decisions that result in standard operating procedures. Hence, organisation memory highly influences the actions of management. Such influences eventually define the structures, systems, and management processes. Individuals and groups in turn draw on these structured procedures and apply them to their problem solving. Organisation memory is relatively stable over time, has

long-terms effects that influence the whole organisation, not just individuals, and groups (Brooke, 2001b, p. 365).

In the modern organisation, knowledge management system such as WebAccounting, that is, centralised data warehousing and management information systems, are widely deployed to assume the facilitation role in the processes of an organisation's memory explication and storage for sourcing codified knowledge, and for decision-making using such storage (Robertson et al, 2000). The proliferation of knowledge management architecture and web-based legacy applications has also ensured the availability and dissemination of organisational memories throughout the entire organisation without geographical constraints (Scarbrough et al, 1999a, p. 17). Technologies play an important role in organisational and individual learning (Scarbrough, 1999b, p. 359).

## MANAGEMENT MOTIVES

An organisation is not a monolith but made up of very different internal/external interest groups with varying motives and intentions (Scarbrough, 1992, p. 125). The management often has strong economics motives and strategic intents. However, such motives and intents do not diffuse well at the workforce level. Clear definitions are not possible because of the complexity of management-workforce interactions, as their relationship is not only functional but also contractual (Scarbrough, 1992, p. 132). The forms of job design and work organisation associated with such contractual agreements usually involve ongoing processes of control (Scarbrough, 1992). Such controls can be broadly categorised into three levels (Scarbrough, 1992, p. 140):

1. **Labour control:** the relationship between an operation's demands and workforce behaviour.

2. **Operation control:** the relationship between strategic demands and the quantity and quality of outputs generated by a particular production systems; and

3. **Strategic control:** the relationship between outputs from an organisation's portfolio of production systems and product-market demand.

Most critical attention has tended to focus on labour control alone. In the wake of the knowledge era, organisations have adopted a more decentralised mode of coordination and operations. Knowledge management systems are widely deployed by organisations to facilitate their business functions (Davenport et al., 1998b, p. 50). The capabilities brought forth by knowledge management systems have allowed organisations to perform their operations more effectively and efficiently (Scarbrough, 1992, p. 134). While knowledge management systems have greatly increased the productivity of individuals, groups, and organisations, a knowledge management system has also become the most important tool for labour control in modern organisations as it increases the predicability and controllability of the labour process (Davenport et al., 1998b, p. 44).

## EMBEDDED IDEOLOGY

A knowledge management system has the far-reaching effect of transmitting the ideologies of management and powerful groups within organisations (Robertson et al, 2000). As Orlikowski argued (1997, p. 11), information management systems are "interpretatively flexible," the physical objective forms of information management systems often actually disguised levels of subjective intent and knowledge and such embedded meanings within information management systems influence and direct the behaviour of workforces in organisations. Hence, the subjective notion of ideology is not to be detached entirely from the objective forms of information systems. Management in particular, exploits the symbolic representations carried by information systems to develop legitimacy for their motives and intents (Scarbrough, 1992, p. 133). Therefore, management groups that dictate the design of information systems are in the best position to translate their interests and perceptions into such embedded ideologies.

"Ideology is a structured system of representations of aspect of reality reflected in, and reinforced by, prevailing social-historical conditions" (Albury and Schwartz, 1982 cited in Scarbrough, 1992, p. 135).

Ideologies are a partial view of the world in that they are not able to capture and express the view of all, but only of some. These views can are highly structured and easily inscribed into technologies. Such "coloured" technologies would then have the ability to reflect and reinforce the dominant ideologies propounded by management and interest groups. The "duality" (Orlikowski, 1997, p. 11) of information systems therefore has the power to institutionalise the actions of some management groups and to contain the gaining of power by others that are against their apparent interests. These embedded ideologies also control the general perceptions about information systems, thereby 'fencing off' the technical opportunities offered by information systems that do not support the interests of management.

Ideologies exist at the social and at the organisational level (Scarbrough, 1992, p. 146). The power structures within an organisation are tolerable by workforces if they are within the threshold of wider cultural and societal ideologies, as, the two ideologies have become, for the medium term, interrelated (p. 147). However due to this reason, general workforces do not generally appreciate fully the implications and hidden agendas of technologies. Technologies are socially accepted means of achieving a higher standard of living and symbolise progress and growth (Orlikowski, 1997, p. 12). Interrelated technologies become embedded ideologies and a result, often became transparent. and thereby ensure the continuity of their propagation and diffusions.

The sources of the strong influence that organisational ideologies possess come from scientific management. Scientific management encourages the development of managers as the legitimate holders of explicit knowledge of the organisations in which they have served (Scarbrough, 1992, p. 148). Their main function is to mediate (essentially to simplify) the environment for the lower workforce (Neumann, 1997, p. 86). From this, management's functions dictate the planning of optimal solutions using the abundant need-to-know knowledge they possess. While at the same time, the workforce is required to adhere to the rules and procedures formulated by their management and both the formal and informal organisations often do not challenge how these solutions are formulated or passed on (Zack, 1999a, p. 125). While such arrangements often present a substantial

shift in power, the perceived progression and employment security for the workforces eliminates the need to challenge or even question such structures. As such, there are strong incentives for both parties to remain on the equilibrium point so derived. However, such equilibrium is far from being stable as it is under constant readjustments. Turbulence in business landscapes has challenged the rigidity of scientific management style and many authors now lay claim to the benefits of flexibility in management style (Scarbrough, 1992; Orlikowski, 1997; Neumann, 1997).

## THE FLEXIBLE MODEL

Piore and Sabel as reference in Scarbrough (1992, p.150) claim:

> Flexible specialisation is a strategy of permanent innovation, accommodation to ceaseless change, rather than an effort to control it. This strategy is based on flexible multi-use - equipment; skilled workers; and the creation, through politics, of an industrial community that restricts the forms of competition to those favouring innovation. For these reasons, the spread of flexible specialisation amounts to a revival of craft forms of production that were marginated at the first industrial divide (p. 150).

While flexibility of management seems to be a viable alternative, benefits from such strategies have to depend on the responses of management and workforce, and the relationships between them. Perceptions and politics played important roles in the assimilation of flexible practices. As previously mentioned, management and workforce have different motive and intents. The implications brought forth by such flexibility would entail the forsaking of predicability and control, and will raise the perception of such dimensional changes as threatening to management, especially those in the middle and lower order. Thus modern organisations respond to changing business environments with a strategy of innovation and production specialisation while keeping intact Fordist-type holds on organisational relations and skill restriction (Matthews, 1989, cited in Scarbrough, 1992, p. 151).

"When confronted by increasing turbulence, organisations normally respond with increasingly bureaucratic behaviours by increasing structural centralisation"

(Cameron, Kim and Whetten, 1987 cited in Neumann Jr., 1997, p. 89). This, in a nutshell, is the real problem - the increasingly intense level of management control to be able to factor-in a mythical "successful" past combined with a wish that allows for an increase in the level of certainty in the face of the reality of an increasingly real and actual levels of uncertainty.

### THE POWER STRUGGLE

Politics amongst interest groups within management has also prompted competitions to secure the management of information systems and knowledge bases as this supports the 'knowledge is power' aphorism. Interest groups that gain control over these often use them to promote their own bodies of expertise, (Swan, 1996, reference in Scarbrough, 1996, p. 127), which has a destabilising effect upon the rationale of knowledge management.

The abilities to self-replicate and self-promote have produced the phenomenon, which Scarbrough termed as the "technology power loop" shown in figure 2.7 below.

On the other hand, interest groups that relinquished such power would simply oppose the transfer of occupational knowledge in order to protect their interests.



*Figure 2.7.*    The technology power loop.

As mention by Zack (1999b, p. 55), "Making private knowledge public and accessible may result in a redistribution of power that may be strongly resisted in particular organisational cultures."

Engineering professions in particular, have strong resistance to the knowledge process (Roos et al., 1999). Within the organisational context, engineering information and methodologies have high transfer propensity and through the codification of their occupational knowledge, leading to the reduction of their power status. Keeping knowledge within their own network ensures the continued reliance of organisations as implicit and explicit knowledge sources. As mentioned in the introduction, information hold out is becoming a feature in modern organisations. Consider this as a corollary; when there is no knowledge sharing, there is no knowledge creation (Roos et al., 1999, p. 165).

## KNOWLEDGE MANAGEMENT PROCESS: AN ORGANISATIONAL LEARNING PERSPECTIVE

To understand knowledge management processes in the context of organisational learning, this section presents a holistic view of the literature on the following:

1. Adaptive learning / maintenance learning;
2. Evolutionary learning / generative learning, and;
3. Senge's Fifth Discipline.

Organisation learning refers to the development of insights, knowledge, and associations between past actions, the effectiveness of those actions, and future action (Lyles, 1988). Argyris (1976) defines organisational learning as the process of detection and correction of errors.

Weick (2001, p. 71) argues that the defining property of learning is the combination of the same stimulus with differing responses. This combination, however, is rare in organisations. This means that either organisations do not or will not learn or that organisations learn, but in non-traditional ways. He further noted, "Perhaps organisations are not built to learn (p. 72). Instead, they are

patterns of means-end relations deliberately designed to make the same routine respond to different stimuli, a pattern which is antithetical to learning in the traditional sense." Weick (1991, p. 72).

The basic and current view of organisation knowledge generation is adaptive learning, which is about coping and is necessarily short term. The increasing adaptiveness is only the first stage; organisations need to focus on double-loop learning (Argyris, 1976), to like generative learning (Senge, 1990) or to like evolutionary learning (Merry, 1995, p. 16).

### ADAPTIVE LEARNING/ MAINTENANCE LEARNING

As Merry (1995, p. 17) stress that adaptive learning focuses on solving problems in the present without examining the appropriateness of the current learning behaviours. Based on an organisation's past success programs, it focuses on optimisations and incremental improvements. The unquestioning adaptation of past success has branded adaptive learning as "single loop learning." Single-loop learning is not self-reflective, as it is incapable of questioning its own assumptions and of engaging in change. Alfonso Montuori termed such form of learning as maintenance learning (Montuori, 1993, cited in Merry, 1995, p. 19), that is learning that allows us to learn within a pre-established framework, but does not allow free inquiry. Banathy (Banathy, 1993, cited in Merry, 1995, p. 25) furthers this argument by noting the hindrance to the development of evolutionary competency brought forth by maintenance learning. Maintenance learning is dealing with a rigid, known outlook and maintaining the status quo. This form of learning is necessary to maintain organisational functions but is insufficient on its own: in times of rapid and massive changes, turbulence and discontinuity, such learning will prove to be totally inadequate. Malhotra (2000), a leading thinker of knowledge management reinforced this point when reflecting on the present form of knowledge management: he argues that the concept of knowledge management is not new in information systems practice and research.

## EVOLUTIONARY LEARNING/ GENERATIVE LEARNING

Banathy (1993) makes a similar point by stating the need that adaptive and maintenance learning be complemented by other forms of learning in order to achieve maximum effectiveness. One of such forms is double loop learning. Double loop as proposed by Argyris, concerns the focus of solving complex and ill-structured problems by bringing an individual's espoused theory and their theory-in-use into congruence. A form of double loop learning is evolutionary learning. Evolutionary learning empowers workers to shape changes. It allows the re-examinations and renewals of viewpoints and enables the redesign of systems often at a higher level of complexity. Evolutionary learning will allow conscious coevolution with the changing environment, rather than merely adapting to it (Banathy, 1993 cited in Merry 1995, p. 26).

Similar to evolutionary learning, generative learning emphasises continuous experimentation and responses in an ongoing examination of the very way organisations go about defining and solving problems. Generative learning is about creating systemic thinking, shared vision, personal mastery, team learning and creative tension (Senge, 1990). Generative learning requires new way of looking at the world.

## SENGE'S FIFTH DISCIPLINE

P. Senge (1990) agues that there is a need for "learning organisations." He suggests five learning disciplines as the means of building a learning organisation. This building occurs where people are continually expanding their capacity to create the personal and professional results they truly desire, and where new and expansive patterns of thinking are nurtured by the organisation, and where collective aspirations are set free, and where people are continually learning how to learn together (Senge, 1990, p. 140).

The five disciplines include:

System thinking: A conceptual framework, a body of knowledge and tools that has been developed over the past fifty years, to make full patterns clearer, and to help us see how to change them effectively.

Personal mastery: The discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively.

Mental models: Deeply ingrained assumptions, generalisations, or even pictures or images that influence how we understand the world and how we undertake action.

Shared vision: The practice that involves the skills of unearthing shared pictures of the future that fosters genuine commitment and enrolment rather than compliance.

Team learning: The discipline that involves mastering the practices of dialogue and discussion, the two distinct ways that teams converse. In dialogue, there is the free and creative exploration of complex and subtle issues, with a deep "listening ' to one another and suspending of one's own views". By contrast, in discussions, the presentation and defending of differing views is expected and there is a search for the best views to support decisions that must be made at one point of time. Dialogue and discussion are potentially complementary, but most teams lack ability to distinguish between the two and to move consciously between them (Senge, 1990, Pp. 144-145).

The first three disciplines have particular application for individual learning behavioural patterns while the last two have particular focus on group learning behavioural patterns.

## SUMMARY AND DISCUSSION

*Reflexive Practitioner:*
*If I were to look back reflectively, I would note that, from the research literature discussed above this currently concludes the exploring of various aspects concerning the development of knowledge management and its role in both tacit*

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*and explicit knowledge in relation to organisational learning. In general, knowledge management requires the ability to capture and manage organisational learning. This means that effective knowledge management through explaining and leveraging tacit knowledge can provide competitive benefits for an organisation. The ability to channel and nurture knowledge and knowledge workers would also enable organisations to operate under a condition of "increasing returns." As such, knowledge transformation processes that support the collecting, sharing, elaborating and dissemination of external knowledge can be applied to solving problems and exploiting opportunities for the organisations concerned (Merry, 1995; Stacey, 1996; Aadne et al, 1996; Hauben & Hauben, 1997; Lewin, 1998; Nonaka, 1998; Tetenbaum, 1998; Wah, 1998; Mycek, 1999; Zimmerman, 1999; Remenyi, 1999; Scarbrough, 1999b). Management, in order to bind an organisation together may use integrating and sharing distributed knowledge as strategies, as research suggests. Management of explicit knowledge, which includes accessing, evaluating, managing, organising, filtering and distributing information in a manner that is useful to recipients, can provide strategic value to the organisation concerned (Remenyi, 1999; Scarbrough, 1999b).*

*As organisations are facing the problems of keeping pace with technology, particularly within the transition from the Industrial era to the information era, it has been suggested that understanding and managing knowledge transfer should be viewed as one of the promising areas for further research and development (Aadne et al, 1996). To gain more insight in this area, Aadne et al. (1996) have proposed four important issues of cooperotive strategies. These are (1) motives, (2) openness, (3) prior experience, and (4) internalisation.*

*While the focus of Aadne et al study was on knowledge-related concept of cooperative strategy, the context of inter-organisational knowledge flow, individual knowledge flow and individual learning are also important, as they begin to show significant influence on knowledge transferred. Based on the findings of Aadnee et al., this research study further outlines factors critical to the success of knowledge management within an organisation.*

*Another factor that offects organisotional and individual learning is organisational memory. Organisational memory eventually defines the structures, systems, and management processes. I suggest that as organisational learning processes began*

> *to influence knowledge management processes, that there are three issues surfacing*
> *from the literature.  These are (1) adaptive learning/ maintenance learning, (2)*
> *evolutionary learning/ generative learning, and (3) Senge's Fifth Discipline.  To*
> *gain more insights in this area, a thorough consideration and understanding of*
> *knowledge management is needed, particularly the necessary conversion of tacit*
> *knowledge to explicit knowledge.  (Personal reflection, March 2002)*

In this chapter, I have attempted to present the insights of the knowledge management in which concentrated on the potential for organisations to efficiently and effectively create, locate, capture, and share knowledge by applying WebAccounting systems. Effective and efficient conversion of tacit knowledge to explicit knowledge would enable organisations to manage organisational learning, and to apply that knowledge to the solution of problems and the exploitation of opportunities.

This literature review has sought to provide insights into the context of knowledge management, thus providing a literary basis for this study. Material relating to knowledge management processes and the uses of knowledge management systems has been described, showing the importance of such material to the Research Question in Chapter One "For managing organisational and individual knowledge, what are the impacts of the adoption and use of WebAccounting, in the conversion of tacit knowledge to explicit knowledge?" Chapter 3 examines an empirical case study using elements of positivist research, while chapter 4 presents another empirical case study with an interpretative perspective. I hope that both will chart my journey towards a mature approach to reflective practitioner ethnography research.   Chapter 5 discusses the theoretical philosophical framework and the methodology employed in this study, with supporting case descriptions and analyses of the two major case studies in Chapter 6. The conclusion - Chapter 7 - identifies several further areas for future research.

## TOWARDS A RESEARCH APPROACH (1):
### REFLECTIONS ON A POSITIVIST APPROACH

### OVERVIEW OF THE CHAPTER

This chapter provides an example of the use and adoption of a WebAccounting knowledge management system. It describes and analyses my first pilot study that provided a background and information source for research into WebAccounting systems used as an agent in converting tacit to explicit knowledge.

I first became interested in-depth research during the time I was working for Organisation A as a consultant at the beginning of the year 2000. I realised that I needed an approach that combined personal beliefs and values with an in-depth understanding of what it meant to work as a part-time consultant. I was interested in not only the personal dimension of business, but also the social and organisational context. I had some questions about making public these beliefs and this situation raised questions about my understanding of managing both tacit and explicit knowledge through an effective knowledge management system within the social structure of the teams and "tribes" with whom I worked. While I was working as a consultant, I found myself exposed to practical and lived experiences of these groups and in their training and development in Management information systems. I could see merits both for myself and for my clients in describing my work as a function of knowledge management. Against this background, I saw myself as needing to develop the research capabilities in order to become a better professional.

To begin this research journey, I conducted a pilot study, involving what I have named Organisation A in the beginning of Jun 2001 and March 2002. The findings of the first stage (conducted in Jnn 2001) of this study were analysed and formed a paper which I presented at the Seventh Annual ANZSYS Conference

(Nov. 2001, Proceedings). In March 2002, the follow up to this second stage formed the continuity of this chapter. Overall, this study began my early experience using elements of positivist research on my journey towards the mature research approach of reflective practitioner ethnography (Wong, 2001c).

Firstly, I show as an outline, of what the literature offers as ontology, epistemology, theory, and practices of the positivist approach. In describing and analysing the WebAccounting knowledge management case study of Organisation A, I employ Moody and Shanks' model for analysing success for knowledge management systems (Wong, 2001c). The study of WebAccounting within a positivist context is to provide insights for the whole thesis and to highlight the strengths and weaknesses of the positivist research approach.

### 3.1. WHAT IS POSITIVE RESEARCH?

According to (Hirschheim et al., 1997; Orlikowski & Baroudi, 1991; Hirschheim & Klein, 1989; Chua, 1986; Burrel & Morgan, 1979), positive research within an information systems research focus, centres on the empirical-analytic research agenda, which is based on the objective views of the functionalist paradigm. The term empirical-analytic refers to an organisational science based on the natural science approach, that attempts to establish a general law which can serve as an instrument for systematic explanation and dependable prediction (Benbaset et al, 1987, Pp. 69-72). This means that the premises of the positivist approach, that is, positivism is based upon the assumption of objective worldviews controlling human behaviour through instrumental and strategic actions during the designing of information systems. However, positivism often ignores the social context in its search for 'truth'.

### POSITIVIST APPROACH – UNDERLYING ASSUMPTIONS IN KNOWLEDGE MANAGEMENT PROCESS AND PRACTICE

According to Chua (1986), and Orlikowski and Baroudi (1991), a positivist approach to information systems development uses an empirical analytic research agenda based on a functionalist paradigm. Positivism employs a natural science approach whereby researchers aim to establish a general law for systematic

explanation and dependable prediction. Yin (1981, 1994) and Benbasat et al. (1987) approach the issues of case study from a positivist stance because they argue that case studies are the preferred research strategy to answer "how?" and "why?" questions.

## ONTOLOGICAL ASSUMPTIONS

Yin (1994), and Orlikowski and Baroudi (1991) refer to the researcher's ontology as built on assumptions and beliefs regarding the nature of the world around us. As such ontology deals with the reality of knowledge. Generally, researchers ontologically assume that the overall objective in social science research, including knowledge management systems is to explore and reveal social conditions (Orlikowski & Baroudi, 1991). Ontological researchers using positivist approaches rely on an objective view of the world. As mentioned by Orlikowski et al. (1991), positivist approaches assume that organisations have structures underlying the actions of those who create the social conditions and activities of these organisations. This means that the role of the researcher is to discover objective social phenomena that exist external to the creators of such reality, who are generally assumed to have a passive role in the situation under investigation.

## EPISTEMOLOGICAL ASSUMPTIONS

Orlikowski and Baroudi (1991), and Guba and Lincoln (1994) define epistemology as the ways and means by which we can obtain knowledge. They state that positivist epistemological assumptions are concerned with the empirical testability of theories, verified or not, through the logic of hypothetical-deductive reasoning concerning the phenomena being investigated. For example, the use of research methods such as large-scale sample surveys and laboratory experiments or descriptive case studies for the gathering of valid empirical data to examine formulated hypothesis. Their data analyses often refer to inferential statistics, where the objective is to discover causal laws. Positivist researchers, who often refer to their approach as the only valid way to rational knowledge, usually reject value judgement in support of their claims to objectivity (Hirschheim, 1991).

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Hirschheim (1991, p. 10) further states that positivism can be characterised as being based on five pillars:

*Unity of scientific method*: This means that the accepted approach for knowledge acquisition (the scientific method positivistically understood) is valid for all forms of inquiry.

*Search for human causal relationships*: This reflects the desire to find regularity and causal relationships among the elements of the study. Based on reductionism, the process is where the whole is further and further reduced to its constituent's parts.

*Belief in empiricism*: This refers to the data, which is sourced from the senses. These senses do not include the subjective experience, unconscious organising concepts, reflection intuition, and the like.

*Science (and its process) is value-free*: This reflects the belief that the undertaking of science has no relationship to political, ideological, or moral beliefs. The process transcends, and is separate from, cultural and social beliefs held by the scientist.

*The foundation of science is based on logic and mathematics*: logic, or mathematics, provide the formal basis for quantitative analysis to investigate the causal relationships of the findings (source from Hirschheim, 1991, p. 10-11).

As noted by Orlikowski and Baroudi (1991), positivists often claim to focus on "actuality" in that the researcher claims to be able to evaluate objectively social action or social processes through control strategies such as close ended questionaries. The use of reduction in survey instruments is one technique to achieve the desired research goals in the most efficient manner (Orlikowski & Baroudi, 1991; Guba & Lincoln, 1994; Chua, 1986).

### LIMITATIONS OF POSITIVIST APPROACH

Orlikowski & Baroudi (1991) and Walsham (1991,1993,1995a) assert that there are limitations to positivist approaches in information systems research. These are as follows:

1. Structured design research methods are usually devoted to the design of technical systems and give little recognition to the range of organisational changes that also occur.

2. Positivistic paradigms view the world as consisting solely of objective reality characterised by order rather than conflict.

3. Using qualitative research, social structures and phenomena are usually found, observed or modelled but rarely interpreted in-depth (source: Orlikowski & Baroudi, 1991, Pp. 113-120).

The detailed relevance of these points to this pilot study is in the last section of this chapter.

## OUTLINE OF KNOWLEDGE MANAGEMENT SYSTEMS IN GENERAL

In this chapter I present research accounts to investigate the knowledge management processes and practices in an automobile sales and services organisation named here as Organisation A. This pilot study was conducted in such a manner that it included positivist elements (Wong, 2001c). The use of the framework for analysing successful knowledge management systems proposed by Moody and Shanks (1999) used in this thesis is to provide those insights into the challenges that are faced in the adoption of the WebAccounting system. These author's studies have successfully evaluated the positive impact of knowledge management projects in the organisational context, facilitating knowledge sharing within the organisation and in enhancing an environment nurturing the creation and managing of knowledge artefacts. Their studies have provided a valuable insight into the current perceptions of knowledge management systems within organisations in Australia as well (Wong, 2001c). For example, the Ayres and Clinton (1997) study of adopting knowledge management systems in the New South Wales Health Systems. Here they confirmed that "in providing the latest medical research knowledge can mean the difference between life and death, an accurate or erroneous diagnosis, early intervention or a prolonged and costly stay in hospital". Using another specific example, the Moody and Shanks (1999) study of adopting knowledge management systems in Victoria Health Systems

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confirmed that "through allowing clinical staff to access latest medical knowledge improves the quality of clinical decision making." They also found that 90% of the medical staff using the knowledge management systems felt that it had improved the quality of patient care.

Offsey (1997, p. 113) asserts that it is increasingly important for organisations to identify the need to develop better techniques to manage their knowledge assets. In a similar view, Newman (1997, p. 123) states that knowledge sharing across departments, functions or geographical locations is recognised as a core organisational competence for most organisations. Consequently, GroupWare applications are a tool for providing solution to organisational competence because they allow information sharing and collaboration across departments and functions.

Consideration that knowledge management being of major importance and an important indicator of success for an organisation is increasing. Supporting this proposal, Remenyi, (1999a, 1999b) argues that knowledge management systems act as an extension of information systems management whereby the organisation benefits from a more effective use of knowledge. Hence, this provides knowledge management with a strategic focus (Remenyi, 1999a, 1999b). In a similar article, Bernard, (1996, p. 23) argues that the adoption of Intranet technology particularly GroupWare applications, also facilitates organisation-wide knowledge management. Organisation-wide knowledge management is defined as "the broad processes of locating, transferring and more efficiently using of information and expertise within an enterprise" (Bernard, (1996, p. 24). He further agues that knowledge management is concerned with decision support systems, data warehousing and data mining, and is closely associated with Intranet applications, particularly GroupWare applications.

Hauben and Hauben (1997, p. 18) assert that knowledge management systems may be seen as an extension of information systems management, which utilises the exchange of business knowledge through IT network. This entails the exchange and sharing of both tacit and explicit knowledge between separate organisations, business-to-business (B2B), or business to customer (B2C). Such

networks of exchanging and sharing of knowledge are crucial to support successful business partnerships.

Daniel and Greme (1999) and Davenport (1996,1998a) state that organisations must first understand its knowledge assets and the manner of the application of its knowledge to achieve knowledge superiority. The implementation of WebAccounting systems enables an organisation to provide strategies for managing and exploiting such knowledge.

Having identified knowledge as a major issue and indicator for the success of an organisation, the next section addresses the outline views of GroupWare, knowledge management, organisational issues, and previous empirical research on knowledge management systems. Section 3.3 discusses the research method used to examine the use and adoption of WebAccounting system for Organisation A. Section 3.4 presents the research findings responding to the four matrixes as presented. Section 3.5 presents discussions of the results with argument to the literature, and concludes with discussions regarding the development of the research approach.

## 3.2. OUTLINE OF GROUPWARE AND KNOWLEDGE MANAGEMENT

According to Jessup and Valacich (1993), the term "GroupWare" refers to Computer Support Co-operative Work (CSCW), Collaborative Computing, Group decision Support Systems (GDSS), Group Support Systems (GSS), Electronic Meeting Systems, Computer-Support Collaborative Work, Computer-Mediated Communications Systems or Group Negotiation Support Systems. They further suggested that the differing names for this field have occurred to reflect the different quadrants on the time/space matrix studied, as well as different research institutions historically using different terminology. In this pilot study, I agreed with Wallis definition of GroupWare. He refers GroupWare as the technology that communicates and organises unpredictable information, allowing dynamic groups to interact across time and space (Wallis, 1996, p. 23).

As stated by DeSanctis (1993, p. 100), the goal of GroupWare is to bring "improvements in organisational efficiency." Gunther (1994, p. 43) states that GroupWare is about "better business practices", both in the way an organisation manages its internal operations and more directly in the way it manages its relationships with customers and suppliers. He also mentions that GroupWare encourages, or more often forces companies to re-examine business processes and trading relationships. WebAccounting, which falls into the category of GroupWare, acts as a tool to transmit standard structured messages electronically from a computer in one location to another computer application in another location. Thus, WebAccounting may be an "enabling technology" that allows organisation to better meet its business goals.

## OUTLINE OF KNOWLEDGE MANAGEMENT, GROUPWARE AND ORGANISATIONAL ISSUES

According to Ciborra et al (1996, p. 20), the reasons for the adoption of a GroupWare technology in enabling the practise of knowledge management within organisations are as follows: -

1. GroupWare applications have a recursive and interactive relationship between user groups, technologies, and the structural properties of the organisation.
2. The process of calling upon and codifying the forms of knowledge (turning tacit into explicit knowledge) starts in the development of hardware and software during its designing stage. This process begins when the knowledge from knowledgeable staff is stored in electronic repositories, and made easily accessible.

Revealed in the social-technical theory advanced by Pan and Scarbrough (1999), is another consideration as to why web-based information technology has a strong interaction with organisational functionality and practice. As argued by Pan and Scarbrough (1999, p. 19), there are three different levels of functionality and practice:

1. *Infrastructure* refers to the hardware/software, which enables the physical channels and communication contact between network members.

2. *Infostructure* refer to the formal rules that govern the exchange between the actors on the networks providing a set of cognitive resources (metaphors, common language) whereby people make sense of the events on the network.

3. *Infoculture* ref    . ie stock of background knowledge, which actors take for granted and which is embedded in the social relations surrounding work group processes. (Source: Pan and Scarbrough, 1999. p. 19-20).

Pan and Scarbrough (1999) proposed that their findings concerning the social-technical view of knowledge management support a close social and technology relationship.    They suggest that technology is the driving factor for top management to be pro-active and supportive particularly about their business performance and competitiveness.

In summary, based on the above positivist and empirical studies by Ciborra et al (1996) and Pan and Scarbrough (1999), I have established that the adoption of information technology (including in this case WebAccounting GroupWare) is closely integrated with organisational issues.

## OUTLINE OF PREVIOUS RESEARCH IN KNOWLEDGE MANAGEMENT SYSTEMS

In this section, I outline a framework for analysing knowledge management systems based on previous empirical research. The framework for the knowledge management project referred to above incorporates four stages: the objectives, the strategies, the success indicators and the success factors (adapted from Moody and Shanks, 1999).

**Objectives of a knowledge management project.**


Objectives define what a knowledge management project is trying to achieve.
Davenport (1998b) studied thirty-one knowledge management projects in twenty-four US based companies and identified four types of objectives that allow organisations to achieve knowledge superiority. They were as follows:


*1.   Creating knowledge repositories*: The first type of project focused on creating structured repositories to store explicit knowledge. Three types of knowledge repositories were identified: external knowledge (knowledge from external sources), structured internal knowledge (internal documents) and informal internal knowledge (tacit knowledge extracted in the form of lessons learned).


*2.   Improving knowledge access*: The second type of project focused on providing access to tacit knowledge and facilitating its transfer between the individuals.


*3.   Enhancing the knowledge environment*: The third type of project focused on the establishing an environment conductive to knowledge creation, transfer and use.


*4.   Managing knowledge as an asset*: The fourth type of project was involved in measuring the value of the knowledge assets (adapted from Daniel, 1999, p. 665).


**Strategies of knowledge management**


Strategies define the methods for achieving the objectives.
Hansen et al (1999) studied knowledge management strategies used in consulting firms, health care providers and computer manufacturers in the United States during the 90's,and identified two broad types of strategy for implementing knowledge management:

*1.     Codification strategy*: Codification is about turning tacit knowledge into explicit knowledge: knowledge that is extracted from the person who developed it and stored in electronic repositories, easily accessible by anyone in the organisation.

*2.     Personalisation strategy*: Personalisation focuses on tacit knowledge and involves the sharing of knowledge directly among people. This knowledge is tied to the person who developed it, and is shared not only face-to-face but also over the telephone, by e-mail or by videoconference (adapted from Daniel, 1999, p. 665).

Hansen et al (1999) found that all companies use elements drawn from each strategy, focussing primarily either on one type or on both. They also found that the choice of strategy was dependent on the competitive strategy of the organisation.

**Success indicators for a knowledge management project**

Success indicators measure the effectiveness of a knowledge management project, which includes the dependent variables or the outcome measures.

Davenport et al (1998) identified four success indicators for knowledge management projects during their investigations of the twenty-four companies. These were:

*1.     Growth in resources attached to the project.* This refers to increases in number of people involved or the size of the budget assigned to the project over its lifetime:

*2.     Growth in knowledge content and usage.* This is measured by increase in the volume of knowledge stored in repositories;

3.    *Organisational initiative.*    This means that if the projects are the initiatives of one or two individuals they are less likely to succeed than projects that originate in organisation-wide initiatives;

4.    *Financial returns.*  This refers to the financial return either for the project itself or for the organisation as a whole (adapted from Daniel, 1999, p. 666).


**Success factors for knowledge management projects**


Success factors define the conditions that lead to success in knowledge management projects. Davenport et al (1998) identified eight types of success factor for implementing knowledge management project. They were:

1.    *Link to economic performance*: This involves money saved or earned. As argued by Davenport, this is the most important element for a successful knowledge management project.

2.    *Technical and organisational infrastructure*: This refers to the level of involvement through technology and organisational infrastructure for the success of a knowledge management project.

3.    *Flexible knowledge structure*: Finding the right balance within knowledge repositories in a project. For example, find the right balance between too much structure and too little structure in knowledge repositories as

4.    *Knowledge-friendly culture*: implementing the characteristics of a knowledge friendly culture.

5.    *Clear purpose and language*: clearly defined communication and objectives are important for success.

6. *Change in motivational practices*: incentives and rewards are important to motivate people.

7. *Multiple channels for knowledge transfer.* This means providing opportunities for face to face contact as well as electronic forms of communication.

8. *Senior management support.* This implies providing funding and other resources for the success of the organisation (adapted from Daniel, 1999, p. 667).

In summary, the above research provided an overview of the work of Davenport et al (1998) and Hansen et al (1999) with empirical studies of knowledge management used by Moody and Shanks (1999) in order to synthesise this into a theoretical framework for managing success in knowledge management systems. Well known is the use of Moody and Shanks' theoretical framework to identify problems and issues in knowledge management systems within the Australian Health Department.

### 3.3. THEORETICAL FRAMEWORK FOR MANAGING SUCCESS OF KNOWLEDGE MANAGEMENT SYSTEMS.

1. The theoretical framework (adapted from Moody and Shanks, 1999) shown in Figure 3.1, which incorporates the objectives, success indicators and success factors of Davenport et al (1998), and the knowledge management strategies identified by Hansen et al (1999) were applied to this pilot study.
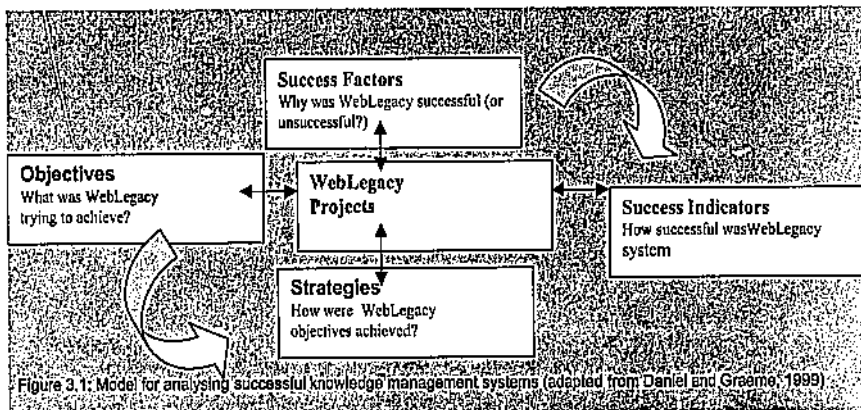
*Figure 3.1.*    Model for analysing successful knowledge management.

Moody and Shanks' (1999) report on how the Australian Health Department identified problems and issues about knowledge management systems, as shown in the Figure 3.1:

2.    Objectives define what the systems was trying to achieve

3.    Strategies define the methods used to achieve the objectives

4.    Success indicators measure how successful the systems was (outcome measures)

Success factors explain why the system was successful (causal factors).


## BACKGROUND TO ORGANISATION A

Organisation A is a Perth based family-owned automotive group which was established in the mid 1980's to offer Western Australian car buyers innovative options in the purchase, sale and servicing of motor vehicles. Employing over 50 staff, Organisation A has several new and used vehicle franchises, and five franchised used vehicle outlets scattered across a large state of an Australian metropolitan area. Organisation A also has six modern full equipped "Formula

One" Autocare centres, which provide comprehensive car servicing and repairs as well as spare parts and accessories for high performance vehicles.

Organisation A's website was designed and implemented by an external consultant and went "live" in July 1999. The initial installation of a WebAccounting GroupWare application allowed management to use their Intranet to facilitate communication and commerce with its staff, suppliers, and customers.

## RESEARCH QUESTION OF THIS CHAPTER

Specifically, I consider the following research question in depth.

In the context of making possible knowledge sharing, how successful is WebAccounting as a knowledge management system, judged in accordance with Moody and Shanks' (1999) success factor model for analysing knowledge management systems, and researched using a largely positivist approach?   .

## RESEARCH METHOD

In my early investigation of the use and adoption of WebAccounting, I considered this pilot case study would provide me with valuable context and background regarding the adoption and use of WebAccounting (Wong, 2001c). The research, which lasted 2-½ months beginning in Jun 2001, led me to consider both research paradigms and their human context. For me, this was the beginning of my journey to in-depth research (Wong, 2001c).

Case study methodology, according to Burns (1994, p. 364), has been used in information systems research, and is usually qualitative in nature. This method of research involves observation of a particular group of people or an individual, such as organisational knowledge workers. Burn (1994) further states that in case study research, a variety of observation and interview methods can be used as the

major tools to collect data, thus enabling the researcher to focus on the subjects, contexts and settings of the study (Pp. 365).

**RESEARCH DESIGN (SEE APPENDIX 1)**

The purpose of this pilot study was to conduct exploratory research employing positivist elements into the perception of Australian business knowledge workers to investigate the question "How successful is WebAccounting as a knowledge management system, judged according to Moody and Shanks' success factor model for analysing knowledge management system?" The following chart discusses the research design used.
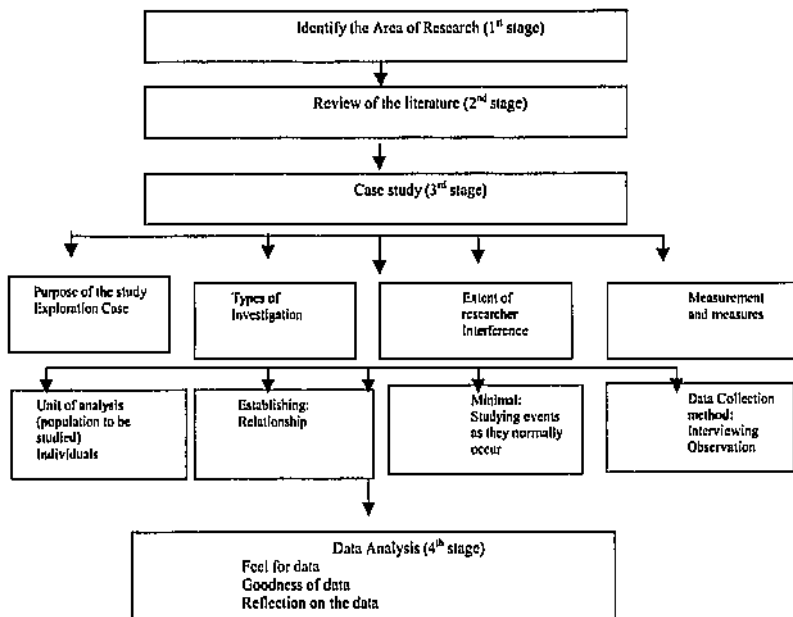
*Fig 3.2*. A summary of the research design
(Adapted from Sekaran, U., 1992, p. 220)

Figure 3.2 presents an exploratory research model employing positivist elements and the case study methodology used in this pilot study is presented in this flow chart (see Fig 3.2). In the first stage, the area of research perspective, positivist perspective, influences the methodology. In the second stage, the literature review narrows the type of positivist approach. Here is conducted qualitative case study research. Outlined in the third stage, is the selection of research instruments, which includes (1) purpose of the study, (2) types of investigation, (3) extent of researcher interference and (4) measurement and measures. The data collection procedures are through observation of individuals and events. Then I applied the hermeneutic approach on the interpretation of interviews, and then this is the approach again applied on the interpretation of interview transcripts. In the fourth

stage, analyses of data using positivist approach through a data meta-matrix (table format matrix) is established. Finally, is the presentation of the summary of the findings, which includes establishing causal relationships, correlations, and the reflection of a reflective practitioner on write-up.

## INTERVIEW TECHNIQUE

I was able to interview six essential players (ie. two technical supervisors, one operations director, and three knowledge workers) from Organisation A. There were six interviews each lasting about two hours, focusing on the objectives of WebAccounting systems, its organisational impact, its success factors, and its success indicators. This interview period is long enough to gain both conscious and subconscious thoughts pertaining to the participant's perceptions (Sampson, 1996, p. 332). All interviews were on the business's premises and we met in a quiet office.

In addition to the interviews, I made follow-up calls to all the six participants between three and five days after the initial interview. This process was to minimise errors of interpretation. I believe that I had established a good level of rapport and trust in the interviews and during the follow-up calls. As mentioned by Belk et al (1989, p. 10), "...the effective collection of sensitive information necessitated a good level of rapport to be promptly established so as to gain the required level of trust."

The interview questions are characterised by a semi-structured format (Fontana & Frey, 1994) and followed a funnel-effect whereby open-ended broad questions were initially asked to probe the issues in a general way. This, followed by questions that are more precise, focused on issues specific to this research (Hall & Rist, 1999, Pp. 291-293). During the interviews, notations were made of body language styles, including posture, tone of voice, long pauses, and physical appearance. Goffman (1971, p. 371) commented that these factors are "all significant in setting the situation."

Based on an extensive literature review, I came up with the following interview questions:

For Stage One:

    1. How does WebAccounting create knowledge repositories for your business?

    2. What are the objectives of your business?

    3. How does WebAccounting improve knowledge access for your business?

    4. What are your perceptions of WebAccounting in managing knowledge as an asset?

    5. How does WebAccounting enhance the knowledge environment of your business?

For Stage Two:

    1. What is the strategic outlook for your business because of employing WebAccounting?

    2. What are your perceptions of how successful are the WebAccounting systems through supporting strategies, both codification strategies and personalisation strategies?

For Stage Three

    1. What is your opinion of WebAccounting as a knowledge management system? How successful is WebAccounting?

    2. What is your opinion about the growth of resources attached to this project, ie, pre-adopting, post-adoption and one year from post-adoption of WebAccounting?

    3. Do you believe that WebAccounting has affected the growth of knowledge and its advantageous use for your business in these three periods? Why? How?

    4. What, is your opinion regarding organisational initiatives resulting from the adoption of WebAccounting? Why do you hold this opinion?

    5. In what direction do you see your business's financial return in five years' time?

1.    What is your opinion about the success of WebAccounting as a knowledge management system?

2.    What are your perceptions of WebAccounting adding to the economic performance of your business, that is, for each of these three periods?

3.    Do you believe that the technical and organisational infrastructure changed in these three periods, through adopting WebAccounting?

4.    Do you think that the use of WebAccounting has brought about a more flexible knowledge structure in your business over these three periods?

5.    In what direction do you see your organisation going in term of knowledge–friendly culture through using WebAccounting for each of these three periods?

6.    What, in your opinion, has WebAccounting facilitated clarity of language and purpose in communication over each of these three periods?  Do you believe that WebAccounting has changed your organisation's motivational practices?  How has it done this in each of these three periods?

7.    In what way do you think that WebAccounting has supported multiple channels for knowledge transfer for each of these three periods?

8.    What is your opinion of senior management supporting the adoption of WebAccounting for each of these three periods?

In addition, informal conversations and documentary evidence were used in order to obtain rich process descriptions of the study.   After transcription of all interviews, and reading them several times, they were then related to the matrix.

## DATA ANALYSIS

In my pilot study of 'Organisation A', I used research methods based largely on the analysis framework of Moody and Shanks (1999).   I found that it was necessary to develop a "table format" matrix to investigate the organisational

impact, success factors, and success indicators. I used the table format matrix that was used in the report of Implementation Guide for Electronic Commerce (2001), to analyses the dependent and independent variables for the four stages in this study. I developed some modifications to specific features in the table format matrix to suit better the case of Org A.

The table format matrix (see table 3.1) for stage one could be stated in positivist terms to address three dependent variables related to "What was WebAccounting trying to achieve": (1) operations staff perspective; (2) existing customers perspective; and (3) marketing staff perspective. Four independent variables were utilised: (1) creating knowledge repositories; (2) improving knowledge access; (3) managing knowledge as an asset; and (4) enhancing the knowledge environment. All the six respondents of Organisation A selected a topic from a list of descriptions in the matrix.

| | Knowledge from internal , external source | | |
|---|---|---|---|
| Objectives KM project | Operations staff | Existing Customers | Marketing staff |
| Create knowledge repositories | Provide 24hrs accessibility/ accurate information provided | Provide quick response on request/queries | Information easily accessible to public |
| Improve knowledge access | Facilitate transfer of tacit knowledge between individual | Increase in Satisfaction | Facilitate transfer of tacit knowledge between individual |
| Manage knowledge as an asset | Moderate | Not sure | Moderate |
| Enhance knowledge environment | Improve conducive environment for sharing knowledge | Increase in Satisfaction | Improve conducive environment for sharing knowledge |

*Table 3.1.*    Table formats matrix showing staff concern regarding the objective of the WebAccounting (Adapted from Moody and Shanks, 1999).

Table 3.2 from stage 2, demonstrated staff concerns regarding the strategies for employing WebAccounting. In positivist terms, the dependent variables for stage two were (1) the functionality databases, (2) the external network components and (3) the listserver components. The independent variables were (1) the strategies of codification and (2) the personalisation strategies where they can be used to customise the preference and screen layouts of WebAccounting system. The "achieve %" refers to the percentage of management-initiated strategy actually

adopted by staff. The "potential percent" refers to the expected percentage that the staff had adopted management-initiated strategies. The "gap percent" refers to the difference between actual and planned adoption.

Table 3.3 from stage 3, indicated staff usage of WebAccounting concerning the success indicators theorised by Moody and Shanks (1999). Table 3.3 showed a multiple matrix table format developed to investigate the design and performance for three periods (the pre. post and one-year after the post implementation). Using positivist language, it could be stated that the sole dependent variable was the success indicator, and that the independent variables were (1) the growth in resources attached to the project; (2) the growth in knowledge content and usage; (3) the organisational initiative, and (4) the financial return.

Stage four, shown in Table 3.4, outlines staff responses to the success factors of WebAccounting. Using positivist terms, the dependent variable was the success factor. The independent variables were Moody's eight elements: (1) link to economic performance; (2) technical and organisational infrastructure; (3) flexible knowledge structure; (4) knowledge friendly culture; (5) clear purpose and language; (6) change in motivational practices; (7) multiple channels for knowledge transfer; and (8) senior management support. The table format used for stage 3 and 4 was inspired by the matrix framework developed in the paper "Developing a Business Case for Electronic Commerce in Small and Medium sized Enterprises" (Brown et al. 2001).

## LIMITATIONS OF RESEARCH METHOD

The limitations linked to the above procedures are my reliance on a small population (6 interviewees) rather than on a larger population (all staff) from Organisation A. However, these six interviewees were deeply involved in the research during the pre and post implementation of WebAccounting system. This means that the responses from these interviewees fulfil the requirements of rigour and reliability in the context of my study. In terms of rigour, the intention was that this pilot study should demonstrate a sound basis in the theoretical and conceptual development inherent in Moody and Shanks' theory. The

methodological design and execution has served the purpose of using the findings in Moody's theory. In terms of relevance, considering the significant problems and opportunities faced by Organisation A and its staff, the aim was to demonstrate the applicability of WebAccounting in the resolution of these difficulties.

## 3.4. RESEARCH FINDINGS- RESULTS OF THE INTERVIEWS

### FIRST STAGE, THE OBJECTIVES OF WEBACCOUNTING

Objectives define what a knowledge management system is trying to achieve. As addressed by Davenport (1998b), and Moody and Shanks (1999), a knowledge management system provides four types of objectives that allow an organisation to achieve knowledge superiority.

*1. Creating knowledge repositories*; the focus of WebAccounting in creating structured repositories to store explicit knowledge;

*2. Improving knowledge access*; the focus of WebAccounting in providing access to tacit knowledge and facilitating its transfer between the individuals;

*3. Enhancing the knowledge environment*; the focus of WebAccounting in the establishing an environment conductive to knowledge creation, transfer and use;

*4. Managing knowledge as an asset*; WebAccounting involvement in measuring the value of the knowledge assets.

Relating to the objectives stance of WebAccounting, the following points drawn from staff responses to the matrix (table 3.1) during the interview can be made with regard to the four objectives outlined above.

| Table 3.1: What was WebAccounting trying to achieve? | | | | | |
|---|---|---|---|---|---|
| | Knowledge from internal , external source | | | | |
| Objectives WebAccounting | Operations staff | Existing Customers | Marketing staff | | |
| 1) Create knowledge repositories | Provide 24hrs accessibility / accurate | Provide quick response on request/quer | Information easily accessible to public | | |

| | information provided | ies | | | | |
|---|---|---|---|---|---|---|
| 2) Improve knowledge access | Facilitate transfer of tacit knowledge between individuals | Increase in Satisfaction | Facilitate transfer of tacit knowledge between individuals | | | |
| 3) Manage knowledge as an asset | Moderate | Not sure | Moderate | | | |
| 4) Enhance knowledge environment | Provide a more conducive environmen t for sharing knowledge | Increase in Satisfaction | Provide a more conducive environment for sharing knowledge | | | |

Table 3.1.     Table format matrix showing staff concern regarding the objective of the WebAccounting (Adapted from Moody and Shanks, 1999).

1.   Regarding the issue of the creation of knowledge repositories, all the six interviewees asserted that WebAccounting creates a virtual information library accessible 24 hours a day to staff across all branches. Significant improvement observed in Organisation A was due to WebAccounting providing external knowledge (knowledge from an external to Organisation A source), making it accessible to staff for more profitable operations. This improved information exchange has lead to tangible and intangible benefits in the form of cost reduction and quality improvement in Organisation A.

2.   In terms of improving knowledge access, four out of six interviewees commented that WebAccounting has helped to facilitate the explication and transfer of tacit knowledge between the individuals.

3.   Concerning enhancement of the knowledge environment, all of the six interviewees agreed that WebAccounting has helped to establish a favourable environment for sharing knowledge by creating.

In summary, WebAccounting has successfully created knowledge repositories for knowledge transformation, sharing, and creation within Organisation A. WebAccounting allows staff from Organisation A to both use and make clear their

tacit knowledge which can then be codified into formulated in electronic form. WebAccounting has also proven to be successful in allowing information sharing and collaboration across both departments and business functions.

## SECOND STAGE, THE STRATEGIES OF EMPLOYING WEBACCOUNTING

Strategies define methods for achieving objectives. Hansen et al (1999), and Moody and Shanks (1999) identify two broad types of strategy for implementing knowledge management system:

1. *Codification strategy*: codification is about turning tacit knowledge into explicit knowledge. Knowledge extracted from the person who developed it and is then stored in electronic repositories, easily accessible by anyone in the organisation.

2. *Personalisation strategy*: personalisation focuses on tacit knowledge and involves the sharing of knowledge directly between people. Knowledge is closely tied to the person who developed it, and is shared not only face to face but also over the telephone, by e-mail and by videoconference.

Hansen et al (1999) found that most companies used elements drawn from each strategy, with a focus either on one type or on both together. The choice of knowledge management strategy is usually dependent on the competitive strategy of the organisation.

To explain the achievement of knowledge management objectives through the chosen strategy, it was necessary to explore the three major components of WebAccounting.

1. Functionality databases (eg. operational and administration): These were on-line databases, which provided access to the latest organisational knowledge, to allow information sharing and collaboration within the organisation.

2. External network (eg. suppliers and customers): Relate to web-based integrated systems that use the Internet to support links in the supply chain. These

networks of systems must interoperate with other systems that support links in the supply chain.

3. Listservers (eg. End-users, videoconference, e-mail) allowed for on-line discussion of problems and issues in particular areas of interest, for example in the marketing and sales activities.

| Table 3.2: The strategies of employing WebAccounting | | | |
|---|---|---|---|
| | WebAccounting components. | | |
| Strategies for the WebAccounting system | Functionality databases, eg. Operational & administration | External network, eg. Supplier and customer focus | Listservers eg end-users |
| 1) Codification strategies | Not codifying because providing access to already codified knowledge | Not codifying because providing access to already codified knowledge | Not ascertainable |
| 2) Personalisation strategies | Not ascertainable | Not ascertainable | Involves exchange of ideas and experiences between individual end-users. |
| Strategies for WebAccounting | Achieved/Potential/Gap | Achieved/Potential/Gap | Achieved/Potential/Gap |
| 1) Codification strategies | 10%   30%   20% | 10%   30%   20% | 5%   20%   15% |
| 2) Personalisation strategies | 0%   0%   0% | 0%   0%   0% | 15%   20%   5% |

Table 3.2.    Table format matrix demonstrating staff concern regarding the objective of the strategies for employing WebAccounting (Adapted from Moody and Shanks, 1999).

The strategy "achieve percent" refers to the percentage actually adopted by staff. The strategy "potential percent" refers to the management expected percentage of staff adoption of a strategy.   The "gap percent" refers to the difference between actual and planned adoption.

In relation to stage 2, "The strategies of employing WebAccounting," the following points drawn from staff response to the matrix (table 3.2) during the interview can be made with regard to the two points outlined above.

Four of out six interviewees identified that the list server component fits into the personalisation strategy because it involved the exchange of ideas and experiences between individuals as end-users. The list servers provided for sharing both the

tacit and explicit knowledge. This facilitated the exchange of ideas and experience among staff of Organisation A via e-mail and by videoconference.

All of the six interviewees commented that the other two components (functional databases and external networks) did not fit into either of the codification strategy or the personalisation strategy. As such both, the functional databases and external networks focused on explicit knowledge, and were not concerned with codifying knowledge. Furthermore, both these resources provided access only to already codified knowledge, which resided in electronic format.

### THIRD STAGE, THE SUCCESS INDICATORS FOR WEBACCOUNTING

Success indicators measure the effectiveness of knowledge management systems, which included the dependent variables or the outcome measures. Davenport et al (1998), and Moody and Shanks (1999) identify four success indicators for knowledge management systems.

1.  Growth in resources attached to the project: this refers to the increase in numbers of people or the size of the budget assigned to the knowledge management project over its lifetime.
2.  Growth in knowledge content and usage: this measure by increases in the volume of knowledge stored in repositories;
3.  Organisational initiative: this means that if the projects are the initiatives of one or two individuals, they are less likely to succeed than projects that originate in organisation-wide initiatives.
4.  Financial returns: this refers to the financial return either for the project itself or for the organisation as a whole.

Relating to the success indicator for WebAccounting, the following points drawn from staff response to the matrix (table 3.3) during the interview can be made with regard to the four points outlined above.

| Table 3.3: Success Indicators for WebAccounting | | | |
|---|---|---|---|
| With respect to organisation #A: | Pre- adoption of WebAccounting | Post- adoption of WebAccounting | One years from post-adoption of WebAccounting |
| 1) Growth in resources attached to the project | Low | Improved | High |
| 2) Growth in knowledge content and usage | No on-line discussion | Increase on-line discussion | Exponential increase on-line discussion/ request /Business Improved |
| 3) Organisational initiative | Not Appealing | Satisfaction | Increasingly Appealing/ satisfaction |
| 4) Financial return | Stagnant | Indications of cost reduction | Business Improved/prof it increased |

*Table 3.3.* Table format showing staff usage of WebAccounting concerning success indicators theorised by Moody and Shanks (1999).

1. Responding to the scope of growth in resources attached to knowledge management systems, all of the six interviewees estimated that the total cost of ownership for implementing WebAccounting project was $98,400. However, I estimated that the annual budget of recurring or operational costs would be $24,000 per annum 2. Responding to the increase in the growth in knowledge content and usage, 100% of the interviewees commented that there was an exponential increase in information usage since the post adoption of WebAccounting.

3. Responding to the extent of organisational initiative, five out of six interviewees noted that there seemed to be greater levels of satisfaction on the part of end users. Furthermore, I had reports that customer complaints in general have dropped significantly since the organisation adopted WebAccounting.

4. Responding to the size of the financial return, all of the interviewees commented that there seems to have been some reduction in cost, as

WebAccounting was able to integrate web EDI with their inventory, accounting, and order entry systems. Four out of six interviewees commented that integration brought abont an increase because it greatly decreases human involvement in information flow, thus making bnsiness processes simpler, faster, cheaper and less error prone.

In summary, the success indicators have indicated that a significant impact to Organisation A has occurred. The introduction of WebAccounting appears to have improved the quality of management's decision-making, and thereby improved the quality of service provided to customers.

## STAGE FOUR, THE SUCCESS FACTORS FOR WEBACCOUNTING

Success factors define conditions that lead to success in knowledge management systems. Davenport et al (1998), and Moody and Shanks (1999) identify eight types of success factor for implementing knowledge management systems.

1. *Links to economic performance*: this involves money saved or earned.
2. *Technical and organisational infrastructure*: this refers to the level of involvement through technology and organisational infrastructure for the success of knowledge management project.
3. *Flexible knowledge structure*: finding the right balance of knowledge repositories to a project.
4. *Knowledge-friendly culture*: finding the aspects of a knowledge friendly culture.
5. *Clear purpose and language*: clearly defined communication and objectives are important for success.
6. *Change in motivational practices*: incentives and rewards are important to motivate people to the use the knowledge management facility.
7. *Multiple channels for knowledge transfer*: this means providing opportunities for face to face contact as well as electronic forms of communication.
8. *Senior management support*: this implies providing funding and other resources for the success of the organisation.

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| With respect to Organisation A | Pre- adoption of WebAccounting system | Post- adoption of WebAccounting system | One years from post-adoption of WebAccounting system |
|---|---|---|---|
| 1) Link to economic performance | Normal | Indication of Improvement in financial savings | Strong Indication of Improvement in financial savings |
| 2) Technical and organisational infrastructure | Normal | Increased involvement in both Intranet & Internet technology & WWW infrastructure | Exponential increased involvement in both Internet & Intranet technology and WWW infrastructure |
| 3) Flexible knowledge structure | Not Appealing | Satisfaction | Increasingly Appealing/ satisfaction |
| 4) Knowledge-friendly culture | Negative attitude to knowledge, organisation learning low, innovation low | Towards positive attitude to knowledge, organisation learning increase, innovation increasing | Positive attitude to knowledge, organisation learning increase, innovation increasing |
| 5) Clear purpose and language | Not determined | Objectives being defined in company mission statement | Objectives being defined in company mission statement |
| 6) Change in motivational practices | No incentives and rewards system | Staff are motivated by incentives and rewards system | Staff are motivated by incentives and rewards system |
| 7) Multiple channels for knowledge transfer | Confined to face to face | Internet access for customer request | Face to face, electronic forms of communication |
| 8) Senior management support | Management participation low | Indications of management support increases | Indications of management support increases |

*Table 3.4.*     Table format showing staff usage of WebAccounting about success factors theorised by Moody and Shanks (1999).

In relation to stage four, "Staff usage of WebAccounting in regard to success factors," the following points drawn from staff response to the matrix (table 3.4) during the interview can be made with regard to the eight points outlined above.

1. Concerning the extent of linking to economic performance, all of the six interviewees commented that WebAccounting project has saved significant amounts of money for Organisation A. However, the estimated total costs to the owner for implementing WebAccounting project was $98,400. Organisation A

anticipated increasing annual sales by Aus $ 30 million (from Aus $100 million to Aus $ 130 million) a year after implemented WebAccounting.

2. Concerning the scope of technical and organisational infrastructure, all of the six interviewees commented that this project used Internet and Intranet technical infrastructure, and the World Wide Web. For example, one of the interviewers commented that they were more relaxed with their daily tasks after the adoption of WebAccounting. WebAccounting not only make their work easier but also give them longer coffee breaks.

3. Concerning the degree of flexible knowledge structure, five of the six interviewees noted that the project involved different levels of structure concerning knowledge content. Some of these have sophisticated indexing structures, for example, information generated from the integration with the internal accounting and inventory systems or information transformed through search engines.

4. In the area of knowledge friendly culture, all of the six interviewees indicated that there was a positive attitude to knowledge sharing particularly from suppliers and among other staff. For example, supplier coordination, including smooth flows of information provides greater information linkage, enabling a competitive advantage over their rivals.

5. About the domain of clear purpose and language, all of the six interviewees stated that the project has provided staff and suppliers with access to on-line inventory request to support in inventory turnover. It also provided speedy information sharing with customers.

6. Concerning motivation to share knowledge, all of the six interviewees commented that the project has successfully proven that staff was motivated to share knowledge through an incentives or rewards system.

7. In considering the matter of multiple channels for knowledge transfer, five of the six interviewees stated that the project has provided two channels for knowledge transfer, both electronic. These are through the Internet for customers to access to the latest product information and through the listservers for staff to share knowledge and experiences amongst individuals.

8. In assessing the extent of senior management support, all of the six interviewees commented that the project has promoted by management, and secured their active participation.

In summary, WebAccounting has addressed to varying degrees of the eight success factors defined in the framework. WebAccounting has also successfully provided cost savings to Organisation A, flowing from improved information exchanges between its customers and its suppliers.

## DISCUSSIONS

This research was undertaken to establish whether the adoption of WebAccounting assisted Organisation A in understanding: (1) the value of its knowledge); (2) assessing how well that knowledge is being applied; and (3) providing strategies for managing and exploiting such knowledge.

I drew several points from these findings:

1. WebAccounting is identified as the most popular application used by staff of Organisation A. It is widely noted as being helpful in its virtual office environment as its geographically dispersed branches can collaborate and exchange information.

2. WebAccounting is able to provide network tools such as shared, indexed and replicated document databases and discussion threads, as well as shared white broads, joint document editing capabilities and full duplex, multimedia communication features. These tools serve to mitigate collaborative losses.

3. Substantial cost savings resulted because of improved information exchanges between Organisation A, its suppliers, and its customers. These tools serve to add value to Organisation A's products and the services to its customers. They also help Organisation A to gain a competitive advantage over its rival.

4. Using WebAccounting to do business may enable Organisation A to strengthen its control over its suppliers.

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These findings support the assertion that WebAccounting has assisted knowledge management within Organisation A, in line with Moody and Shanks' model for analysing knowledge management. Furthermore, these findings are consistent with previous American studies in knowledge management (Davenport, De Long, and Beers, 1998; Hansen, Nohria, and Tierney, 1998) and Australian studies (Moody and Shanks, 1999).

## 3.5. DISCUSSION REGARDING THE DEVELOPMENT OF THE RESEARCH APPROACH

This pilot study was at the beginning of the research interest in the use and adoption of WebAccounting as a tool in organisation knowledge management. Because of this, it reflects an early stage of my understanding of both knowledge management and research approaches. Perhaps its main benefits have been that it has enabled me to engage with the literature and to provide a general overview of organisational success factors related to WebAccounting.

The pilot study has attempted to address the question "How and why does the adoption of WebAccounting systems support knowledge management in facilitating organisational knowledge sharing and enhancing the environment in which knowledge artefacts are created and managed." Clues to the answer originate in the four stages of Moody and Shanks' theory. There they outlined the reasons why organisations were becoming increasingly aware of knowledge orientation, and the critical success factors and indicators that they need to identify for an effective and efficient knowledge management systems. As suggested by Davenport (1998) and Hansen (1999), an understanding of the above areas, as they relate to the development and adoption of WebAccounting may assists companies in the following ways:

1.  Firstly, an understanding of WebAccounting can give some insight into the development of critical factors that may lead to the success of building a tangible, pragmatic entity for knowledge management systems (Davenport, 1988b).

2. Secondly, an understanding of the features and functions of WebAccounting and their respective benefits may help companies to maximise the efficiency and effectiveness of adopting WebAccounting (Moody, L & Graeme, G 1999).

3. Thirdly, an understanding of the development of critical strategies may allow a company to identify, improve, protect and exploit the value of organisational knowledge (Remenyi D, 1999a).

I came to understand that such a general study would be of only limited significance because it was too broad to be of practical use for practitioners and theoreticians. I realised that I needed to focus the research interest in a specific area in order to make a significant contribution to knowledge in the field of information and knowledge management. I realised from my experience of the pilot study case study, and from installing and using WebAccounting, that my central concern was now in the area of the conversion of tacit to explicit knowledge (Wong, 2001c). I also realised that I would be able, from my experience as a consultant with Organisation A, to contribute positively by comment, analysis, and insight. As a consultant, I worked as part of the knowledge worker team and became a trusted member and part of the "tribe"; hence, I would be able to use ethnographic research approaches to deepen my analysis.

In terms of research method for the pilot study, I realised that limitations due to the number of research participants would be an issue. Such a small sample size would influence the value of the findings. Moreover, researching a single company made it difficult to generalise any findings, thereby risking the possibility of researcher bias (Sekaran, 1992, p. 18). However, the research method did employ certain elements of positivist approach in the formulation, testing and validation of Moody and Shanks' theory in that it specified the independent variables, dependent variables, and the relationships among them (Moody et al, 1999). The dependent variables represented the outcomes that the company was interested in achieving, while the independent variables represented factors that influence the outcomes their manipulation and changing is possible. The manipulation of the independent variables in order to achieve the desire levels in the dependent variables is a well-known problem.

I came to realise that by using a positivist approach, I had no choice but to engage in the research activities of "normal science," which were theory-driven, not practice-driven (Markus, 1994, p. 125). As mentioned by Benbasat and Schroeder (1997: p.38), theory driven research refers to empirical research with concrete recommendations, synthesis of prior research, and critical essays about practice, and practice driven research includes evaluation research and policy research with promising alternatives to applied theory research (Davenport, 1998b; Markus, 1989, 1994a, 1994b). While published practice driven research is usually by consultants, often this research suffers in that it seems to lack rigour (Guba, 1994, p. 114). Nevertheless, consultants are typically faster at identifying practitioners' needs for research, as they frequently produce good (if not rigorous) research as a key success factor in their relationship with their clients (Guba, 1994, p. 118).

On further consideration of the pilot study, I realised that there would be two general limitations with a research approach based within positivism (Wong, 2001c).

1.  With a focus on objectivity, research targets, and research methods, there arises a risk of an over-reliance on understanding conclusions based on the objective measurements within the positivist paradigm. For example, the social structures of reality are perceived by the positivist researchers to be *modelled* (rather than interpreted or recreated) and thus such researchers often make assumptions derived from moral judgement or subjective opinions (Guba, 1994; Chu, 1986). I quickly realised, however, that the subjective opinions and judgements I gained from my six months work experience as an internal consultant for Organisation A were very important sources of research insights.

2.  I further realised, that during my study of Organisation A, that in a positivist approach, deductive and inductive analysis can easily fail to capture important humanistic issues (Guba, 1994, p. 115). With a tendency to deny the role of some aspects of human judgement and experience, "data" has an artificial anthoritarian voice (Jonsson, 1991; Guba, 1994). For example, the positivist form of inquiry dominates reasoning in practical questions and thereby

reducing the importance of intentional human actions (Orlikowski & Baroudi, 1991 p. 114). Positivist research tends to set up controlled experiments so as to manipulate certain variables while keeping other variables fixed (Hirschheim et al, 1997, p. 5). By these means, the researcher seeks explanations through external and measurable factors, stimuli, to discover universal laws or principle that depict causal relationships (Hirschheim et al, 1997, p. 7).

## SUMMARY AND CONCLUSIONS

When I *looked back reflectively*, I noted that the pilot study of Organisation A was based on the assumption of using objective worldviews as resources in researching knowledge management systems (Hirschheim et al., 1997; Orlikowski & Baroudi, 1991; Hirschheim & Klein, 1989; Chua, 1986; Burrel & Morgan, 1979). From this, the controlling of human behaviour through instrumental and strategic actions within their knowledge management processes and practices allowed me to understand, characterise, and measure organisations and groups that were using a knowledge management system in some apparently objective manner. This led to my discovery that objective reality is largely independent of human subjectivity. Furthermore, employing the positivist approach in the prediction of and the understanding of human behaviour through the testing of Moody's framework of analysing successful knowledge management has failed to explain the historical and contextual influences on human action.

I am reminded of the work of Jonsson (1991) who recognised that survey research and controlled experiments do provide a rigorous basis for the statements that are made, but tend to cut the researcher off from discovery of non deterministic and reciprocal relations in social systems. Positivist research has institutionalised the criteria of validity, rigour and replicability that dominate the conduct of social research and tends to preclude the thought that humans can be active initiators of processes that may change the world (Hirschheim et al., 1997; Walsham, 1995; Orlikowski & Baroudi, 1991).

I realised that employing a purely positivist approach would be inadequate for my overall thesis investigation of WebAccounting as an agent in converting tacit to explicit knowledge, since my experience and research at Organisation A. could only inadequately represent 'truth' on the basis of a positivist view. I wanted to incorporate an understanding what Walsham (1995) refers to as connections and wholes concerning the use and adoption of WebAccounting.

I sought an alternative approach, and decided that the interpretivist research perspective might serve as an alternative to positivist research as it offered to address the issues that underpin my major research study that is, the argument that information is knowledge, and that information is also social (Jonsson, 1991). This means the assumption that the end-product of information is an interpretative act performed by an individual on data in context.

Although my Masters level research employed the positivist natural science paradigm, I began to doubt the adequacy of the approach concerning my WebAccounting research. Hence, I began a second pilot study in the use and adoption of WebAccounting. I decided to immerse myself in the interpretative research paradigm both for study experience and to understand better the use of knowledge management systems from another view. This view made known in the next chapter.

# CHAPTER FOUR: REFLECTION ON A KNOWLEDGE MANAGEMENT
## CASE STUDY WITHIN AN INTERPRETATIVE APPROACH.

*Interpretivism asserts that reality, as well as our knowledge thereof, are social products and hence incapable of being understood independent of the social actors (including the researcher) that construct and make sense of that reality.*

*(Orlikowski and Baroudi, 1991 p. 113)*

## OVERVIEW OF THE CHAPTER

This chapter provides another example of the use and adoption of the WebAccounting Knowledge Management systems (Wong, 2001b) but this time using Olikowski's and Baroudi's understanding of interpretivism. It was my second research pilot study in the use and adoption of WebAccounting. I conducted this research, involving what I have named "Organisation B" (Organisation B) in the beginning of September 2001 and April 2002. The findings of the first stage (conducted in Sept. 2001) of this pilot study were analysed and formed a paper, which I presented at the Second International Web-B Conference (Nov. 2001, Proceedings, Wong, 2000b). Followed up in April 2002 the second stage formed the continuity of this chapter. In this study, I decided to immerse myself in the interpretative research paradigm while experiencing the background and context of WebAccounting for my overall thesis. I present the research approach used in this chapter, based around ethnography and interpretivism, and then consider its suitability for my purposes and for this particular setting. As already mentioned in Chapter Three, where I describe my pilot study in employing elements of positivism, here, there was no attempt to predict human behaviour. I was searching for an authentic means of conducting, investigating, and recording my experience in the research field, with the use of ethnography supporting interpretative qualitative fieldwork. As mentioned by Prasad (1997, p. 100), the ethnographic approach depends heavily on

interpretivism, and incorporates three important elements: - (1) thick descriptions; (2) a focus on cultural context; and (3) immersion and connection. Thick description refers to a detail, comprehensive account of the research situation, and the need to represent multiple perspectives such as reflecting on the weak and marginalised as well on the strong and powerful. The cultural context of ethnography refers to how the determination of the research's shape is by the participant's interpretations of the research situation. Closeness within the social situation and personal connectivity with the participants are necessary elements of any ethnographic study (p.106). Prasad further identifies ethnography's anthropological tradition and with its "emic" focus, concentrates on local interpretations, and by the grasping of the insiders' point of view. Ethnographers "…try to understand any situation based on the meanings that it holds for relevant social actors" (Prasad 1997, p. 106).

I discuss what the literature presents as ontology, epistemology, theory and practice related to the interpretative approach. In describing and analysing WebAccounting, (a Knowledge Management system which had been adopted by Organisation B, I used Porter's (1986) traditional supply chain, and Papazoglou and Yang's (2000) Integrated Value Chain Analysis model to investigate the management of shared knowledge within Organisation B. WebAccounting's dominant investigative method is with an interpretative paradigm to provide relevant insights for my overall research and to exemplify the strengths and weaknesses of an interpretative research approach.

### 4.1. WHAT IS INTERPRETATIVE RESEARCH?

According to Walsham (1993, p. 4), interpretative research in information systems focuses on understanding the context in which the information systems is placed, and how that information systems influences and is influenced by that context. In contrast to the positivist views, the interpretative approach focuses on the understanding of human behaviour through social constructions such as language, consciousness and shared meaning from the participants who assign meaning to these phenomena (Meyers, 1994a, 1994b, 1995; Boland, 1991; Orlikowski & Baroudi, 1991). Interpretative research does not generally predefine dependent

and independent variables in a tight research design, but tends to focus on the complexity of human sense-making as the situation emerges (Meyers, 1995, p. 51). As mentioned by Burrell and Morgan (1979), Interpretivism seeks an explanation within the realm of individual consciousness and subjectivity. The interpretative approach aims at understanding the inter-subjective meaning embedded in social life to explain human behaviour and takes into consideration language and human communication (Gibbons, 1987, p. 3). Reality is assumed to be understood from the perspective of the participants who make sense of a situation and that social reality is interpreted by the researcher who examines it (Williams, 1996, p. 103). Thus, the interpretative approach asserts that human knowledge of reality, including the domain of human action, is a social construction by human actors, including the researchers (Walsham, 1993, p. 5).

## INTERPRETATIVE APPROACH – UNDERLYING ASSUMPTIONS IN KNOWLEDGE MANAGEMENT PROCESS AND PRACTICE

According to Orlikowski and Baroudi (1991, p. 113), the interpretative approach is based on subjectivist understanding of human behaviour in organisations. Interpretivism employs a dialectical hermeneutic approach, whereby hermeneutics is primarily concerned with the meaning of a text or text analogue (Myers, 1995, p. 51). This approach recognises the life-environment context, and thereby allows the researcher to study the mutual understanding among participants within the inter-subjectively shared worldview of participants (Orlikowski & Baroudi, 1991, p. 114).

### ONTOLOGICAL ASSUMPTIONS

Orlikowski and Baroudi (1991, p. 115) describe ontology as the nature of the world around us: ontology deals with the reality of knowledge. Generally, ontologically, researchers assume the social construct of the nature of reality through languages, consciousness, and shared meanings; however, it may be perceived and structured through ideas from various different languages and cultures (Walsham, 1995, p. 5). As mentioned by Orlikowski et al. (1991, p. 115), research employing interpretative elements concentrate on the study of ways in which social reality is a meaningful constructed status quo. This means that an

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interpretative approach deals with the nature of reality by claiming that no independent reality exits, but rather, an inter-subjective construction of the human own cognitive apparatus (Walsham, 1995, p. 6).

## EPISTEMOLOGICAL ASSUMPTIONS

Walsham (1995, p. 5), a leading advocate of the interpretative paradigm states that in an interpretative approach, the epistemological stance on the nature of knowledge claims that facts and values are intertwined and hard to disentangle. In a similar view, Orlikowski and Baroudi (1991) identify that epistemology as the ways and means by which we can obtain knowledge. They further comment that epistemological assumptions are concerned with the understanding of social processes, and involve getting inside the world of those involved in it. To this end, the research methods used, such as in-depth field studies in the form of case studies, ethnographic studies, and participant observation, generate knowledge using this paradigm (Walsham, 1995, p. 7).

## PROBLEMS OF INTERPRETATIVE APPROACH

Orlikowski & Baroudi (1991) and Walsham (1995b) assert that there are limitations to the interpretative approach to information systems research.
It is unable to evaluate critically ways of life observed by the researcher, and is therefore unable to analyse instances of false consciousness and domination, that prevents the actors from knowing their true interest (Walsham, 1995b, p. 380). For example, the researcher reproduces his personal reflection of internal perceptions rather than critically understanding the situations studied.

It ignores political activities and political interest's attempts to destroy a balance between individual and collective interest. For example, interpretative research avoids conflicts in goals and attempts to achieve consensus among participants in the Knowledge Management processes. This means interpretivism does not look at how a participant' understanding is distorted through false consensus, manipulation, and domination (Walsham, 1995a, p. 75).

The relevance of these points to the pilot study is detailed in the latter section of this chapter.

## 4.2. OUTLINE OF SUPPLY CHAIN MANAGEMENT AND KNOWLEDGE MANAGEMENT IN GENERAL

In this chapter, I present research accounts to examine the Knowledge Management processes and practices in a non-profit organisation named Organisation B. This pilot study was conducted in a manner that included interpretative elements. Michael Porter's (1985, 1986) value chain analysis and Papazoglou and Yang's (2000) Integrated Value chain Analysis model are used to provide insights into the challenges faced in the adoption of the WebAccounting system. In the past, organisations successfully used these models to evaluate the positive impacts of gaining competitive advantages. For example, "SET" (see www.setcom.org) used Papazoglou and Yang's (2000) Integrated Value chain model to support secure EDI, in which their transactions guarantee integrity of information, confidentiality and non-repudiation (Papazoglou & Yang, 2000, p. 8). Another specific example is "Common Ontologies" (see www.ontology.org) being developed in several industry sectors particularly in the U.S. It adopts Papazoglou and Yong's model to preserve and extend its EDI infrastructure, by leveraging semantics and structure of EDI standards such as "X12" and "EDIFACT". In this way, its workflow and business processes can communicate effectively with X12 and EDIFACT documents, and its trading partners can interact without misunderstanding (Papazoglou & Yang, 2000, p. 8).

It is conventional wisdom that in order to succeed in the digital economy, an enterprise must understand its core competencies and how it can maintain its competitive advantage (Wong, 2001b). Sometimes, the achievement of competitive advantage is by forming alliances with partners in order to provide customers with services that knit together seamlessly. Cambridge Technology Partners states that

*A value chain integration is the process in which multiple enterprises within a shared market cooperatively plan, implement, and manage*

*(electronically and physically)* the flow of goods, services, and information from point of origin to point of consumption. *(Cambridge Technology Partners Report, 1998, p. 10)*

## PORTERS VALUE CHAIN AND INTEGRATED VALUE CHAIN ANALYSIS MODEL

As shown in figure 4.1, Porter (1985, 1986) states that the value chain analysis model can be viewed as a method of looking at a business, with its main objective being to identify ways in which competitive advantages can be achieved. The model applies to situations involving different activity sectors such as: (a) organisational infrastructure, (b) human resources management, (c) information technology developments, and (d) procurement sectors. The five primary value adding variables are (a) Inbound Logistics, (b) Operations, (c) Outbound Logistics, (d) Marketing & Sales, and (e) Service. To use this model, all of the examined business activities sought ways of improving efficiency and cost reductions to increase profit margins.
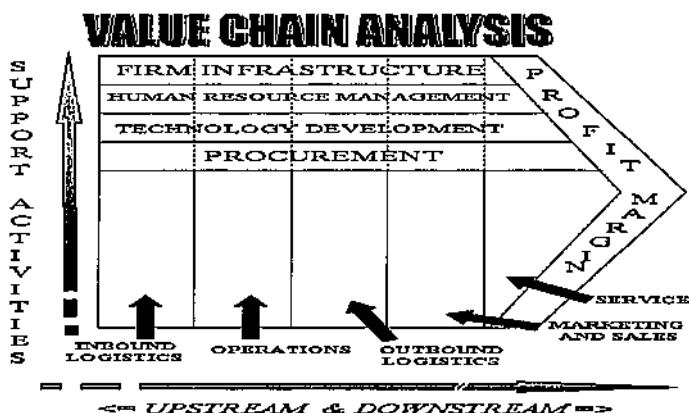


*Figure 4.1.* A diagram showing Porters Value Chain Model. (Adapted from Micheal E Porter, 1986)

Papazoglou & Yang (2000), authorities in supply chain management who applied the latest value chain model to information systems, state that the achievement of value chain integration is through a system of internal processes, programs, and data repositories. They need not stand alone, but interoperate with each other in order to support the supply chain of the organisation. Considered in this light, WebAccounting provides value chain integration, since its web-based integrated system uses the Internet to support links in the supply chain.

Papazoglou & Yang (2000, p. 2) further state that for a successful business to improve its e-commerce transactions, the integrated value chain systems should cut across departmental boundaries. WebAccounting allows for such an integrated view of business elements by allowing tacit and explicit knowledge sharing and distribution. Papazoglou and Yang also indicate that integrated value chain systems can be achieved through the utilisation of distributed workflow technology that allows business processes to be shared and passed across the value chain so as to create networks that could lead to more efficient organisations. The distributed workflow technology could be made up of integrated business functions, application program interfaces, and data warehousing from existing legacy systems. When describing Organisation B, I show that such a distributed workflow technology is available through WebAccounting.

### ROLE OF TECHNOLOGY CHALLENGES AND INTEGRATED VALUE CHAIN ANALYSIS MODEL

In this section, I shall turn to take a back-to-front tour through the value chain, looking briefly at technological challenges within each link. Figure 4.2 depicts the links in the value chain.

| Inbound Logistic | Operations | Outbound Logistics | Marketing/ Sales | Customer Service/Support |
|---|---|---|---|---|

**SUPPLIER**                                    **CUSTOMER**
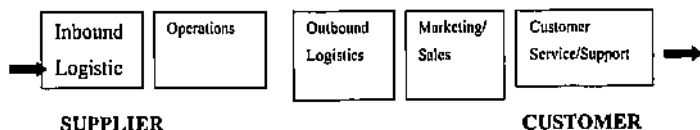
*Figure 4.2.*   Links in the Porter (1986) Value Chain model are shown as a series of stages.

According to a report by Cambridge Technology Partners (1998, p. 9), in the digital economy, an enterprise must have the ability to exchange data with suppliers quickly and easily, regardless of format. The report also states that data formats can be based on standards, such as Extensible Mark-up Language (XML) or Electronic Data Interchange (EDI). When employing WebAccounting, examples of value chain activities are:

1. Inbound Logistic.
2. Operations.
3. Outbound logistics.
4. Marketing/Sales.
5. Customer Service/Support.

*1.*   *Inbound logistics* systems must recognise and understand data originating outside the enterprise, and replicate and transform it for use in internal and external downstream processes. Examples are inbound e-mail and posting.

2.   *Operations systems*, which include repositories for storing explicit knowledge, form the centre of the value chain. In the digital economy, all-operational activities can share data at maximum network speed among internal and external partners, thereby performing value-adding processes.

*3.Outbound logistics* activities involved individual staff roles and tasks associated with managing the customer and supplier relationship. To

integrate transactions into accounting and purchasing systems better, the outbound logistic system facilitates electronic invoicing.

4. *Sales, marketing, customer's service, and support* are the customer-facing links of the integrated value chain. In the digital economy, customers are required to have an authorised read-and-update access to enterprise data that will supersede obstacles presented by an operational, internal application silo. In return, the companies can interact with customers through a variety of delivery channels. Consequently, this provides companies with the chance to consolidate, aggregate, and deliver data over the Web and any other outbound channels intuitively and immediately (Cambridge Technology Partners' Report, 1998, Pp. 9-10).

Having identified how organisations can gain competitive advantages through the literature of Porter's supply chain management and Papazoglou's & Yang's (2000) integrated value chain management, the next section describes the empirical research on Porter's supply chain management of Organisation B. Section 4.4 outlines the theoretical framework used to examine the use and adoption of Organisation B's WebAccounting system. Section 4.5 outlines the research methodology for this pilot study. Section 4.6 presents discussions of the findings with arguments directed to the literature, and concludes with discussions regarding the development of the research approach.

### 4.3. BACKGROUND OF ORGANISATION B.

Organisation B is a worldwide movement of people who campaign for human rights. It is independent of any government, political ideology, economic interest, or religion and mobilises volunteer activists in more than 140 countries and territories in every part of the world. To help raise funds it sells a variety of merchandise to its members and to its supportive customers. The Australian branch of Organisation B has been open since 1977, and the Branch Executive Committee forms the base of its management structure, which consists of a President and a Vice-President, a Secretary and a Treasurer. There is a committee composed of ten members, who coordinate and provide help for action plans and campaigns. The Australian branch currently has only ten paid full-time staff

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members, and income comes from Government grants, membership subscriptions, pledging, direct mail campaigns, and other fund raising activities such as Star Day. The Australian branch has also opened three souvenir shops, which sells Organisation B's merchandise and souvenirs.

Deposits of income to the National Income Account come from allocated membership fees. Other income generating activities specifically relate to branch operations such as, the Star Day Group, and other events and merchandising income are directly deposited to regional accounts which helps offset operating costs.

The Australian branch has a few other small working groups. These work groups organise individual or joint events and help to organise the main fund raising event, Star Day. The regional office currently has seven letter writing Networks operating. This is in addition to the general "Urgent Action Network." Also there are a range of specialist networks focussing on the areas of health, legal issues, religion, women, unions, journalists, and writers.

The "Urgent Action Network" currently has 1250 members, and includes community groups and over 30 school groups.

In 2000, the legal network responded to about 30 "Urgent Actions" pertaining to legal issues such as imprisonment without fair trial, the death penalty, and threats to and intimidation of human rights lawyers and other legal professionals.
The Religious Persecution Network includes individuals, schools, and church groups. Members receive "Urgent Action" cases from a range of countries as well as information about the international campaign called the Universal Declaration of Human Rights campaign. The Health Professionals Networks also distributes letter-writing actions to its members of the network as well as publishing articles in the AMA bulletin.

In the next section, I shall turn to address how Organisation B's strategic plan translates into critical success factors.

Organisation B's strategic business planning process begins and interacts with its mission and long-range goals and objectives. These goals and objectives promote the observance, through out the world, of human rights as set out in the Universal Declaration of Human Rights, through impartial action and the international solidarity of a worldwide movement of people.

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From this Organisation B's goals and objectives translate into critical success factors. These critical success factors address the success measurement criteria for Organisation B's Knowledge Management systems design, and its development activities at the tactical, operational and control levels. However, these critical success factors would also enable Organisation B to produce quality services to satisfy its members and customers. These critical success factors are:

1.  *Implementing, utilising and improved Knowledge Management systems.*
    Improvements in increased levels of Knowledge Management makes information easy to find and share, as content/document management, correlation and indexing information, dynamic publishing and customer profiling can facilitate collaboration. Consequently, an increase in collaboration stemming from improvements in personnel efficiency would lead Organisation B to achieve productivity gains.

2.  *Integrating marketing functions with the Internet*
    Savings may also be realised from efficiencies, eg, using the Internet as a medium for campaigning for human rights. Organisation B can create savings on the promotion of the observance of human rights by making information easily and widely available on the Internet. With greater ease of information accessibility, its members' satisfaction might actnally increase.

WebAccounting would assist these critical factors and to support Organisation B's attempts to achieve an integrated view of all business elements that cut across departmental boundaries and assist them to manage the entire operational flow of the business.

## EMPIRICAL RESEARCH EMPLOYING PORTER SUPPLY CHAIN MANAGEMENT ON ORGANISATION B.

I use Porter's value chain analysis framework to outline Organisation B's business-to-business supply chain and to investigate the impact of implementing WebAccounting. This allows large volumes of information to flow across organisational boundaries, thereby transforming the relationship between trading partners.

The first part of this section is devoted to exploring the following factors:
1. The nature of markets and distribution channels,
2. Organisational structure and process;
3. Buyer power influence and the implementation of WebAccounting with the organisation's suppliers, members, and customers.

In Organisation B, staff members are constantly exchanging information about their activities with their suppliers, their members and customers through business meetings, exchange of docur ₋. by telephone, telex and by using facsimiles. The implementation of WebAccounting would facilitate data warehousing as it allows large volumes of information to flow across organisational boundaries.

Holland, Lockett and Blackman (1992a, p 541, 1992b) suggested that "the general organisation can cover the whole of the supply chain from inventory to customers and for each industry sector the number of stages may vary." Figure 4.3 depicts the links of the supply chain for Organisation B.
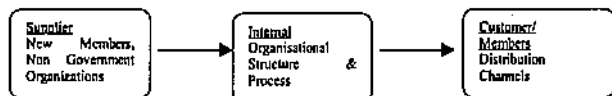


*Figure 4.3.* Links of supply chain for Organisation B

WebAccounting is applicable in many parts of the chain. I have aggregated the chain in order to produce a general conceptual solution for Organisation B,

showing a reduction in the number of stages to three main ones- (a) supplier, (b) internal/organisational process, and (c) customer/members.

These stages enabled the management team of Organisation B to develop a generic scheme of supply chain management for them to use regardless of their position in the chain.

### SUPPLIER-RELATED CHANNEL

Holland, Lockett and Blackman (1992a, p. 540) state that "The strategic EDI model contains several factors such as supplier-related stage, internal operations and customer-related channels, which are important for planning EDI links with suppliers. In the past, only companies with a dominant market share were able to impose trading terms on suppliers that included EDI arrangements." However, the trend has changed. The implementation of WebAccounting in Organisation B has enabled them to be able to control their suppliers in the end.

### INTERNAL OPERATIONS CHANNEL

Holland, Lockett, and Blackman (1992a, p. 541) also state that "The internal operations were concerned about the implication of WebAccounting with suppliers and customers on internal operations, and how these can be exploited for the benefit of the organisation."

In Organisation B's case, WebAccounting has created a knowledge repository for storing explicit knowledge. It has created a virtual 'information Library' accessible 24 hours a day by Organisation B staff across all branches within Australia. This results in improved information exchange resulting in increased intangible benefits, cost reductions and quality improvements.

### ORGANISATIONAL STRUCTURE AND PROCESS CHANNEL

Holland, Lockett, and Blackman (1992a, p. 541) also assert that electronic data interchange may link customers with suppliers thus affecting the nature of business relationships. For example, individual roles and tasks associated with

managing customer and supplier relationships therefore change. From this, the achievement of staff and cost reductions throughout the whole organisation took place and this demonstrates an extension of the value chain.

For Organisation B WebAccounting became important for information sharing with both suppliers and customers, for strategic communications between their subsidiary companies, and for information application processes, such as order entry. WebAccounting has also enabled Organisation B to facilitate electronic invoicing to integrate transactions better into accounting and purchasing systems. These processes have resulted in better quality and timeliness of information so that orders can be placed more frequently and in smaller, but economic, quantities.

### CUSTOMER-RELATED /DISTRIBUTION CHANNELS

In Organisation B's case, the number of ownership stages measures the length of the supply chain from its supplier to its customers. If there are a high number of ownership stages, it is more likely that it involves a traditional chain of market hierarchies (ie producer, wholesaler, retailer, and consumer). However, a potential alternative chain for Organisation B to utilise would bypass the wholesaler, resulting in a lower purchase price for its customers. In reality, Organisation B is likely to retain as high a portion of the savings enjoyed by its customers and members as is allowable.

In Organisation B's case, the introduction of WebAccounting and its subsequent integration has led to gains in efficiency and a reduction of manual data entry errors. This can be coupled with redirecting employees from tedious manual tasks to resolving critical business issues in order to improve margins, reduce inventory levels, improve internal processes, and otherwise reduce extraneous costs.

In summary, the above empirical study of Organisation B, employing Porter's supply chain management, provided valuable insights into the challenges of using and adopting WebAccounting systems.

## 4.4. THEORETICAL FRAMEWORK FOR EVALUATING THE COMPETITIVE ADVANTAGE OF ORGANISATION C ADOPTING WEBACCOUNTING

In this section, I describe the theoretical framework of Papazoglou and Yang's (2000) Integrated Value Chain Analysis for investigating information flows of organisational business processes and focus on competitiveness and the role of technology (refer to fig. 4.4). The integrated value chain analysis has assisted Organisation B in regard to the extent in which its staff members were involved in different functions (ie. general management and regional action networks staff and technical staff).

*Business Value*

| Integrated Value Chain for Organisation B | |
|---|---|
| Business Transactions<br>Intranet/Extranet integration tools used for its business outputs involving education issues, human resources issues, day-day sales operations issues, activism activities etc | Converged<br>E-Commerce |
| Process Automation<br>The integration information flow of administration, finance, marketing, human resource management processes etc. | Workflow |
| Information Sharing<br>Content/document management, correlating and indexing information from activist groups, volunteers speaker groups, staff interactions, information gathered from members and the community as a whole | Collaboration<br>Knowledge<br>Management |
| Information Access<br>Quarterly and annual reports, business information kits, merchandise catalogue, public events etc | Electronic<br>Publishing |

*Efficiency/cost Savings*

*Figure 4.4.* The proposed integrated value chain model for organisation B

As we can see in this proposed framework, WebAccounting is taking on a much broader and more strategic role in support of business requirements- one that goes well beyond the efficiencies and cost savings to be achieved through electronic publishing.

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## RESEARCH QUESTION OF THIS CHAPTER

Specifically, here I consider the following research question.

> What insights, especially regarding competitive advantage and the management of knowledge in an organisation in the context of the adoption and use of WebAccounting, can be gained by using Porter's value chain model (1986) and Papazoglou & Yang (2000) value chain integration model, researched using a largely interpretivist approach?

## RESEARCH METHOD (SEE APPENDIX 2)

In an attempt to answer the above research question, this chapter incorporates a pilot case study of a non-profit organisation - Organisation B. The following research method is applied only to this pilot study in this chapter. It provides me with valuable context and background for understanding the research paradigm towards my major research, which I will discuss in Chapter Six. This was my second venture into case study research; the first discussion was in Chapter 3.

According to Yin (1994), case study methodology has often been used in information systems research, and it is usually qualitative in nature. This method of research involves observation of a particular group of people or an individual. In a similar vein to Yin (1994), Burns (1994, p. 365) states that in a case study research, a variety of observation and interview methods can be used as major tools to collect data, hence enabling the researcher to focus on the subjects, contexts and setting of the study.

## RESEARCH DESIGN

In my attempt to use an interpretative approach, embodying rich pictures, I have been influenced by Checkland's (1972, p. 87) soft-system methodology (SSM). As mentioned by Checkland (1972, 1991), SSM allows 'what is' and 'what could

be' to exist simultaneously for a researcher investigating a real-world problem. This allows the development of an impression of the 'situation of concern', and accommodation of large numbers of ideas making progress towards a consensus of ideas (Duczynski, 2001, p. 20).
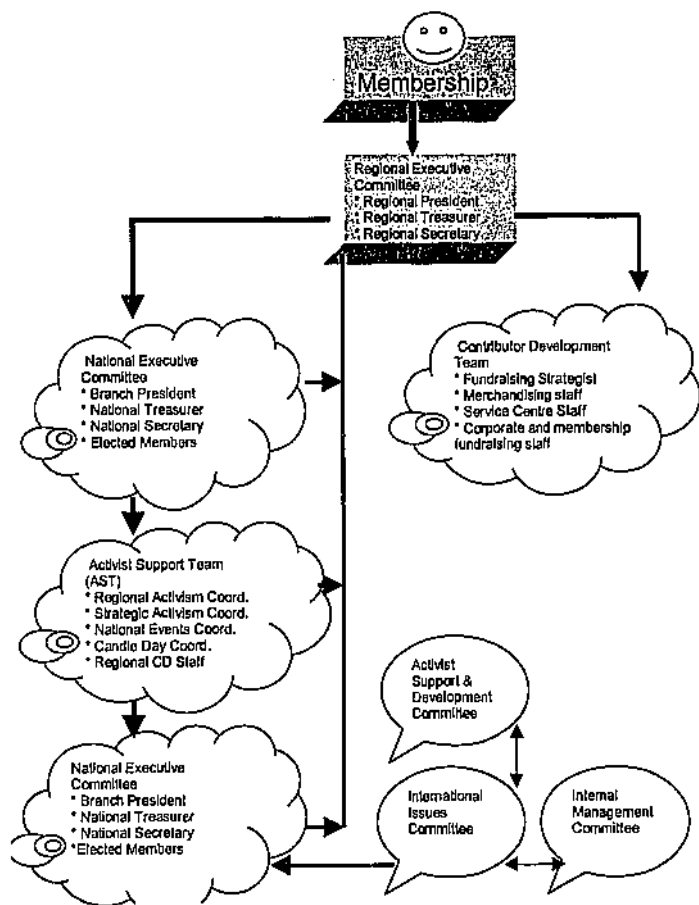


Figure 4.5. Rich picture of Organisation B

Rich pictures are receiving recognition as a significant form of imagery, a form that can interweave the factual with the *feel* of a situation. As mention by Duczynski (2001, p. 22), rich pictures allow complete expression of events and relationships. They bring emotions and interpretations that are superior to written text, as they convey meaning beyond the metaphorical, as they encourage a deeper and more personal level of analysis.

Rich pictures encourage a qualitative analysis and an expression of ideas that requires the drawing of pictures as well as taking notes and writing prose (Checkland, 1991, p. 45). My rich picture in Figure 4.5 is a form of the issue I faced and even though it does not align exactly with the SSM approach, it was valuable to me as an aid to understand the function of Organisation B. In the rich picture, people occupy various positions within the organisations and these positions offer various pieces of information for consumption, and conceal others (Duczynski, 2001, p. 22). In my rich picture (fig. 4.5), I was more concerned with the people and the information resources available to them. My role was to secure an approach for bringing the people and the information together; blending them into a single well functioning associate that fosters shared understanding and knowledge.

### RESEARCH SETTING

In this study, the dialectical hermeneutics approach was used to interpret the data (Yin 1994). The source of the research methodology used for this particular study was a case study within an interpretative approach.

According to Boland (1991, p. 439), "Hermeneutics is the study of interpretation, especially the process of coming to understand a text. Hermeneutics emerged as a concern with interpreting ancient religious texts and has evolved to address the general problem of "How we give meaning to what is unfamiliar and alien" (p. 440). In short it is concerned with the meaning of a text or text analogue. The data in this study, (the interview transcripts and reflective practitioner data), were analysed in terms of themes, motifs and key words.

In collecting the data from Organisation B's management team, key players were identified from Organisation B's and six individuals (the regional co-ordinator, two administration officers, and three field officers) were interviewed. The interviews were semi-structured and later transcribed. Each interview took two hours to complete and focused on the objectives of the particular area of Knowledge Management which the individual was involved. The networks, which were shaping the diffusion, design, and implementation processes, were also scrutinised. In addition, informal conversations and documentary evidence were used in order to obtain rich process descriptions of the project (Sekaran, 1992, Yin, 1994).

This case study explores the relationship between the analysis framework of the integrated value chain adapted from Porter (1986) and the architectural framework proposed by Papazoglou (2000). It also examines the factors that drove the integrated value chains and the interoperability of WebAccounting systems in the context of Knowledge Management.

A summary of the data sources used to answer the research question is presented in Table 4.1

| | Method |
|---|---|
| 1. To what extent does WebAccounting allow customers to purchase products, make contributions Online, and how does integrating the customer service application with the purchase process, will save money? | Semi-structured interview with the regional co-ordinator, Observation during activity time, Fieldnotes. |
| 2. What do you think of WebAccounting as a means of improving interoperation support for e-commerce, and its evolution from the current simple page-serving environment to rich application platforms providing server-side application runtime engines? | Semi-structured interview with administration officer No 1, Observation during activity time, Fieldnotes. |
| 3. What do you think of WebAccounting's abilities in enabling intellectual property management, | Semi-structured interview with field officer No 1, Observation during activity time, |

| | |
|---|---|
| document management, correlation, and indexing information and dynamic publishing on The World Wide Web? | Fieldnotes. |
| 4. What do you think of WebAccounting's abilities in allowing information dissemination to customers or members over The WWW, which results in more marketing or public activities being organised by the customers/members, themselves? | Semi-structured interview with administration officer No 2, Observation during activity time, Fieldnotes. |
| 5. What do you think of using WebAccounting to expand into new channels of collaboration with external parties and supplying new market segments through electronic commerce? | Semi-structured interview with field officer No 2, Observation during activity time, Fieldnotes. |

*Table 4.1.* Data Sources to answer the research questions.

## ANALYSING THE DATA

The process of the investigation began with a semi-structured interview with the six participants. In the course of these interviews, I was able to establish a rapport with the participants (Goffman, 1971, p. 365). I was also able to collect some background information regarding their perceptions, beliefs and awareness of what constitutes effective Knowledge Management through the adoption of WebAccounting, as well as establishing a rapport with the participants

## RELIABILITY AND VALIDITY

Burns (1994) claims that a researcher can employ triangulation techniques to ascertain reliability and validity in case study research. Triangulation in information systems research involves the use of two or more data-collection methods to check for consistency of the emerging findings. This helps prevent the researcher from accepting too readily the validity of the initial findings. Thus, to ensure reliability and validity of this study, I used the following data collection methods: 1) non-participant observations, (2) semi-structured interview with the 6 participants, and 3) specific reflections by the six participants.

## METHODOLOGY LIMITATIONS

As with any research, there were methodology limitations: in this case, these included:

1. Restrictions of qualitative research,

2. Availability of interviewees,

3. Numbers involved in the case study, including both sample size and selection procedures.

## LIMITATIONS OF QUALITATIVE RESEARCH

Unlike quantitative research, which has a strict set of procedures for each technique used, the nature of qualitative research allows for a greater flexibility of the interpretation of the results (Denzin & Lincoln, 1994; Copper, 1999, p. 2). This flexibility means that there is a lack of comparability between interviews because of the lack of standardisation (Sampson, 1996, p. 331). The lack of standardisation in interview outcome that results from this study requires that the researcher to draw intelligent conclusions from the general view presented by those interviewed.

## LIMITATIONS OF AVAILABILITY OF INTERVIEWEES

The busy schedules of essential players in the participating organisations inevitably placed time limits on interviews. At times, responses to questions asked were rushed. I made follow up calls to minimise these drawbacks, and to clarify uncertain areas and probe questionnaire issues further.

## LIMITATIONS OF THE CASE STUDY, BOTH IN SIZE AND SELECTION.

The limitation of sample size is largely due to financial constraints; availability of existing users and the fact that there is only a handful of organisations in Australia that have adopted WebAccounting. In addition, this study is limited to a large state of Australian based organisation. Comparability with organisations using WebAccounting in other Australian states and abroad is therefore limited.

### 4.5. FINDINGS

In this section, I describe and analyse the case study of the employment of WebAccounting as a Knowledge Management system at Organisation B. This includes scrutiny of Papazoglou and Yang's (2000) Integrated Value chain model as well as employing an approach adopted based on ethnography and interpretivism.

In figure 4.5, the proposed integrated value chain model adapted from Papazoglou and Yang (2000), outlines that the greater the ability of an organisation in extending its WebAccounting applications, the higher the value of the model's applications, leading to higher returns (refer to figure 4.5). Although the lower level applications deliver cost savings and efficiencies, the upper level applications create increased organisational advantages for resources and efficiency of operations. For example, publishing quarterly & annual reports, the member's directory, a diary of events and activities etc, by means of an electronic publishing application, can provide high value in many areas such as time, paper, printing and postage costs.

**Question One:**

**Eddie Wong:** To what extent does WebAccounting allow customers to purchase products, and make contribute online, and how does integrating the customer service application with the purchase process, save money?

**Regional co-ordinator:**

"Yeah, we use [the Internet] to advertise. Mostly though it is just to promote, our organisation and we only do this through our Web site and web portals (Yahoo, Ozemail etc). Using banner ads, recently our market segment growth has increased significantly. We rely on WebAccounting systems very heavily though. Through WebAccounting, we established ourselves as a virtual business. People know that we are on-line and the

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only way one can tell these people effectively is by advertising through the Internet." <SOI, April, 2001, file 1, page 1>

> *On reflection, it can be deducted that the regional coordinator was confirming that Organisation B added leverage to its resources by moving from a lower end, (ie. the information access platform) to a higher level, (the information sharing platform of the model as shown in Figure 4.4, the integrated value chain model). The higher level of application creates increased business value and further increases the efficiency of the operation.*

**Question Two:**

In some cases, integrated security, encryption, indexing, messaging, scheduling and database services are included in WebAccounting. This has enabled Organisation B to look beyond the electronic publishing application to the business processes and opportunities at the lower end of the model, as the admin Officer outlines next.

**Eddie Wong:** What do you think of WebAccounting as a means of improving interoperational support for e-commerce, and its evolution from a simple page-serving environment to the rich application platforms providing server-side application runtime engines?

**Administration Officer No 1:**

"For the first time in Organisation B history we used The WWW Internet media for a fundraising campaign. The campaign was also designed to raise public awareness of Organisation B concerns with the East Timor crisis and to build long-term support for our organisation through obtaining new contributors. By using WebAccounting Systems, we implemented the design and media placement, which we have been working with for some time. The results from this campaign easily surpassed any recent fundraising campaign undertaken by Organisation

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B. Overall we secured 845 new members and received donations from 442 individual who had not given previously to Organisation B. A total of over $ 240,000 was raised from members through a direct Internet mail appeal." *<SO2, April, 2001, file 2, page 1>*

> *It is apparent from the administration officer's response that Organisation B has moved up from an information-sharing platform to the process automation platform of the integrated value chain model (fig 4.4). This advancement in WebAccounting's application shows that Organisation B has increased business value and efficiency of operations.*

**Question Three:**

In general, profitability from organisational activity on the Web comes from productivity savings, information management savings, and incremental or new revenue streams (eg. The simplified collection of membership fees). Productivity savings arise from a reduction in order and processing costs, and a more efficient information management. Improvements in information management make information easier to find and share with colleagues. For Organisation B, WebAccounting supported more efficient intellectual property management, document management, the correlation and indexing of information, and dynamic publishing on The World Wide Web. The database management system in WebAccounting allows for profiling of customers, which facilitates target marketing and specialised customer service. Such customer profiling allows for customer integration and participation, which lead to further productivity gains for Organisation B. For example, in the area of information sharing it involved content/document management, correlating and indexing information from activist groups, volunteers speaker groups, staff interactions, information gathered from members and the community as a whole.

**Eddie Wong:**

What do you think of WebAccounting's abilities in enabling intellectual property management, document management, correlation and indexing information and dynamic publishing on The World Wide Web?

**Field Officer No 1:**

During the peak of the crisis, a team of crisis response network was set up in Darwin. A principle objective of the Darwin team was to gather information about the crisis in East Timor and together with the sending of this information to head office. Then this information was used to produce press releases, public documents and action materials for Organisation B members. WebAccounting systems helped the completion of the design and media placement. Throughout the year, Organisation B increased its lobbying of the Australian government with delegations and submissions to ministers and government departments. Our advocacy efforts continue to be successful. Our new recruitment of members achieved a modest growth. Without WebAccounting system, Organisation B's capacity to raise collaboration among members in advocacy particularly in an increasingly complex world would be seriously restricted." *<SO3, April, 2001, file 3, page 1>*

*Here, field officer No 1 confirms that the application has progressed from the process automation platform to the business transaction platform of the integrated value chain model (fig 4.4). Thus, an increase level of application provides increased business value and efficiency of operations for Organisation B.*

**Question Four:**

Savings have been realised from improved efficiencies in the marketing, services and public activities organised by Organisation B. WebAccounting allows for information dissemination to customers or members over The WWW, which results in more marketing or public activities being organised by the

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customers/members, themselves. This lowered Marketing costs through reduced brochure printing and distribution. In addition, expenditure related to business and public functions also lessened from making information easily and widely available. Due to more efficient information access, customers/members of Organisation B feel more involved and more satisfied with the organisation's level of service.

**Eddie Wong:** What do you think of WebAccounting's abilities in allowing information dissemination to customers or members over The WWW, which results in more marketing or public activities being organised by the customers/members themselves?

**Administration officer No 2:**

"One of the major public activities of Organisation B is Star Day. The essential function of Star Day is to raise awareness of current campaigns. As a member of Organisation B, we can play a vital role by acting to support our campaign. I would like to see more effort put into publicising Star Day on The WWW. We rely on digital posters, media ads, and making contact with people through the Internet. I am not overly worried about producing publications that meet all of the member needs. Such task can easily be taken care of through WebAccounting systems" <*SO4, April, 2001, file 4, page 1*>

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*Administration officer No 2 is recounting that as the organisation's businesses activities are converging towards e-commerce, an improved operations efficiency and savings can be realised.*

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**Question Five:**

Fifthly, incremental or new revenue streams are available for organisations participating in digital commerce, through, for example, online sales, advertising revenues, or information brokering in this case Organisation B. Incremental revenue has been achieved by using the Web to expand into new channels of

collaboration with external parties and supplying new market segments through electronic commerce.

**Eddie Wong:** What do you think of using WebAccounting to expand into new channels of collaboration with external parties and supplying new market segments through electronic commerce?

**Field officer No 2 said:**

"My wife, Kelly, and I have successfully created and maintained a vast retail card-selling network through the Internet. In the early 90s, we used to travel far north from Gympie in Queensland to south Woomera in South Australia. We regularly visited retail outlets and making friends for Organisation B along the way. We worked on all levels of the card-selling business, from the commissioning of the original work of Australian artists, to printing, packaging, and distribution. With the implementation of WebAccounting systems in the beginning of 2001, we have expanded our market segments. Through the Internet, we have successfully increased our sale into thousands of dollars. The result of these labours to date has been thousands of cards sold, and over $200,000 raised for Organisation B, and the employment of a permanent card coordinator in the Victoria Branch."

*<SOS, April, 2001, file5, page 1>*

*On reflection, it is obvious from the Field Officer's comments that as the organisation's businesses activities converge towards e-commerce, improved operation efficiency and savings are being realised. The availability of this increased revenue will support both old and new projects.*

## 4.6. DISCUSSIONS

Overall, the case of Organisation B has shown how the implementation of WebAccounting has successfully increased the number of electronic connections, simplified inter-organisational processes and at the same time revealed new ways to shrink, speed up, and virtualise the organisation's supply chain. This study also

addresses the manner that WebAccounting technologies have triggered competitive advantages of and increased revenue for Organisation B, that is:

1.  By improving management, planning, forecasting and replenishment from reduced stock outs, lower cost through reduced inventory and reduced returns;
2.  By increasing the revenue base through faster product introductions and decreasing marketing costs and increasing revenue from higher quality goods for sale;
3.  By improving design, product management, through faster time to market and lower distribution cost; and
4.  By improving the management of the merchandising/category through the use of more advantageous and effective pricing and promotional strategies.

The case of Organisation B has shown how the social and technological aspects of the WebAccounting system can assist organisations and individuals to manage organisational knowledge to create sustainable competitive advantage. This finding appears to be consistent with two previous American studies (Cambridge Technology Partners Report, 1998; Holland, Lockett and Blackman, 1992a, 1992b). Cambridge Technology Partners Report (1998) studied the effectiveness of electronic data interchange (EDI) Web-based systems as a tool that created competitive advantage to the organisation. Holland, Lockett, and Blackman (1992a, 1992b) explored the supply chain management strategies for an organisation. They discussed the role of value chain integration in increasing customers' perceived value and investigated the information flows of business processes through the adoption of electronic data interchange (EDI) Web-based systems. The conclusion identified that the integrated value chain system of WebAccounting could support the integrated view of all business elements that cut across departmental boundaries. In addition, it also allows business processes to be shared and passed across the value chain so as to create networks of highly efficient virtual organisations, which would be impossible to achieve through the conventional business paradigm (Papazoglou, 2000).

**DISCUSSION REGARDING THE DEVELOPMENT OF THE RESEARCH APPROACH.**

This research account looks into three prominent issues in relation to the conduct of empirical work on the interpretative case study of Organisation B.

1.   The role of the researcher in dealing with the complex human process in capturing, understanding, filtering and analysing other people's interpretations and conceptual apparatus before feeding a version of events back to others.

2.   The use of interviewing techniques that were concerned with the style, skills, personality, reporting and sensitivity in judging and conducting the interviews.

3.   The reporting methods of the researcher interpretations of other people's interpretations concern the successful adoption of WebAccounting in supporting Knowledge Management at Organisation B.

This study presented research accounts of the interpretative approach and is based on the understanding of human behaviour through social constructions such as language, consciousness and shared meaning from the participants (Alversson & Willmott, 1992a, 1992b). This approach attempts to recognise the subject matter of the inquiry with the life-environment contexts. It attempts to understand how staff of Organisation B, through their participation in Knowledge Management processes, enact their particular realities and endow them with meaning so as their meanings, beliefs and intentions can help them to constitute their social action.

The above discussion led me to think about an important issue; that is, can an in depth study with an interpretative approach allow me to successfully conduct the research in examining the conversion of tacit knowledge to explicit knowledge through adoption of WebAccounting?

Having conducted the pilot case study of Organisation B's using the interpretative approach, I found that it did not sufficiently address the critical social theory issues. Critical social theory perspective is an integrative theoretical framework,

combining interpretative and critical elements. Walsham, (1993, 1995a, 1995b) and Orlikowski & Baroudi (1991) state that critical social theory approach is an attempt to dissolve the boundaries between the Interpretivists and critical research traditions, which have usually been seen as quite distinct. Walsham (1993, 1995a, 1995b) identify that critical social theory emphasises both the importance of subjective meaning for the individual actor and their place in the current social structure. Critical social theory refers to the understanding about the nature and interaction of social (the inter-subjectively shared world), human (the subjective world), and technical (the objective world) (Ngwenyama & Lee, 1997b).

## EPILOGUE

The critical social theory perspective recognises the process of learning and the behaviour of practitioners who have to traverse a variety of sub-cultures within organisations (Orlikowski & Baroudi, 1991). After reading research literature in the field of critical social theory from Guba (1994), Chua (1986), Habermas, (1984, 1987), Alvesson & Willmott, (1992a, 1992b), Glesne & Peshkin (1992), Moon (1999), Orlikowski & Baroudi (1991), I decided to employ the critical social theory perspective in an effort to understand the social contradictions and conflicts inherent in the existing social structures of organisations and society through self-reflection in the hope of human emancipation (Alvesson & Willmott, 1992b, p. 434; Orlikowski & Baroudi, 1991, p. 19). Critical social theory asserts that established systems of domination alienate people from self-realisation, restrict human potentiality (Chua, 1986, p. 618). According to Held (1980, p.16) and Ngwenyama & Lee (1997b, p. 5), critical social theory takes into account the human construction of social forms of life and the possibility of their re-creation in an historical context. They further commented that it aimed to also lay the foundation for explorations in an interdisciplinary research environment, that is questioning the conditions that make possible the imitation and transformation of society, the meaning of culture, and the relation between the individual, society and culture.

The following chapter describes the theoretical framework used in my major research, critical social theory. This aims to critique both ideology in social

theory and its methods, such as the identity of scientism, and then to develop an organisation science that is capable of changing organisational Knowledge Management processes through the dialectical approach (Alvesson, 1992a, 1992b) or communicative interaction (Habermas, 1984, 1987a, 1987b, 1987c).

# CHAPTER FIVE

## PHILOSOPHICAL THEORETICAL METAPHORS AND RESEARCH METHODOLOGY

> Self-reflection leads to insight due to the fact that what has previously
> been unconscious is made conscious in a manner rich in consequences.
> (Jurgen Habermas, 1974, Theory and Practice. p. 23)

### OVERVIEW OF THE CHAPTER

Habermas's astonishing quote beginning this chapter above relates to both developments in my research methodology and theoretical frameworks, which I describe in this chapter. Note how Habermas reveals the relationship between self-reflection and the unconscious and then propels us to consider what could be the rich consequences. Some of these rich consequences (Williams (2003) tends to use the term "enormous benefits") for me begin by my describing and justifying my various writing styles in this chapter. As this process progressed, I found it inevitable that I disclose relevant aspects of my worldview and personality type.

Repeating for clarity, this study adopts an ethnographic, critical social theory approach, including elements of the heuristic inquiry approach. It aims to elicit inner dialogue and open discourse responses using one-on-one interviews within a phenomenological, reflective practitioner methodology which, as well as bringing forth research insights, has the added benefit of encouraging inner growth leading to balanced wholeness within the individuals involved. That is,

following Williams' (1996) reading of Habermas' critical theory of interpretation, I came to understand that Habermas pursued a dialectical integration of the dialogue between explanation and existential understanding (Stickle, 2002, p. 1). Stickle further mentions that Habermas describes different paradigms of interpretation which involves both discourse (written text) and dialogue (hearing and speaking). Discourse differs from dialogue because in discourse: (a) meaning is detached from the original circumstance that produced it; (b) the intentions of the author are distant; (c) and the addressee is general rather than specific and ostensible references are absent (Stickle, 2002, p. 2). On the other hand, Habermas argues that through dialogue the objective meaning may be released from the subjective intentions of the speaker (Habermas, 1984,1987). That is, objective meaning allows multiple acceptable interpretations of intended meanings. The important corollary is that these multiple meanings may be constructed not just according to the speaker's world-view but also according to its significance in the listener's world-view (Stickle, 2002, p.1).

In line with Schön (1983, 1987), I employed the use of reflective practice in the research of web-based knowledge management systems. The research approach used extensive literature searches (Clegg, 1996, Ballantyne & Packer, 1995, p. 29), writing academic peer-reviewed papers, and employing elements of heuristic inquiry (Moustakas, 1990; Tesch, 1990) and reflective phenomenology (Moustakas, 1990; Tesch, 1990). As a reflective practitioner, I kept relevant notes and documents during the period of the research, and continually reflected upon the empirical data resulting from this research. At significant points, I refer to the research by giving examples and vignettes to illustrate and explain the issues at hand.

Reflecting upon my own life experience (employing Schön's (1983) notion of reflection-in-action), allows me to employ Moustakas's (1990, pp. 32-34) notion of validity in heuristic research. I found that these practices resonated with Habermas', Bowers', Moustakas' and Tesch's emphasis on the importance of self-reflection and in line with the thrust in qualitative research literature on the

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researcher's voice and signature, researcher bias, and managing subjectivity (Denzin & Lincoln, 1994, p. 424).

Inspired by post-modern concepts (especially the creative research writing styles and lateral thinking possibilities afforded by such thinkers and Derrida (1983) and, in information systems research, Walsham (1986,1995) and exploring depth dimensions of critical theory, I became aware that I was connecting my own tacit knowledge with the research process within the spirit of heuristic inquiry (Moustakas, 1990, 1994). As alluded to in my discourse at the end of Chapter Two, I was actually living out the knowledge management process I was researching.

The remainder of this section of the dissertation is set out in the following manner. Section 5.1 addresses the philosophical dimensions involved in the development of the theoretical framework, also describing and justifying my various writing styles. Section 5.2 describes the evolution of my approach to the research, including further dialogues with the self. I felt compelled to disclose relevant aspects of my personality type and my world-view in regard to tacit knowledge and the communication process (Richardson, 1990, 1994). Section 5.3 outlines the procedures embodied in the research design. Section 5.4 describes the research settings and instruments, establishes the validity of the measures used, and also outlines data analysis. Section 5.5 presents some limitations of the methodology and methods employed.

## 5.1. PHILOSOPHICAL DIMENSIONS

A methodology represents an operational framework within which one is able to conduct research and where the facts are so placed that their meaning may be seen more clearly (Remenyi, 1999a, 1999b). In this study, I begin to seek the development of an appropriate methodology that involves a consideration of the broad range of alternative methodological approaches, whether qualitative or quantitative, interpretivist, positivist, critical, or post-modern.

**Discourse and Communicative Rationality**

Drawing on my experience of studying within a masters and then a doctoral research programme over the last five years, one of the areas of exploration has been the linking of critical theory with Constructivist thinking within the realm of *critical constructivism* (Taylor and Williams, 1993; Duczynski, 2001). This can be practically applied to my major research by employing *open discourse* methods, wherein I (as the researcher, the reflective practitioner and the reflexive learner) and the participants from OrganisationA and OrganisationC, discourse among ourselves as a group, and also as individuals in one-on-one discourse. In a similar vein to Taylor and Williams (1993), Mingers (2001) argue that "a critical perspective allows the illustrations of the relationships between the researchers. This also includes the methods used and the research site, as they are crucial in explaining how the particular work came to happen, thereby helping to evaluate it" (Mingers, 2001, p. 253). I relate the conduct of employing open discourse techniques to what Bruner (1990, p. 67) states:

> in referring to the benefits of open discourse, negotiating and renegotiating meanings by the mediation of narrative interpretations is, it seems to me, one of the crowing achievements of human development (Bruner, 1990, p. 67).

**Interpretivist and Positivist Approaches to Research**

Interpretivist research aims at producing an understanding of the context of the research questions, and the process whereby the research questions influence and are influenced by the context (Walsham 1993, p. 74). Trauth and Jessup (1999, p. 2) identify that "the objective of interpretative research is to piece together people's words, observations and documents into a coherent picture expressed through the voices of the participants" (p. 2). Similarly, Boland (1991, p. 441) that "interpretative research does not predefine dependent and independent variables, but focuses on the complexity of human sense making as the situation emerges, and it attempts to understand phenomena through the meanings that people assign to them" (p. 441).

Positivist research, on the other hand, is concerned with testability and generalisability of theories in order to discover the general principles or laws that govern the natural and social world (Orlikowski, 1991, Pp. 113-118). Positivist research deduces evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of influences about a phenomenon from a representative sample to a stated population (Orlikowski, 1991, p. 115). As Maykut and Morehouse (1994, Pp. 11-13) explain, positivist research assumes that knowledge can be "separated into parts and examined individually" and the researcher is able to be objective, not influencing or being influenced in the research. Interpretivist research assumes that knowledge is mostly "constructed" and the researcher is inextricably interwoven into the research, affecting and being affected by the process (Williams, 2000a, 2000b, 2002). Positivists, on the other hand, claim that research can be value-free because the researcher can stand independently from what is to be known. Interpretivists, on the other hand, "regard values as embedded in their research, that is, the research topic, the research methods and the researchers themselves all have certain value orientations" (Maykut & Morehouse, 1994, p. 11). Positivism assumes that fact and value are distinct, are grounded in objective idealism, and are concerned with the repeatability of an explanation (Walsham 1993).

According to Zmud (1995), information systems research may be able to provide theoretical foundations for managing organisational knowledge, which can then be used by management to make decisions. Information systems research involves the uses of information technologies in addressing the generation, storage, transfer, application, embedding, and protecting of the organisational knowledge, wherever sourced. In this regard, the positivist perspective, according to Lee (1991, Pp. 342-349) may restrict the "lifeworld" of a project using phenomenology. Lee (1991, p. 347), describing lifeworld, comments that "it is the world of consciousness and humanly created meanings." That is, it involves the people, their meanings of the world, and their behaviour that they manifest in that world (Lee 1991, p. 347). He also mentions that people who conduct such research may find themselves necessarily inter-woven with the research subject, and this provides the needed subjective meaning that is the basis

of this research paradigm. An advantage of employing positivist research is that it may allow the researcher to efficiently and effectively collect that narrow subset of facts and data describing merely objective and publicly perceptible aspects of human behaviour. However, the subsequent danger is that the research may ignore facts and data that could be vital to the project's conclusions.

In this section, I discuss the strengths and weakness of both interpretative and positivist research in regard to contrasting images of the human beings that communicate their tacit knowledge with each other via information technologies. According to Lee (1994) and Markus (1994), the positivist perspective in researching the communication of tacit knowledge (largely unconscious) involves in depicting this communication as a physical process of transporting a material substance from one person to another person through a channel. The receiving person could thus easily be treated merely as a passive receptacle of the transported symbol (ie. as the flow through a channel) (Lee, 1994, p. 145).

The interpretative perspective, on the other hand, "treats a person not as a passive receptacle, but as an intelligent being in a shared social context, who can transform whatever learned words and clues he/she receives into an understanding of what the speaker or writer meant (ie. "one person's reaching an understanding of what another person means" (Lee, 1994, p. 146). In the growing light of these understanding, as the research progressed I progressively realised that neither the positivist nor the interpretive perspective might be suitable for researching the communication of tacit knowledge.

## Qualitative and Quantitative Approaches to Research

Much of the literature regarding the organisational implications of knowledge management systems is based on quantitative research methods (Bezjian-Avery et al., 1998, p. 23; Haynes et al., 1998). As this study is of an ethnographic interpretative nature, investigating the human interpretative perceptions concerning WebAccounting, it was deemed appropriate to use qualitative research methods (Zikmund, 1996). Maykut and Morehouse (1994), stress that the emphasis of qualitative research is on "understanding through looking closely at

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people's words, actions and records or taking the form of verbal statement" (p. 17), and" in a narrative or descriptive way, more closely representing the situation as experienced by the participants" (p. 2). Such an emphasis again, makes qualitative research appropriate for this study.

## Ethnographic Dimensions using Reflective Practices in the Study of the Communication of Tacit Knowledge.

Guba (1981, 1994), Glesne and Peshkin (1992), stress that in an ethnographic paradigm the researcher seeks to discover or uncover propositions of multiple realities where these realities are socio-psychological constructions forming an interconnected whole. These realities can only be understood as aspects of the holistic relationship between persons and the environment, and form an integral part of the mental process of reflection. Tesch (1990) and Moon (1999, p. 64), authoritative researchers in reflection and professional development, make a similar point by agreeing that such reflection "involves the process of thinking and may be aided by the process of articulation of that thinking orally or in written form. Professional practitioner practice may refer to reflection on the everyday events of practice or the conditions that shape reflection, such as political influences" Moon (1999, p. 64).

Moon (1999, p. 64-65) argues that researchers engaging in perspectives of ethnographic reflective practitioner practice should participate in a larger ongoing dialogue or reactions to a specific event or an unexpected occurrence or observation of a problem, rather than following any particular set of research techniques (p. 64). When conducting professional practitioner research, Moon (1999, p. 65) asserts that the data collected will not "become meaningful to the researcher" until the researcher "brings a theoretical focus to it". She further claims that ethnography strengthens reflective practice and "ethnography reflection can be deepened when there is some sharing of the reflection with others" (p. 65). In discussing the different forms of reflection, Hatton and Smith (1995) is quoted by Moon (1999, p.75) as claiming that there are three forms of reflection. These are listed in order of increasing sophistication:

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1.  *Descriptive Reflection*: a reflective description of events;
2.  *Dialogic Reflection*: with some stepping back from the event and exploration with the self about reasons for the event;
3.  *Critical Reflection*: – exploring reasons for an event in the broader social, ethical, moral or historical context (Moon, 1999, p. 75).

## What is a Reflective Practitioner?

Schön (1983) and Moon (1999) describe the reflective practitioner as someone who is simply thoughtful about his or her own practice. In fact, reflective practice involves the mental process of reflecting, which may or may not be characterised by what is commonly referred to as "being reflective" Moon (1999, p. 157). According to Kolb (1984), Honey and Mumford (1986) cited in Moon (1999, p. 158), "being reflective" is interpreted as an orientation to practice or other aspects of life. It also seems to imply a quality in a person who uses reflection frequently, "comfortably," and, perhaps by implication, publicly, and who demonstrates that it has value for their work. They further suggest that a person using particular forms of reflection imply that such reflection is habitual, perhaps as a learning style (p. 159).

Moon (1999, p. 159) also speaks of the reflective practitioner who possess a self-image as a facilitator, who has an important recognition of the uncertainty of the professional situation, who knows about the uncertain knowledge base of the profession and, knowing all this, can identify the sources of the problems that need to be resolved in practice. Therefore, the reflective practitioner will cope with this uncertainty by putting the relationship with the clients at the centre of practice in an attempt to develop reflectively negotiated and shared meanings and understandings as a joint process (Moon, 1999, Pp. 158-160).

Schön (1987) distinguishes between two reflective processes: (1) reflection-on-action and, (2) reflection-in-action as follows:

Reflection-on-action refers to the form of reflection that occurs after an action and relates, via verbalised or non-verbalised thought, to the action that the practitioner

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has taken. In other words, it describes the process of reflection that takes place after the event. During this process, the practitioner makes explicit and evaluates the theories of action used to solve a problem (Wong & Williams, 2002). On the other hand, reflection-in-action occurs in association with action and guides the process of action via knowledge in use, which is derived from theory.

The concept of reflection-in-action is one of the cornerstones of Schön's theory, in which the process integrates theory, intuition, and action in situations of uncertainty. For an ethnographic reflection on professional practice, a researcher should be looking carefully for ways in which historical and cultural context shapes the researcher's perceptions (Taylor and Williams, 1993; Hatton and Smith, 1995).

Williams (2000a, 2002) mentions that reflective practice is a process with which increasing numbers of professionals are engaging in order to better understand, take full ownership of, and enhance the work that they do. Extending his pioneering research begun in his doctoral thesis (1996) (the source of over 50 academic papers and articles: see Williams (1993, 1996, 2000, 2002). As I am extending his seminal work in what he now terms *heuristically critical reflective practice*, I add to my previous quotations and citations from Williams' project to allow him to honour his contribution and his voice.

> The Reflective Practitioner style of writing was first introduced by Donald Schön in 1983 and others have built on his work (eg. Pribbenow, 2000; Overmeer et al, 1998). This style has been widely accepted and there are even University Courses specifically dealing with the Reflective Practitioner style (eg Griffith University, 2001; George Mason University, 2001).

According to Williams (2001, 2002), who expresses his own research using a subjective and artistically personal authorial signature (Richardson, 1990,1994), action research professional practice and reflective practitioner research is usually written in distinctive reflective practitioner styles, with researchers evolving as they find their own voice and distinctive authorial style. This evolution occurred

in the writing style used by Donald Schön from 1983 (Schön, 1983 & 1987). This research method allows the researcher to give an account of how they applied knowledge in their workplaces. It encourages them to reflect on their experiences and then comment on what they believed the learning's of those experiences were (Williams, 2001, Wong & Williams 2002).

Reflection is the "active and militant" tool that enables contextualisation (Smyth, 1989, p. 2). For example, Williams (1996) found in his heuristically critical reflective practitioner research in university education that *technical-rational* education fails to provide the elements necessary to enable researchers to develop the heuristics needed to deal with the unpredictability and chaos of real world issues (Wong & Williams, 2002).

Employing reflective practice in analysing problems involves the study of cognitive processes (Schön, 1983; Smyth, 1989; Habermas, 1987). According to Hamm (1989), in order to solve a problem, the practitioner needs to draw on both analytical thought and the levels of his/her professional experience. Schön suggests that how reflective practitioners think about problem solving largely depend upon not only on what type of problem is presented but also on how the problem is presented. In discussing different problem solving experiences, in professional practice, Williams and I worked together to summarise as follows:

> Professional practitioners operate as a form of practice-based research and resource. While they may not be doing professional practice research degrees or papers, as Winter, Griffiths and Green comment "there is a clear link with industry, professions, and other workplaces. In addition, the focus on particular contexts of practice means that the concepts of *reliable, useful, good,* and *wise* are all tightly bound to the context in which the practitioner is producing knowledge. A claim to practice-based knowledge is an obvious example of a claim to knowledge which is context-bound, and in which the subjectivity of the producer of the knowledge cannot be eliminated. Thus, practice-based research is more than a way of bringing about cooperation between higher education and other sectors, and they are more than a manifestation of a bridge between economic activities and academic learning"(Wong & Williams, 2002, p. 2).

In discussing problem solving capacity through the reflection-in-action, we succinctly state that:

> Reflective practice is "making tacit knowledge explicit" (Hall, 1998). Freidman (1998) took it one step further, using reflective practice as a diagnostic tool for those situations where "automatic, skilled reasoning and behaviour" gets managers into trouble. Reflective practice is underpinned by participatory action research methodology (Ellis & Kiely, 2000). This allows the participants to "create their own knowledge and theory relevant to their own specific situation." Freidman (1998) pointed ont that the challenge in this process is to balance the disturbance in equilibrinm necessary to enable change with the psychological safety essential to a learning environment.

Williams (1993, 1996, 2000, 2002) snggests that reflective practice inquiry often includes an ethnographic element as they are often embedded in work teams and thus write from within a shared culture. Furthermore, Williams (1993, 1996, 2000, 2002) contends that heuristic, the emphasis is on conducting in-depth and wide-ranging reflection of the empirical material, gained from reflection and co-participant interviews, to glean heuristic impressions or insights that "shine, reflect, refract and focus light on the phenomenon being considered" (see also Taylor and Williams, 1993; Whitehead, 1998, 2002).

To flag what will be a crucial turn in this thesis, Williams latest work suggests that the *critical* dimension of heuristically critical reflective practitioner research usually lead to *critical moments of decision*. Creating an existential dilemma, these moments can lead to political or social action within emerging ethical sensibilities as the "wellsprings" (Taylor & Williams, 1993) of being human lead to explication to consciousness of personal tacit knowledge.

The *heuristic* dimension of heuristically critical reflective practitioner research, especially with ethnographic elements, can lead to depth understandings, which can clarify research findings. In the following section, I describe how *self-dialogue* can add yet another dimension to this research approach.

## Self-Discourse and Heuristically Critical Reflective Practitioner Inquiry

This section provides a basis for understanding some of the reasons and implications of my employing the research self dialogue in the research. I engage in self-reflection where my personal understandings and interpretations from my own experience have contributed to the evolution of my research questions. In order to learn the depth about my experience, I employ heuristic inquiry methods, which allow me to explore the broad and open-ended study into the research questions. That is, the researcher is able to deal with the interrelationships between themselves, the participants, and the context of the research subject (Williams, 1996; Van Manen, 1997, Whitehead, 1998, 2002).

As some aspects of heuristic inquiry may seem strange to the reader, I feel it necessary to quote Moustakas's (1990, p. 43) seminal and authoritative work themselves:

> The heuristic researcher is not only intimately and autobiographically related to the question but learns to love the question. It becomes a kind of song into which the researcher breathes life not only because the question leads to an answer, but also because the question itself is infused in the researcher's being. It creates a thirst to discover, to clarify, and to understand crucial dimensions of knowledge and experience (p. 43).

Moustakas (1990), describes his heuristic research process as "a way of knowing" and that "whatever presents itself in the conscious of the investigator as perception, sense, intuition, or knowledge represents an invitation for further elucidation" (p. 10). Furthermore, Moustakas (1990) claims that in heuristic inquiry the researcher might say that "I n. iy become entranced by visions, images and dreams that connect me to my quest. I may come into contact with new regions of myself" (p. 11). The researcher may recognise that "intellect, emotion and spirit all have their place and may form a unity in heuristic investigation" (p. 11). Moustakas (1990) concludes my stating that "in the heuristic process, self-understanding and self-growth proceed together as the phenomenon under investigation becomes intimately understood" (p. 11).

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The above quotes from Moustakas (1990) helps me to understand the experience of phenomenological inquiry through self-dialogue (a process of speaking to oneself in an open, but recordable manner), I am able explore within my thoughts, dreams or experience and relate these factors to the research questions (Taylor & Williams, 1993, Whitehead, 1998, 2002). As such, the purpose of heuristic inquiry may provide the researcher to see first hand the research questions through an inward looking lens that enables them to mentally turn inward upon myself and allows me to experience and to describe the explanation of the research findings (Shelef, 1994). It then allows the researcher to turn outwards so they may experience participant's perception of the research subject (Taylor & Williams, 1993, Whitehead, 1998, 2002). Moreover, it also enables the researcher to become re-focused inwardly to validate and deepen the continuing discussions of the research findings.

## Theorists and Critics of Post-modernity

In this section, I discuss Jacques Derrida (1983a, 1983b, 1984, 1987,1996) contemporary cultural theory of post-modernity as an inspirational source in supporting my writing style.

Jacques Derrida, (1930- ), a French philosopher, from whose foundational thinking sprung the ideas of deconstruction, was born in El-Biar, Algeria. In 1952 he began studying philosophy at the École Normale Supérieure in Paris, where he later taught from 1965 to 1984. From 1960 to 1964, Derrida taught at the Sorbonne in Paris. Since the early 1970s, he has divided much of his time between Paris and the United States, where he has taught at such universities as Johns Hopkins, Yale, and the University of California at Irvine.

In 1967, Derrida published three books—*Speech and Phenomena*; *Of Grammatology* and *Writing and Difference*, which introduced the *deconstructive* approach as an unusual and highly creative way of reading texts (1983a, 1983b, 1984, 1987). While Derrida states that deconstruction is not a method, it can be

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understood and utilised as a strategy of analysis that has been applied to literature, linguistics, philosophy, law and architecture. His other works include Glas (1974) and The Post Card (1980). Due to the range and creativity of his work and thought processes, it is difficult to pigeonhole or categorise Derrida, and his later works continue to redefine his thought (Gonzalez, 1999). In the end, I take Derrida's project as more of a way of seeing, an approach, and inspiring sequence of suggestions that frees me to use intuition and creativity and lateral thinking and playful freedom in this thesis (Derrida, 1978, 1983a, 1983b, 1984, 1996).

In his book *Of Grammatology*, Derrida allusively turns his wickedly suggestive attention to construct a tower of traces and perceptive allusions based around a loosely subjective notion of Western Philosophy from the pre-Socratics through to those that follow Heidegger (Derrida, 1976). According to Roger Geerta Gonzalez (1999), the Derrida's radical and undergirding, but also overarching comment is that "logos" or speech takes precedence over writing in the Western conversation regarding philosophy. According to Gonzalez (1999), the emergent domination of logos as speech, at the same time claims while pretending and posturing to have and exhibit a direct form of a language and therefore, a tight mapping or closeness to what is rally a rigid "presence" or centre of identity as subjectivity. The result is that the Western construction of philosophy lifts up and elevates even reifies logos and speech, while writing is debased and serves to become a dangerous eclipses of freedom. Thus, in an ironic turn around, as recent Western philosophers try to imprint and dominate writing with logos/speech patterns. Thus, this style of writing and related expressions as "texts" claims and pretends to exhibit a powerful and dominating posture of presence of identity and subjectivity. A presence of authority, and a presence of power in a disturbingly similar manner to the conqueringly oppressive logos/speech (Derrida, 1983a, 1983b, 1996; Deconstruction, n.d.).

Derrida counters this by developing a method to identify these patterns, with an artistic and I would say heuristic use of deconstruction, at times and with backward mutterings of a strangely concealed doubt and sense of inferiority yet with strong elements of care and love, and even a growing awareness of ethics

and normative sensibilities (Derrida, 1983a, p. 30). The deconstruction process identifies logo-centric paradigms, such as dichotomies, to show that the possibility of a presence within any contextual language constantly involves "play" and yet "differs" continuously in relation to something else. Because of this, only a "trace" of the subject/object exists (Derrida, 1983a, 1983b). Deconstruction, as a method, is, some critics, I would say with a sense of fear and inadequate understanding and courage longingly wish to claim, is fading away, unuseful, irresponsible, and, indeed, is dead (Derrida, 1976, 1978, 1983, 1996). I would agree, however, with those who perhaps have experienced the playful freedom and creative opening that deconstruction allows in pricking the bubble of arrogant Western philosophical and cultural presumptions. Is that new thought forms and even paradigms spring from older ones, as the real insights and contributions of previous patterns and way of thinking inform and assist new and maturing approaches in that balance between freedom and control, love and defence, art and science, which seems to characterise the Western and largely humanist project in the advancing of theory (Derrida, 1976, 1978, 1983a, 1983b, 1996; Deconstruction, n.d.).

Gonzalez (1999) states that Derrida's major interest is on language, and his major contribution is his contention that traditional or metaphysical reading makes false inferences about the nature of text. A traditional reader believes that any language is capable of expressing ideas without loss or change from the authors intentions, that writing is secondary and inferior to speech, and the author is the source of the text's meaning. Derrida's deconstructive style of reading undermines these assumptions and offers serious challenges that a text has an unchanging and unified meaning (Gonzalez, 1999).

According to Lechte (1994), if Western culture has tended to arrogantly and short sightedly assume that speech is a clear, unambiguous, and direct way to communicate. Ultimately drawing on psychoanalysis and linguistics, Derrida seriously raises questions by and at times engagingly ironic and humorous yet committed attack on this assumption. Therefore, according to Derrida cited by Lechte (1994), the unconditional acceptance of the author's intentions in speaking

is not possible. This approach tends to multiply the number and range of interpretations and readings and analyses and commentaries on any text that can assert to have authority and insight (Lechte, 1994).

Moreover, deconstruction shows that there are multiple layers of meaning at work in any modern language (Derrida, 1976, 1978, 1983a, 1983b,1996; Deconstruction, n.d.). By deconstructing the written works of previous scholars, Derrida (cited by Lechte (1994)) attempts to show that language is not a constant in human civilisation. Although sometimes portrayed by critics as destructive of philosophy, the use of deconstruction can serve to allusively and creatively and even humorously show the inevitable tensions between clarity and coherence that govern modern philosophy and the shortcomings that accompany its production (Lechte, 1994).

Having identified some philosophical dimensions involved in the research findings, the next section discusses the outline of the developments in my theoretical framework.

## DEVELOPMENTS IN MY PHILOSOPHICAL THEORETICAL METAPHORS

In exploring the nature of my qualitative research methodology, one reason for working within Habermas' framework is that his work has had a greater impact on information systems research discipline than any other social theory school. By adopting Habermas' critical social theory, I am building on work that has developed among management information systems scholars (Hirschheim and Klein 1994; Lyytinen 1992; Lyytinen and Hirschheim 1988; Lyytinen and Klein 1985; Mingers 1981; Ngwenyama 1991; Ngwenyama and Lyytinen 1997).

Habermas (1984, 1987a, 1987b, 1987c) has developed he calls "a theory about communication," this is, the theory of communicative action.

Habermas' critical social theory may be recognised as a unique class of advancement within contemporary schools of thought concerning critical social theory (Williams, 1996). Jurgen Habermas was a philosopher, sociologist, and Professor of Philosophy at the University of Frankfurt, Germany (which is famous for its program of developing a "critical theory of society"). Habermas was a student of Adorno (an influential thinker in Western culture), and before becoming a professor of philosophy and sociology at the University of Frankfurt in the mid-1980s, he taught philosophy at Heidelberg (Stickle, 2002, p. 2). Habermas reflects that he became "radicalised" by learning from Adorno while becoming his assistant. I can relate to this process as I, indeed, have become radicalised by studying under Mark Williams.

For clarity and brevity, I quote from the Cambridge Dictionary of Philosophy (date), cited by Stickle (2002):

> Critical theory is primarily a way of doing philosophy, integrating the normative aspects of philosophical reflection with the explanatory achievements of the social sciences. The ultimate goal of its program is to link theory and practice, to provide insight, and to empower subjects to change their oppressive circumstances and achieve human emancipation, a rational society that satisfies human needs and powers... Habermas' Analysis of Communication seeks to provide norms for non-dominating relations to others and a broader notion of reason (Pp. 278-279).

The development of Habermas' critical social theory has influenced the modern empirical social and natural science paradigm (Stickle, 2002, p. 3). Habermas seeks to understand and help to improve the human construction of the social reality of human life. As such, Habermas constantly advocates critical self-examination (within the framework of critical theory), to aid the process of "the unmasking of unexamined pervasive ideologies in the shaping/developing of history and a theory of culture that may provide an evaluation of social

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importance and foundation of everyday language" (Stickle, 2002, p 3). That is, the critical social theory approach may provide understanding of the social contradictions and the inherent conflicts of organisations and society through the use of self-reflection. As such, this self-reflection may provide the researcher a non-objectivist, yet balanced, understanding of the ontology and epistemology of the social contradictions (Wong and Williams, 2002).

Hirschheim and Klein (1994), who extensively employ critical theory, argue that "emancipatory research in organisations focuses on human wellbeing and emancipation in information systems development and use" (p. 83). They argue for a plurality of rational arguments in the information systems development process, suggesting that traditional information systems development practices "are too functionalist concentrating merely on producing system designs" (p. 84). They also argue that critical social theory allows researchers to participate as not only the observers or describers of information systems and organisations (as traditional information systems researchers do) but also as transformers of information systems and organisations that use them (Hirschheim and Klein, 1992, p. 85).

Another reason why I adopt the philosophy of critical social theory in this research is that it sourced from a social science field and it recognises that information systems operate within social surroundings. As mentioned by Orlikowski and Baroudi (1991, Pp.113-114), critical social theory has become a "major riposte to the more traditional positivist approaches, since it can be claimed that the social context of information systems research and development is gaining a wider acceptance as being an important research area". The following section discusses the underlying assumptions in information systems practice, which uses a critical theory approach.

## Underlying Assumptions in Using Critical Theory in Information Systems Research

In the next two sections, I present ideas regarding the underlying assumptions, ontology, and epistemology of employing critical theory in information systems

research. These ideas rely mainly on Ngwenyama and Lee's (1991, 1997a, 1997b) works, since they are considered as authoritative researchers employing Habermas critical social theory in information systems.

According to Alvesson and Willmott (1992b, p. 434) and Orlikowski and Baroudi (1991, p. 119), the critical theory perspective attempts to recognise social contradictions and conflicts inherent in the existing social structures of organisations and society through self-reflection in the hope of human emancipation. This concerns the emotions, assumptions, and social perceptions of individuals. This is in line with Alvesson et al. (1992b), and Orlikowski et al (1991), Ngwenyama and Lee (1997, p. 152), who argue that critical social theory asserts that established systems of domination isolate people from self-realisation and hold back human potentiality.

Research using this approach to social science phenomena involves both an empirical-analytical and interpretative components (Alvesson et al, 1992b). In discussing perspectives on Information System research that differ from the positivist perspective, Ngwenyama and Lee (1997, p. 152) claim that:

1. It is sensitive to the "lifeworlds" of the organisational actors and is oriented to interpreting and mapping the meanings of their actions from their perspective. That is, organisational contexts are not static and change over time because of the installation of new social practices affecting the organisational actors.

2. It adopts pluralistic methods of inquiry such as participation, observation, and the analysis of contextual data. That is, to reconcile knowledge development with the need for Organisation and individual improvement.

3. It does not separate (as would the laboratory experiments of positivism), the subjects of inquiry from the organisational context within which they are situated. That is, to regard as socially constructed the knowledge of information systems and organisations,

in the same manner, as the research's questions are also socially constructed, separate, and unusable as a positivist experiment.

4. It recognises that the organisational context is not only important to meaningful constructions, but to social activity as well

(source: Ngwenyama and Lee 1997, Pp. 152-153).

Ngwenyama and Lee (1997) further indicate that critical social theory (unlike most positivist perspectives) do not view people as "passive receptacles of whatever data or information is transported to them, but as intelligent actors who assess the truthfulness, completeness, sincerity and contextuality of the messages they receive" (Ngwenyama and Lee, 1997, p. 153).

On the other hand, Ngwenyama and Lee, (1997) claim that critical social theory perspectives (unlike some interpretive approaches) "requires the researcher to attend not only to the matter of mutual understanding, but also to the matter of the emancipation of organisational actors from false or unwarranted beliefs, assumptions, and constraints" (Ngwenyama and Lee, 1997, p. 153).

As has already been outlined, it is my suggestion that not only positivist and interpretivist, but also critical approaches have limitations. These shortcomings can be ameliorated by the inclusion of heuristic approaches, especially if reflective phenomenological approaches are included.

## Critical Social Theory Perspective in Recognising Organisational Communication and Social Action

As has been indicated earlier, Habermas (1972, 1979,1987a, 1987b) has advanced that his Theory of Communicative Action describes four main types of intentional behaviour or social action:

1. Instrumental;
2. Communicative;
3. Discursive;

4.    Strategic.

Each of these types of social action type has a specific focus and orientation, each representing a different aspect of human behaviour in a social setting. In discussing the different types of intentional behaviour, Ngwenyama and Lee (1997a, p. 155) identified that this approach, unlike most positivist approaches, views "human beings as active processors or interpreters, who are not mere receptacles for the meanings transported to them, but who re-create or activate the meanings that they come to hold" and that "communication richness is not a function of the channel through which it is acquired". Unlike most interpretivist approaches, they state that this critical theory categorisation recognises "that a person who reads, listens to, or otherwise receives a message need not restrict her concept of meaning in regard to the message just to mutual understanding, but can also be critical of it" (p. 155). Furthermore, and this takes a bit of consideration, a person's understanding what is going on seen not merely as just interpretive but also the person is seen to be able use their critical facilities. On top of these assertions, Ngwenyama and Lee (1997a, p. 155) claim that Habermas' communication action involves "the understanding of what the speaker or writer means through the testing by the recipient of validity claims associated with the action type perform by the speaker or writer". In other words, the person listening or reading is seen to be able to see through "distorted communications (meaning that communicative acts that are false, incomplete, insincere, or unwarranted)" (p. 156).

Ngwenyama and Lee, like Habermas, are interested in how well a person recreates a meaning that another person intends them to understand. That is, "by how well a person through her assessment of the validity claims made by the person communicating to her succeeds in emancipating herself from distorted communications, whereby such communications is deep-rooted in 'social action'" (Ngwenyama and Lee, 1997a, p. 156). Thus, in order to comprehend the term "social" in critical social theory, Ngwenyama and Lee (1997a, p. 156) suggest that it is necessary to consider the orientation of a person's actions to other individuals and to those actions being embedded in an organisational context.

This organisational context "serves as a reference schema in which actors are able to act and to interpret the actions of other and relates to the possibilities and potential for social action." They argue that in executing social actions, "an actor would rely upon the fact he/she shares every aspect of the organisational context with other actors involved in the action situation" (p. 156). In light of this, the contextuality of social action has numerous practical consequences for daily organisational life and for researchers who observe it. The following examples (source from Ngwenyama 1997a, p. 152) describes these issues:

1.    "In an attempt to uncover the deficiency of Habermas' account of "contextuality", Ngwenyama claims that an actor cannot simply construe any meaning he would like for his own actions or the actions of others and cannot simply exercise complete free will in how he/she chooses to act. A researcher cannot build a valid explanation or interpretation by examining just the individual factors alone.

2.    In an attempt to uncover the deficiency of Habermas' consideration of "shared organisational context" Ngwenyama claims that conflicting interests motivate different individuals who hold different opinions on the same matter and who can end up with negotiated meanings for the same action.

3.    In drawing attention to Ngwenyama's consideration of the "publicly observable behaviour", Schutz (cited in Ngwenyama, 1997, p. 152) says "the same overt behaviour (say, a tribal pageant, as it can be captured by a movie camera) may have an entirely different meaning to the performers. This is, what interests the social scientist is merely whether it is a war dance, a barter trade, the reception of a friendly ambassador, or something else of this sort".

4.    In discussing the "publicly observable behaviour" (whether an order or a command), Ngwenyama claim that these behaviours

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could be meaningful when coming from one person to another (such as from a Navy Captain to one of his men) but not when involving a different pair, such as the CEO of an organisation or the trade union boss of the same organisation. Thus, in order for publicly observable behaviour to be meaningful, a social context is necessary for it to be in possession of meaning."

*(source: Ngwenyama 1997a, p. 152)*

Having described what Habermas contends are the norms of social action, I will use the next section to describe Habermas' communicative action.

## Habermas' Theory of Communicative Action

In the following sections, I discuss some recent literature concerning the ontology, epistemology, and practice of employing Habermas' Communicative Action. Most of the ideas were based on Taylor's work (1993) and the work of Williams (1996, 2000a, 2000b, and 2002). Within his theoretical framework, Habermas (1987) claims that communicative action:

> is inter-subjective and co-operative reflectivity, by building mutual understanding and co-operation towards that which is true, free, just and fair." This leads him to argue that the rational form of communication, which is oriented to reaching an understanding across all the three dimensions (objective, social and subjective) of the worldviews are relative to the degree of rationalisation attained in a "lifeworld". (p. 342)

Following Habermas's concept of communicative rationalities, Williams (1996) following Pusey (1987, p. 81) asserts that Habermas identifies three categories of human rationality:

> 1. **Instrumental rationality**, manifested mainly in work, as it is mainly technical or instrumental knowledge, and it is primarily oriented to success or control of nature, and studied in the empirical natural sciences.

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**2. Strategic rationality** is manifested mainly in persons or dominating classes, forcing or controlling other persons or classes by manipulation, coercion, propaganda, threat or by raw power.

**3. Communicative rationality** manifests itself mainly in language and self-reflection and is principally of an ethical or moral character that is concerned with freedom from internalised or outer coercion or unjust authority. It is chiefly oriented to understanding what is true, free and just; and it is oriented to reaching inter-subjective understanding and true consensus; and it is principally studied in the historical, hermeneutic or critical disciplines.

In discussing the term of "communicative rationality" Habermas, (1996) states that "communicative rationality refers to a mindset or a way of thinking that is most clearly demonstrated in language and self-reflection, especially that of an ethical or moral character" (p. 12).

Additionally, in reference to the theory of communicative action, Habermas cited by Lechte (1994, p. 190), states that an important principle is "what it means for a speaker, in performing one of the standard speech acts, to take up a pragmatic relation to something in the objective, social or subjective 'actor-world'."

As mentioned by Stickle (2002, p. 3), Habermas' Communicative Action may involve the "mastery of a particular language's grammar or vocabulary in order to allow us to differentiate between three domains of reference: the subjective, the inter-subjective, and the objective." He further mentions that Habermas' communicative competencies are in a similar vein to Hegel's concept of establishing truth claims. That is, Hegel believes that good faith in one's communication would allow us to reach consensus about truth and the validity of any claim. Thus, "truth resides from one's own worldview and not from the outside worldview" (p. 3).

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**Habermas' Conceptualisation of Human Cognitive Interests.**

Another appreciation of Habermas' critical social theory of human cognitive interests lie in the theme that his Theory of Knowledge Interests is about evolving three basic types of knowledge about information systems and organisations, this is, the **technical, social** and **emancipatory** (Ngwenyama, 1991).

Outhwaite (1987) claims that Habermas' categorisation of human interests speaks of a balancing of instrumental action (which launches itself from instrumental rationality) with communicative action (occurs from communicative rationality). In discussing the different areas of Habermas' critical social theory regarding human interests, Ngwenyama (1997a, p. 147) identified the following:

> 1. The **Technical Knowledge Interest** is prepared for the purposes of control and manipulation, for example, the building of effective information systems applications to support organisational processes. That is, the engineering orientation of organisational and technological issues which focus on the developing of theories, methods and practices that aid in improving an organisation's information systems applications and positively, the lives of individuals who use them.

> 2. The **Social Knowledge Interest** shows up mainly in language and is founded upon the issues of ethics or morality or both, for example, the development of the understanding of social relationships that an individual develops while working on information systems applications. That is, the interpretation of the meanings those individuals build around information systems, and the appropriation and use of these social relationships because of these interpreted meanings.

> 3. The **Emancipatory Knowledge Interest** comes from self-reflection. This is, it is largely concerned with emancipation from coercion or unjust authority, real or imagined; it is oriented to truth, freedom and justice; and is mostly studied in the critical sciences,

Thus I came to understand the idealistic thrust, of Habermas' critical social theory and human cognitive interests, in laying a framework to point to the need for balancing the technical, social and emancipatory aspects (Ngwenyama, 1991). Further than this, I came to understand that these findings may be not only manifested but actually through self-reflection processes by the external researcher (Wong & Williams, 2002).

### Implications of Habermas' Notions of Self-Reflection and Self-Development.

In the previous sections, I discussed the literature presenting Habermas' critical social theory paradigm in information systems research, and present a relationship between self-reflection and communicative action. It is time to put the analysis into practice and show its application in developing a model that allows me to developing the above mentioned approaches with practice.

Figure 5.1 illustrates a process whereby self-reflective practice is able to provide a way for practitioner applied or tacit knowledge to become explicit knowledge. That is, as Habermas gaining of explicit knowledge from what was previously tacit makes the knowledge richer in consequence through self-reflection. For example, if a professional desires to achieve reform in their profession, through systematic inquiry by collaborative, self-critical communities of practitioners they can legitimately employ an autobiographical approach integrating practice into theory. These autobiographies may act as manifestations of a bridge between economic activities and academic learning. This research approach may allow them to reflect, through emancipatory discourse, through writing in the form of a critical ethnography concerning their personal experiences. Thus, these findings manifest themselves through a self-reflection process combining theory and practice through change and reflection within an ethical framework. This is an iterative process involving problem diagnosis, action intervention, and reflective learning possibly with an external researcher (Wong and Williams, 2002).

Reflective Practitioner
Researcher

Combines theory &
Practice through change
and reflection within an
ethicality framework, is
an iterative process
involving problem
diagnosis, action
intervention, and
reflective learning.

Self-reflection & Self
development
Self-Critical Communities of
Practitioners

Action Research
Communities in
Marketplace

feedback of experience

Manifestation of a bridge between economic activities and academic

*Figure 5.1.* A diagram illustrating my synthesis of some links
possible for those involved in action research, professional
practice, and reflective practitioner research.

In the next section, I discuss the theory behind the understanding of the social
aspects of the research. That is, those aspects that manage tacit knowledge
through self-reflection, and then the reasons for my adoption of such theory in the
research investigations.

In discussing the theory of Habermas' communicative action in understanding the
social aspects of unconscious knowing (tacit knowledge) and self-reflection,
Ngwenyama, (1997b, p. 153) states:

> Routine social interaction requires that organisational actors
> monitor the action situations within which they operate and reflect
> upon their actions and the actions of others. When doubt arises in
> the mind of an actor about validity claims of any action, the actor
> first enters a cycle of critical reflection to test the claim.

Williams (2002b) sees that reflective practitioner research within the professions
may create foundation knowledge while producing a researching mental structure,

a kind of professional curiosity. He further advocates that such attitude may help professionals to become aware of and interested in problem solving, this, perhaps sourced from an inability to satisfy particular clients in a manner that satisfies the professional as well.

After reading critical social theory literature, I decided to employ Habermas' theory of communicative action to investigate knowledge management systems development and its practices for the following reasons.

1.  Firstly, according to Ngwenyama and Lee (1997) and Hirschheim and Klein (1992, 1994), Habermas' critical theory has been more popular in conducting information systems research than any other critical school of social theory. This approach is able to serve as a powerful framework to understand the changes in organisational knowledge management in a broader social context and to describe how this relationship functions within an organisation (Lyytinen, 1988; Lee, 1997).

2.  Secondly, as argued by Markus (1994a, p. 120), Habermas' theory provides details of the processes of understanding information systems research from the context of a social perspective. That is, Habermas' concept can explain how the interaction of social, human, and technical systems provokes changes in the context of information systems research. These include human (subjective world), social (inter-subjectively shared world), and technical (objective world), which are all interrelated (Chna, 1986; Laughlin, 1987, 1988; Guba, 1994; Ngwenyama and Lee, 1997).

3.  Thirdly, Habermas' theory provokes open discussion, that is, dialogue on ways in which critical evaluation can be applied (Lyytinen, 1985; Habermas, 1987; Taylor and Williams, 1993; Denzin et al, 1994; Myers, 1995). As argued by Moustakas (1990), Tesch (1990) and Maxwell (1992), the problem-solving scenario can become clearer

through Habermas's thinking on cultural background and political interest development.

In the next section, I present a reflective discourse to elucidate further the aims of this research.

## 5.2. AN INITIAL DISCOURSE WITH THE SELF

In this section I begin with a dialogue between Aristotle (an aspect of my own psyche, representing in Jungian terms, the innate wisdom of the anima) and myself (Encyclopedia of Greek Mythology, 2002). This represents a developmental account of my theoretical framework whereby I show the reader how my writing style would make real the themes of my thesis through a dialogical interweaving of academic and technical understanding (Taylor and Williams, 1993; Whitehead, 1998). These dialogues, concerned with the development of an inner, psychologically oriented understanding, deepen the research within the framework of critical theory.

I then sketch out my understanding of the characteristics of both inner discourse and open discourse and how they fit into Habermas' dreams of communicative action. That is, where I advocate stages of inner discourse prior to open discourses. In discussing the understanding of Habermas' ideas of human communication action, Taylor and Williams (1993) claim that inner discourse can be profitably employed "in order to enable the development of inner dialectical consensus to form a balanced wholeness for building up mutual trust and better understanding" (p. 16). In this spirit, I include the following inner discourse.

### An Inner Discourse

The following inner dialogue with an imaginary person named Aristotle, that stemmed out from my inner worlds and outer worlds, are important to the development of my understanding of thoughts and reflections from a personal

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point of view. These views allow me to understand the processes that determine people's involvement in the creation and application of knowledge about them and about their worlds.

**Eddie:**    "Aristotle, let me discuss Habermas critical social theory in more detail. I regard Habermas' linguistic work as a fundamental part of personal sense making and is the source of communicative linguistic meaning. For example, Habermas seeks human emancipation that is, liberty and freedom, by positing that all social actions provoke a basic set of rules. This set of rules allows individuals to express their opinions and honour their outcomes through open rational argument (Wong and Williams, 2002). Habermas also mentions that each type of social action would convey its own validity rule set. Additionally, Habermas' vision is also in a similar vein to Apel's concept of philosophy:

> human beings cannot fully acknowledge their own motives or the intentions in their expressions. Consequently, empathy and introspection need to be supplemented in achieving and maintaining mutual understanding (one person coming to understand what another person means) among those who are involved in a coordinated organisational situation. That is, the preference for reason and understanding (the grounding for critical thinking) may reveal that all communication, speech (speech-like action) must be grammatical, sincere, and appropriate in order to be meaningful (p. 47). Lack of such attribution may raise doubts for validity judgements, since these validity judgements involve a process for reaching agreement, that is, the act of speaking itself commits the speakers to favour reason. (Apel, 1980, p. 46)

According to Habermas' Theory of Communicative Action as cited by Ngwenyama (1997b, p. 151), breakdowns in communication may occur "when a person fails to observe the norms or fails to understand the actions of other persons. I consider such breakdown processes may be elaborated or explained through the context of Habermas' notions of linguistics communication."

Aristotle:    "Eddie, I appreciated that you have presented a bottom-up understanding for extracting the effective structure of human emancipation.  What about Habermas' linguistics communication, which, in my understanding, relates    to thinking processes and is applied to facilitate personal learning or sense making interpretations?"

Eddie:    "In order to answer your question, we need to look into the formal features of linguistic communication through the lens of the critical social theory paradigm of both Habermas and Ngwenyama and Lee (1997).    As mentioned earlier, Habermas distinguished the cultural and social sciences (our surrounding subjective worldview) from the natural sciences (our objective worldview) based on their objects and the appropriate means for knowing them.  That is, according to Habermas, as cited by Pusey (1987, p. 87), the natural sciences refer "to phenomena that is opaque to thought (eg observation of uniformities in the actors behaviour through the outside perspective)".  However, the humanities "which engage texts, verbal expressions and actions could be investigated from the inside through an understanding of the author".

The issue of linguistic communication often arises around discussion and the criticisms of debate (Klein and Hirschheim, 1992, p. 290). For me, how criticisms of debate relate to linguistic communication, is through the interpretation of human behaviour. This is accomplished by reconstructing a person's internal cognitive and learning processes through dialogue or discourse (Klein and Hirschheim, 1992, p. 292). In this, I have come to recognise the influence of the learning culture, that is, organisational tacit knowledge, on the participants' thinking and behaviour and the outcomes resulting from this change. In doing so, I am able to provide thick descriptions that reveal the reasons behind the research interest that establishes the research contexts. Likewise, these thick descriptions allow the readers to judge the worth and merit of my major research, this through their own personal reflection in relation to some form of acceptable truth."

Aristotle: "Eddie, are you saying that judgements through personal reflection may produce some form of acceptable truth?"

Eddie: "I believe so. As Mallery et al (1986, p. 2) mentions:

> the phenomena of natural science concerning knowing could only be studied from the 'outside', that is through observation of uniformities in the research participant's behaviour and these uniformities could only be explained via the construction of causal laws. However, in the phenomena of personal reflection that is opaque to thought, this could be investigated from the 'inside' through an understanding of the research participant's experiences and intentions. Thus a reflective research methodology could reliably and

intelligibly account for itself through the
internal cognitive processes (eg. personal
reflection) which motivated and gave meaning
to each of them. (p. 2)

Aristotle:      "Eddie, could your personal reflection be facilitated by an
understanding of Habermas's concept of 'lifeworlds'?"

Eddie:          "I believe so. As Habermas mentions, every human group
involves a lifeworld. In discussing the concept of lifeworld,
Habermas (1984) cited by McCarthy (1984, p. 5) claims that
the lifeworld refers to linking action theory more
convincingly with the rationalisation process. It has three
dimensions: (1) culture, (2) society and (3) personality. In
another discussion of the lifeworld concept, Habermas cited
by Lechte (1994) claims it is "the world of everyday life, the
total sphere of an individual's experience, including the
stock of previous experience. It is the biographically
determined situation into which the individual is inserted,
willy-nilly. This is the world as taken for granted in which
individuals seek to realise pragmatic objectives" (p. 187).

According to Habermas (1987, p 120), it is this lifeworld
concept that links the concept of communicative action
firmly to the coercive forces of society. Communication
action relies on a cooperative process of interpretation in
which participants relate simultaneously to something in the
objective, the social, and the subjective world's (p. 120).
That is, communication refers to the activities of an
individual so he/she may gain recognition of the validity of
their utterances, particularly those involving language (p.
121). To understand fully the notion of reflection, one must

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share or be willing to share, one's lifeworld understandings."

**Aristotle:**     "Eddie, are the participants of the organisations you are researching are embedded in lifeworlds?"

**Eddie:**     "Yes, I believe my colleagues in the those organisations do share the background-knowledge of lifeworld in the context of their organisations. That is, they would develop their own distinct lifeworlds, to varying degrees, during their time working as part of the organisations. In understanding the notion of a self-reflective methodology in exploring both tacit and explicit knowledge, I realise that culture may have an implied influence and I have acknowledged this as part of the big picture."

**Aristotle:**     "There is much to think on in what you say, Eddie. Following the discussions of Habermas' ideas by Orlikowski and Baroudi (1991, Pp.113-119), they mentioned that the positivistic approach in information systems research has been shown to be repeatedly flawed in its application to information systems development within the context of organisational 'lifeworlds'. What is your opinion?"

**Eddie:**     "In my journey searching for a better model for information systems research, I found that many systems development projects (including knowledge management systems) were abandoned or had failed (Lyytinen and Hirschheim, 1988; Orlikowski and Baroudi, 1991; Davenport et al, 1996), due to little or no communication with the social actors or participants. There was a failure to achieve consensus due

to misunderstandings or mistrust about the development process For example, Gibbons (1987, Pp. 11-12) argues that "the concepts present in the language of the positivist research philosophy cannot reflect the everyday language usage of the study participants, as these are considered too ambiguous and subjective" (Pp. 11-12). From this, I realised that the conservative cultural values that underpin the information systems 'lifeworld' perspective function within the social practices of information systems development (p. 13).

Using the critical social theory perspective, I would see an emancipator practice of involving open discourse followed by critical discourse that should result in political action. In the research I have concentrated only on open discourse (through myself, the reflexive practitioner, with the voice of my psyche) and then on inner discourse (through the innate wisdom of the anima referred to as the action-researcher, see Chapter Six). It is to another theoretical perspective on information systems research that I turned to find ways to balance my perspective on open discourse in conducting major research. With that, I think it is time for a recess."

Having discussed the developments in my philosophical theoretical framework, the next section outlines the procedures embodied in the research design.

## 5.3. RESEARCH STUDY DESIGN

From the literature review and the definitions given in Chapter Two, I assert that researching the subject of knowledge management is by focusing on a particular knowledge management system such as WebAccounting.

However, I came to learn that in order to attempt in understanding of the research subject, whether in topic area, in epoch, in theoretical synthesis, or in an engagement with conceptual issues, this would involve the use of study design pathways to enlarge its theoretical understanding. Thus, the adoption of a study design pathway is necessarily to seek answers to the research question put forward in Chapter One, that is, 'How successfully does WebAccounting operate as an agent in converting tacit knowledge to explicit knowledge?' This new study design pathway is based on the architecture of the five-stage knowledge product model by Meyer and Zack (1996, Pp. 44-45).
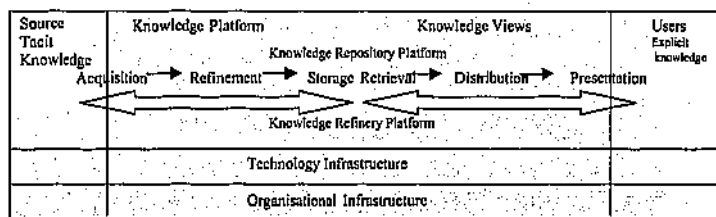


*Figure 2.2:* Architecture of Knowledge Products (Meyer & Zack, 1996)

Figure 2.2 above illustrates how the study design of the architecture of managing tacit knowledge, it is encompassing five distinct evaluations, and is based on Meyer and Zack's approach to evaluation of tacit knowledge. Also shown in figure 2.2, is the sequential undertaking of (1) acquisition, (2) refinement, (3) storage retrieval, (4) distribution, and (5) presentation. This is elucidated in Figure 6.1 and 6.2, (see Chapter 6), which shows an overview of the knowledge management architecture models of Organisation A and Organisation C and a description of the processes for each evaluation phase. Accordingly, the specific questions addressed in the context of managing the architecture of the tacit knowledge evaluation phase of the study were as follows:

1.   The organisation's commitment to effective and efficient knowledge management;

2.   The organisation's knowledge management architecture;

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3.      The organisation's method of processing flows of information within knowledge management (integrative or interactive application);

4.      The challenges faced in adopting WebAccounting;

5.      The impediments faced in adopting WebAccounting.

## Research Methodology

As my study involves social and organisational contexts with human science hermeneutical dimensions (ie. the process of mimetics through reconstructions of facts by the understanding of its meanings and intentions rather than by deductive explanation (Standing, 2000), it is suggested that an ethnographic reflection on professional practitioner case study methodology is most appropriate.   As mentioned in the beginning of this chapter, I have adopted a mainly ethnographic, critical social theory approach, with elements of heuristic inquiry.  I studied two cases in-depth, OrganisationA and OrganisationC in an attempt to gain empirical and interpretive understanding of their results, that is, in terms of the conversion of tacit knowledge to explicit knowledge, by their adoption of the WebAccounting processes.  These organisations employed me during the time when WebAccounting was operational.  I was able to observe ethnographically and experience in-depth, virtually all the aspects of WebAccounting referred to in this thesis from the perspective of a knowledge worker.  As a reflective practitioner, I kept notes and documents during that time and reflected upon the empirical qualitative data for this research.  At certain points, I will refer to this research by giving examples and vignettes to illustrate and explain the issues at hand. For me the concept of vignettes emerged as a significant issue because they examine topics from multiple perspectives (Ellis and Bochner, 2000, p. 740). These vignettes illustrate through the thoughts and text of an 'intra-subjective' style (p. 741). This creates a self-inquiry that uses reflective comments to expose personal thoughts about the conversion of tacit knowledge to explicit knowledge, by the adoption of WebAccounting.

The following flow chart (see Fig 5.2, below) presents the ethnographic reflection on the professional practitioner case study methodology used in this study.   In phase one, the philosophical perspective, either the interpretivist or the positivist

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or both, influences the methodology. The ethnographic-reflective-practitioner-practice paradigm employing critical social theory narrows the interpretive approach. Then comes the performing of qualitative ethnographic reflection adopting the critical social theory perspective. In phase two, the selection of research instruments that includes both face-to-face interviews and documentation, is outlined. Then the establishment of data collection procedures takes place through the recall of the reflective practitioner data. Then the application of the hermeneutic approach takes place on the interpretation of interview transcripts. In phase three, the analyses of data occurs using an ethnographic interpretative approach through a data meta-matrix. The processes of discovery, observation, documentation, and assessment were integral aspects of the methods employed in this stage of the study. Finally, comes the presentation of the recorded summary of the interpreted findings, which includes the reflections of the reflective practitioner.

Figure 5.2: Is a diagram illustrating the methodology flow chart showing the progression of the research. This figure (5.2) also demonstrates how I have endeavoured to combine critical social theory with a reflective phenomenological approach.
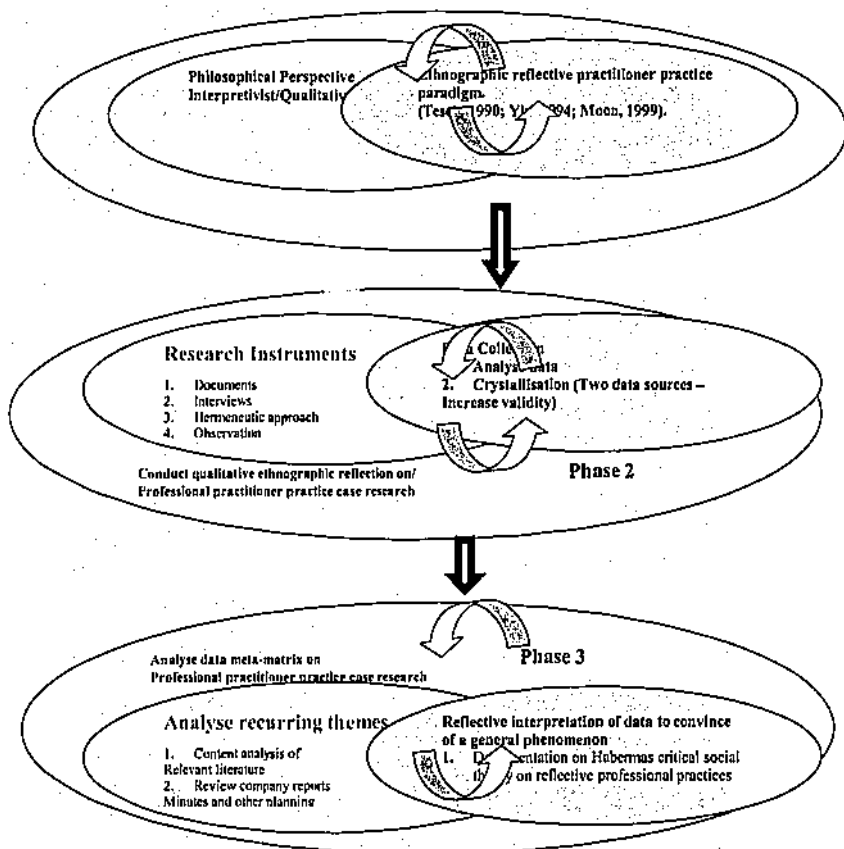
*Figure 5.2.* A diagram illustrating the methodology flow chart showing the progression of the research.

## Research Design

In this section I outlines the procedures embodied in the research design. Figure 5.3 shows a qualitative case study methodology employing Habermas' critical

social theory perspective within a phenomenological, reflective professional practitioner approach that is used in this study.

However, Habermas (1987a, p. 341) points out that "any methodology that systematically neglects the interpretive schemata through which social action is itself mediated, is doomed to failure." Habermas demands the "grasping of 'meaning' that is constitutive of social reality." Hence the qualitative nature of this type of research approach is only enhanced by "experiential accounts or lived-experience descriptions (which) are never identical to lived experience itself..."(p. 342). In similar vein with Habermas' concepts, Van Manen (2000, p. 2) says

> "...all recollections of experiences, reflections on experiences, descriptions of experiences, taped interviews about experiences, or transcribed conversations about experiences are already transformations of those experiences. The upshot is that we need to find access to life's living dimensions while hoping that the meanings we bring to the surface from the depths of life's oceans have not entirely lost some the natural quiver of their undisturbed existence" (Van-Manen, 2000, p. 2).

Moreover, case study research allows cross-case analysis and comparison, and the investigation of a particular phenomenon in diverse settings (Yin, 1994, p. 46). As the adoption of knowledge management systems, particularly in Australia, is still in the emergent phase, I felt that the case research methodology would be most appropriate. Hence, case study research is best utilised when the goals of the researcher and the nature of the research topic influence the selection of a strategy (Yin, 1994, p. 47). Case research is particularly an appropriate for certain types of problems, such as those in which research and theory are in the early, formative stages (Yin, 1994, p. 47).

Figure 5.3 below indicates the formal research design process for this study. The shaded boxes indicate modification to the Yin case study model, incorporating elements of Habermas' critical social theory perspective and utilising a phenomenological, reflective professional practitioner approach.
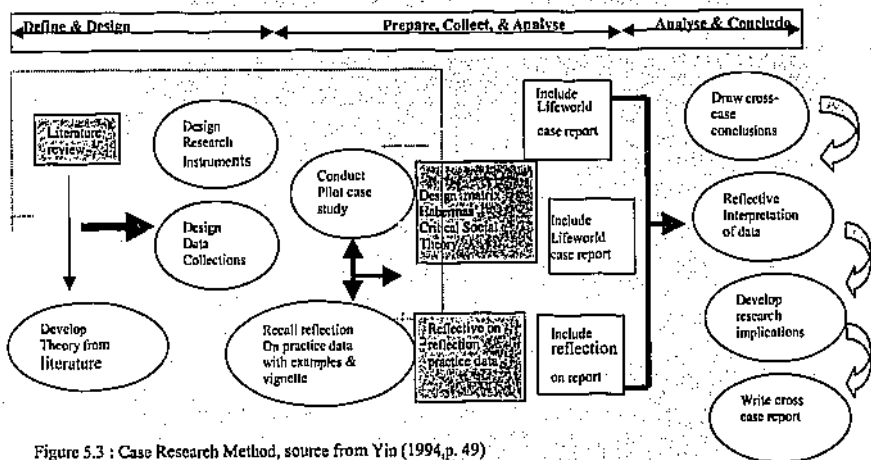
Figure 5.3 : Case Research Method, source from Yin (1994, p. 49)

Firstly, the incorporation of the literature review as the first step I thought that theory development, as a second step, would be more fruitful if an initial review of the literature and the identification of methodology for the research were included as stated at the beginning of this chapter.

Secondly, the selection of research instruments and the definition of specific measures in design and the data collection process were established.

Thirdly, the adapted model includes an additional step, shown by the upper central shaded box. This is the design for a meta-matrix for coding and analysing the data, as outlined by Miles and Huberman (1994, p. 234). A meta-matrix is " the 'crossing' of two lists, set up as rows and columns." The purpose of this method of analysis is to enable the data to be analysed visually, the data from all cases easily compared and contrasted, and as well, the themes and patterns identified.

Finally, a reflective practitioner interpretation of the whole case is incorporated. It includes the usual reflection on data collected, together with examples or vignettes from the researcher's experience during his time with the researched organisations, which further reflects on the empirical, qualitative data obtained (Ellis and Bochner, 2000, Pp. 740-743). I believe that this iterative process of data collection and the analysis of the collected data and its reflective interpretation will illustrate and explain the issues at hand.

## Case Study Employing Reflective Practitioner Processes

Interpretation of the results includes reflective practitioner practices. As a reflective practitioner, I critically reflect on the responses by the participants, and their emotive feelings at that time, the time when each distinctive voice speaks from its own personal and unique experiences within their individual lifeworld (Moustakas, 1990; Tesch, 1990). Moreover, data used includes researcher recall as well as company documents and portfolios. Reflective practitioner data forms an iterative process in the write up: however, the text of the company documents can be analysed using a content analysis approach which involves searching for structures and patterns in text as a basis for making inferences. According to Yin (1994, p. 45) content analysis of documents can assists in creating the "how" or "why" questions, which can be employed in the interviews.

Additionally, this holistic case study design employs an ethnographic, critical social theory approach, including elements of heuristic inquiry and involves a combination of secondary data and face-to-face interviews with the research participants. The analysis and interpretation of the patterns, viewpoints, insights, events and actions that emerged during the research journey are also important tools in providing meaning for and an outcome for this research. Each introduced meaning is through the voice of the participants and then discussed from the viewpoint of the reflective practitioner. According to Van Manen, (1997, p. 7), this style has basics of a confessional ethnography, where the dialogue addresses

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the epistemological beliefs and assumptions that underpin the participants practices in adopting the role of managing tacit knowledge facilitator.

As mentioned by Yin (1989, p. 23) a case study "is an empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used." This study fits within the context of this definition. As this study investigates the adoption of WebAccounting in facilitating knowledge sharing: the boundaries between tacit knowledge and explicit knowledge in knowledge management are not clearly evident, and multiple sources of evidence, including documentation, interviews and direct observations are employed by the research.

Miles and Huberman (1994, Pp. 235-237) and Yin (1989, p. 25) have supported the use of case studies adopting a qualitative research methodology. Miles and Huberman (1994) have given emphasis to its provision for a chronological flow of events that extracts in-depth information from a close lived experience. For me, the concept of lived experience would offer a useful interpretive perception by not only exposing my underlying beliefs, but also including my responses to the daily interactions with my participants (Ellis and Bochner, 2000, p. 743).

My work is a record and illustration of lived experiences that Tech (1990) refers to as "ethnomethodological interactionism." For example, the investigation of managing tacit knowledge through WebAccounting is satisfied through examples, narrative descriptions, dialogues, stories, autobiographical journals and vignettes, draft reports and documentation (Ellis and Bochner, 2000, Pp. 744).

As a reflexive practitioner, I believe it is important to translate my practical reasoning into practical knowledge that is potentially useful in investigating the issues of managing tacit knowledge through WebAccounting. I address the three recurring themes which form the basis of this study, and these provide me with an interrelated matrix which has derived all the issues and outcomes relevant to the management of knowledge through WebAccounting. They are:

1. The role of WebAccounting's knowledge repositories in converting tacit knowledge to explicit knowledge.

2. The role of WebAccounting's on-line formats in converting tacit knowledge to explicit knowledge.

3. The organisational changes resulting from the conversion of tacit knowledge to explicit knowledge through the WebAccounting system.

Additionally, the criteria for these recurring themes include a range of findings that have demonstrated that the use of reflective professional practise promises to be an improvement over existing strategies. Chapter six will explain this. The procedures used to support the above themes included:

1. A review and qualitative content analysis of relevant literature and documentation on Habermas' critical social theory on reflective professional practices;

2. A review, examination and content analysis of relevant Organisation A and C reports, minutes of meeting, and other policy and planning document;

3. Structured interviews with key personnel of Organisation A and C; and

4. An incorporated account of reflective professional practice to illustrate and elucidate the issues at hand.

## 5.4. RESEARCH SETTING

**The Following Processes Were Used in this Research: Interviews**

Interviews provide a means of obtaining data that allow for the clarification and probing of issues surrounding an evaluation object (Burns, 1994; Guba and Lincoln, 1981). Schumacher and McMillan (1993) suggest that a qualitative interview may range from an informal conversational interview through to a standardised open-ended interview. Throughout the interview process, I focused

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on the characteristics of employing tacit knowledge by the participants. However, the enriching of the participant's lived experience through 'Dialogue' with the reflexive practitioner and action researcher was possible (Richardson, 1994, p. 522).

As a result, six senior managers from two participant organisations OrganisationA and OrganisationC were invited to take part as well as technical supervisors, operations managers and knowledge worker. Each interview took about one hour, focusing on the research questions identified in Chapter One.

Also conducted were interviews with WebAccounting consultants to gain alternative perspectives on the topics and issues raised by the study. I asked these consultants questions relating to the relationship between WebAccounting, its organisational impact, success factors, and success indicators.

### Interpretation of The Findings

Interpretation of the findings of this research included elements of a dialectical hermeneutics approach. According to Boland "hermeneutics is the study of interpretation, especially the process of coming to understand a text" (p. 439). Hermeneutics, originating with research interpreting ancient religious texts, "has evolved to address the general problem of how we give meaning to what is unfamiliar and alien" (p. 440). In short it is concerned with the bringing out the meaning of a text or text analogue. The data in this study, the interview transcripts and reflective practitioner data, were analysed in terms of themes, motifs, and key words. Throughout the interpretation of the finding process, I also interspersed quotes to give the participant's voices into the data to enhance the qualities of "apparent truth" and "authenticity" of the findings (Richardson, 1994, p. 522).

### Procedure

Interviews and telephone calls were used to collect in-depth information about the perceptions of these individuals with specific regard to the research question. The

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provision of an ethics clearance, began at the start of March 2002, and was made known to the eight participating candidates. Follow-up calls were at times necessary to ascertain correct interpretation of ambiguous and incomplete responses. Observation and notation of body language, tone of voice, reaction to distractions, and personal appearance, occurred along with coding and interpreting the interview transcripts.

The interview questions were characterised by a semi-structured format (Fontana and Frey, 1994) and followed a funnel-effect whereby open-ended broad questions were initially asked to probe on issues, followed by more focused and specific questions (Hall and Rist, 1999, Pp. 291-299).

As noted in Chapters Two, a review of relevant literature was an integral aspect of the present study, both in order to provide an understanding of the setting and to establish the need for reflective professional practice development.

I asked a series of open-ended questions during the interviews. The interview questions covered the following areas:

1.  The organisation's commitment to effectively and efficiently manage knowledge;
2.  The organisation's knowledge management architecture;
3.  The organisation's method of processing flows of information within knowledge management (integrative or interactive application);
4.  The challenges faced in adopting WebAccounting;
5.  The impediments faced in adopting WebAccounting;
6.  The role of knowledge repositories within WebAccounting system in converting tacit knowledge to explicit knowledge;
7.  The roles of WebAccounting on-line format in converting tacit knowledge to explicit knowledge;
8.  The organisational changes resulting from the conversion of tacit knowledge to explicit knowledge through WebAccounting system;

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I wrote and noted all interviews by hand and not by tape recording at the request of informants, which resulted in an easy flow of information. During each interview, I noted overall observations as well.

**Validity and Reliability -- Crystallisation**

The use of crystallisation techniques mitigates issues of biases during the collection and analysis of case data (Richardson, 1994, p. 521). Throughout the interpretative process used here, I use reflection as a technique to solicit inner dialogue and to encourage inner growth leading to balanced wholeness (Williams, 1996). Through reflection, I am able to *validate* partially my findings, as Richardson (Richardson, 1994, p. 521) recommends, through crystallisation. Through crystallisation I seek to discover or uncover propositions of multiple perspectives where these perspectives are socio-psychological constructions forming an interconnected whole (Tesch, 1990).

Taylor and Williams (1993) and Whitehead (2002) describe crystallisation as the use of multiple perspective of qualitative data collection methods, which increase the validity and reliability of results through the provision of a comprehensive interpretation of the adoption of learning via tacit knowledge, rather than with the traditional triangulating intention. The major qualitative research methods used for this study were semi-structured one-on-one interviews and reflective practitioner processes. Such interviews have a history of use by academics in other reflective related studies (Taylor and Williams, 1993; Whitehead, 2002).

**Data Analysis**

The analysis of data collected in this study is as follows:

In particular, the analysis of the interview transcripts was executed utilising systematic coding via content analysis (Morgan, 1988). Coding of the content was used to identify and develop relevant essential themes. As part of this process, collection and identification of themes and patterns allow the researcher to understand and group issues (Huberman and Miles, 1994). I performed

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separate content coding for each case interview transcript. I compared the resultant themes across all interviewees to highlight common points and to develop relevant essential findings. I then combined the cases and I conducted cross-case analyses. I framed the analyses by the theoretical model as shown in section 5.1, and compared and contrasted with the literature and themes and issues presented as shown at the beginning of this chapter. Throughout the process, I added to the general analyses and, I believe, enriched these analyses by the addition of the reflection practitioner data. I discuss this realisation more fully in Chapter Six.

## 5.5. METHODOLOGY LIMITATIONS

As with any research, there were methodology limitations. These can been seen to include:

1.      the limitations of qualitative research in general;
2.      availability of interviewees;
3.      the number, size, and selection of case studies.

### Limitations of Qualitative Research

Unlike quantitative research, which has a strict set of procedures for each technique used, the nature of qualitative research allows for a greater flexibility of the interpretation of the results (Denzin and Lincoln, 1994; Copper, 1999). This flexibility means that there is a lack of comparability between interviews because of the lack of standardisation (Sampson, 1996). The lack of standardisation of the interview outcomes obtained from this study requires that the researcher draw intelligent conclusions from the general viewpoints presented.

Some quantitative researchers claim there are limitations inherent in using a case study approach such as uniqueness and low dependability of the results. On the other hand, Maykut and Morehouse (1994) indicate that several elements in the procedures for collecting and analysing the data in qualitative research findings may increase the trustworthiness of the findings. Some of these elements include

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using multiple methods of data collection (referred to triangulation) and the building of an audit trail through documentation of all procedures (Denzin, 1988; Worthen and Sanders, 1987). Also, the use of techniques such as member checks which refer to the process of asking research participants to tell you whether you have accurately described their experience (Maykut and Morehouse, 1994, p. 147) can assist in increasing the reliability of data collection procedures.

## Limitations of Availability Of Interviewees

Busy schedules of essential players in the participating organisations placed time limits on interviews. Rushed responses to questions that I asked were common during these times. This was a research limitation, so to maximise the utility of an interview; 1 made follow-up calls to clarify uncertain areas and probe questionnaire issues further.

While undertaking the investigation, the researcher, "I," wore a number of additional hats during the course of this study, such as:

1. Project coordinator: which involved all aspects of co-ordinating the knowledge management project, from promotion of the staff development program through to the organisation of venues, materials, and so on;

2. Group facilitator: which included the facilitation of the entire knowledge management project;

3. Evaluator: who required obtaining responses then weighing and judging the information received.

While undertaking the investigation, I was an ex-colleague of the OrganisationA and OrganisationC participants. By virtue of being an insider, I was in a unique position to understand and empathise with colleagues taking part in the study in ways not open to an outsider (Andersoll, 1983, Atkinson and Hammersley, 1994; Borg et al. 1993).

**Limitations of The Case Study, Both In Size And Selection.**

This study is limited to two Australian based organisations. The limitation of sample size is largely due to financial constraints, availability of existing users and the fact that there is only a dozen or so organisations in Australia that have adopted the WebAccounting software at present. Comparison with organisations using WebAccounting in other parts of Australia and abroad has not been possible, again due to financial and time constraints.

Further to the limitations arising from the qualitative case study design, the small number of study participants also limits the general use of the findings of this research.

# CHAPTER 6

## CASE DESCRIPTIONS & ANALYSIS

*Reflexivity doesn't mean simply to "reflect on" (which usually comes later, or too late) but is an immediate critical consciousness of what one is doing or thinking or writing. However, since it is impossible to do anything innocently in our age of lost innocence, reflexivity can easily slide into ironic self-consciousness, cynicism, and politically correct hypocrisy.*

*(Appignanesi &Garratt, (1995), Introducing Postmodernism)*

## OVERVIEW OF THE CHAPTER

Will my heuristically critical reflection practitioner approach lead me, taking Appignanesi and Garratt's (1995) warning, to "slide into ironic self-consciousness, cynicism, and politically correct hypocrisy"? This chapter revisits OrganisationA and presents research on OrganisationC. These companies employed different Website design consultants to develop company-specific WebAccounting GroupWare systems, allowing an inter-organisational exchange of codified information in a structured, computer-processable form.

This chapter describes an heuristically critical reflective practitioner approach to augment my ethnographic experience of being professionally involved in the development of knowledge sharing through WebAccounting in these organisations. During the research, I became increasingly conscious that, through my professional and ethnographic experience and knowledge, I was probably manipulating the questions I asked the research participants. Thus, I concluded that the research had left me merely with a collection of anecdotes. However, used wisely and ethically, this research material could prove to be significant research value. I used reflections of my past experience, as well as my emerging hopes and visions and goals for the future, so that my knowledge had chronological dimensions as well.

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As a guide for the reader and myself, I explicitly refer to the henristically critical reflective practice research approach throughout this chapter. However, sometimes, my use of these reflective practice elements will be tacit and the reader might become more aware of them than I might. At other times I will refer to these openly when I wish to add my voice as a researcher on issues of rigour and relevance, or when I wish to assist the reader through my own personal experiences. In the discussion section of this chapter, I will refer to how I used reflective practice inquiry to describe the contexts, processes, and findings of my research.

The starting point of the analysis and discussion of each case is the theoretical frameworks presented in Chapter Five applied to the following:

1. The organisation's commitment to effective and efficient knowledge management;
2. The organisation's knowledge management architecture;
3. The organisation's method of processing flows of information within knowledge management (integrative or interactive application);
4. The challenges faced in adopting WebAccounting; and
5. The impediments faced in adopting WebAccounting.

In addition, the interview transcripts are included in my presentation of the cases, and analysed by systematic coding by means of content analysis (Morgan, 1988). Coding of the content was used to source, identify, and develop relevant essential themes. Collecting and identifying themes and patterns allows the researcher to understand by grouping issues together (Huberman and Miles, 1994). The separate preparation of the content coding analysis for each case interview transcript, resulted in themes that were then compared across all interviews to highlight common points and to develop relevant key findings. Then I treated the cases as an entity or whole, with their themes, and then subjected them to a series of cross-case analyses. I framed these analyses using the theoretical model as shown in figure 2.2 (chapter 2). They were then subsequently compared and

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contrasted with the literature using themes and issues presented in chapter two and five. During the whole process, reflection and reflective analysis of the reflection practitioner data informed and enriched these analyses.

## CASE STUDY ONE: OrganisationA

### Background information

I was a part-time consultant with OrganisationA during the time when WebAccounting was installed to when it was fully operating. I was thus able to ethnographically observe and have in-depth experience in most of the aspects of WebAccounting referred to in this thesis from the lived perspective of a knowledge worker. As a reflective practitioner I kept relevant notes and documents during that time, and reflected upon the empirical qualitative data for this research. At certain points, I will refer to this research by giving examples and vignettes to illustrate and explain the issues at hand.

### Commitment to Effectively and Efficiently Manage Knowledge in OrganisationA

OrganisationA, as a car dealership, has adopted the strategy of developing a sustainable competitive advantage by adding value, instead of merely selling cars, and this was to be accomplished by having exceptional levels of customer satisfaction. This requires not only knowledge of the automobile market, but also real and intuitive knowledge of a potential and real customer's personal needs and preferences. The management of OrganisationA recognises that selling cars requires that sales staff to have practical industry experience, particularly in solving customer problems. However, this invaluable practical knowledge is mainly tacit and resides primarily in the individual minds of their senior staff. This practical knowledge is chaotic and complicated, that is, within the processes of making a decision, a person has to account for many variables, often subconsciously, and the necessary skills are only acquired after years of experience with the firm and other experiences, in all facets of this industry. As a

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result, the management of OrganisationA believes that in today's competitive environment, its entire knowledgeable and experienced staff should engage this practical knowledge using the WebAccounting methodology in solving their client's problem. In light of this, OrganisationA has already posted much of its explicit knowledge regarding auto services and merchants, past and prospective customers lists and new mechanical services knowledge into on-line electronic repositories comprising sets of the integrated WebAccounting knowledge management system.

*An entry from my reflection practitioner journal describes the OrganisationA WebAccounting system:*

> *For some businesses increased Internet hits to their web page lead to greater revenue. With WebAccounting, staff members do not need to spend many hours looking for information. Since WebAccounting is itself intrinsically a web site, most WebAccounting pages offer links to other pages and opportunities for more web surfing. For those interested in sharing information, WebAccounting provides a Comment Board whereby staff members can post messages or light-hearted, friendly greetings to others. WebAccounting can thus provides an Intranet venue for staff looking for that hard-to-find information or knowledge. Other WebAccounting features include the following: chat rooms for group discussions, message boards, information about deportmental reports, new daily releases of research, and staff e-mail addresses. My conclusion from this reflection is that the WebAccounting system assists staff through virtual face-to-face meetings, exchange of e-mail, webs surfing, intrinsic rewards and motivation.*
> *(Note: Reflection practitioner memo, May 2002, file3, p. 3)*

### Knowledge management architecture of OrganisationA

OrganisationA has on-line Forum processes, through software known as WebAccounting Forum, which provides the company with competitive data from which tactical strategies can be evolved in order to be exceptionally competitive. This Forum allows staff of OrganisationA to establish, place, allocate, share, and

incorporate the new practical tacit knowledge base and use the sum of staff experience to support customer's requests.
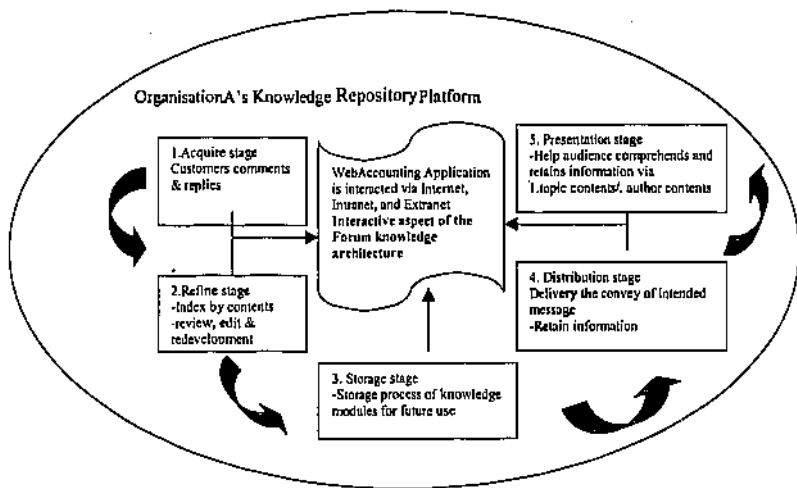


*Figure 6.1.* A diagram showing interactive aspects of Organisation A's knowledge management architecture model. (Adapted from Meyer and Zack. 1996, p. 47)

Figure 6.1 describes the processes of Organisation A's knowledge management architecture. Meyer and Zack used this knowledge management architectural process in investigating the knowledge management development processes of Buckman Laboratory (based in U.S.) in 1995. As for Organisation A, the WebAccounting Forum facilitates two types of knowledge management processes: firstly, the direct and ongoing exchange of knowledge through the interactive aspect of the Forum's knowledge architecture, and secondly, the Forum's ability to support the refining, archiving, and recording of knowledge exchanges for future use. For example, with the interactive WebAccounting technology, the users may communicate through the Forum with their audience by means of a presentation that is an active and exciting experience. This also allows the user to interact with other software or communications technologies, such as the Internet, Intranet, and Extranet to gather or process information.

These processes are part of an integrative aspect of the Knowledge Management Architecture Model, see figure 2.3, Chapter 2.

*From my experience and reflection on the Web Forums at Organisation A, it became apparent that the WebAccounting portal is a site designed to be the centre of an Internet browsing session. The forum portal caters for knowledge worker research in addition to offering message boards and a chat line. These pages offer staff and customers a doorway to the discovery and the exchange of information. The advantage of the WebAccounting Forum Board is that people can post messages from wherever they can access the Internet as the forums hosted by WebAccounting can be accessed by authorised customers or suppliers through a pin-security system. Customer and Organisation A staff can meet virtually and share ideas, and some customers use Forum boards to put out feelers for vehicles they want to purchase or trade, while others list vehicles for sale. For example, suppose a customer has a dilemma over which vehicle to offer in trade, or how much to ask for her trade on her vehicle. Someone in Organisation A, who knows the car market, can help her to determine what type of deal would be best. The Forum board also provides suppliers with an arena for listing their inventories. The WebAccounting forum board offers links for continuous updates of information and provides a virtual portal where customer can browse the virtual aisles with a virtual shopping basket and can even go on a virtual tour of the product and facilities. My reflection on the WebAccounting forum board appear to be in similar vein to McMaster, 1995; Scarbrough, 1999a, 1999b; Hauben and Hauben, 1997; Remenyi, 1999; Miller, 2000 and Rheingold, 1995 (See chapter two). These authors argue that a Web-based knowledge management system is an extension of information system management. Where the exchange of business information through an IT network that is the electronic exchange of information between separate organisations (B2B), or between an Organisation and its customers (B2C), may be used to support successful business partnership.( Note: Reflection practitioner memo, May 2002, file3, p. 3)*

**The Method of Processing Flows of Information within Knowledge Management at Organisation A**

This section describes the basic steps for processing OrganisationA's information. As mentioned above, OrganisationA's method of knowledge presentation may appear to be similar to Buckman Laboratory (Meyer and Zack, 1996). OrganisationA arranges several knowledge management roles under the WebAccounting system. For example, senior and experienced staff members take a leading role in the advising of junior staff and in providing the tactical strategies in solving customer's problems. Then these activities are reviewed by the IT staff to identify useful links for storage in an on-line repository. The links are captured, revised, and condensed into keywords, then these keywords are codified, collected, and put together to form explicit knowledge. This knowledge then becomes available and easily used by the staff members. The IT personnel of OrganisationA encourage staff involvement in using the Forum. For example, WebAccounting Forum is able to deliver on-line services or recommendations, such as current repair and maintenance issues to mechanics as they require. This allows the service managers at the head office of OrganisationA and their mechanical staff at different service outlets to interact with each other. This interaction enhances communication and encourage active participation in a media-rich learning process. Moreover, these tools allow sales personnel to search through WebAccounting for publicly available information about potential customers as well.

*In my own use of WebAccounting Forum, I noted the ease with which users could post items or enter topics for discussion. Once a post appears, other users can add a sub-topic under the main topic in outline form. This enables discussions to flow easily without a lot of off-topic drift. If any staff member wants to move on to another topic, then s/he simply finds one that suits his or her needs or posts a new item. The WebAccounting system is thus powerful and easy to customise. I found numerous examples of staff using HTML code to add images and hyperlinks to their posts. In this manner, the WebAccounting Forum allows for continuous updates of information and provides codified content,*

*collected and integrated so that it becomes widely accessible, easily distributed, and easily used by all staff. ( Note: Reflection practitioner memo, May 2001, file3, p. 3)*

### A Challenge Faced by OrganisationA in Adopting WebAccounting

OrganisationA's ability to leverage its collective knowledge by means of WebAccounting's Forum is possible only because of the integration of this computer software with the culture and structure of the organisation. The management of OrganisationA quickly became aware that its staff would be reluctant to create, share, and exchange valuable knowledge. Therefore, it was a necessary part of the project to see the development and installation of a generous reward system for those engaging in the knowledge sharing processes inherent in WebAccounting. This reward system boosts cooperation, trust, learning, and innovation among staff members. It also motivates staff members to use WebAccounting during their own time as well as during business hours. Therefore, staff members often retain more knowledge with the adoption of the WebAccounting system. Not only is the knowledge stored in Forum of economic benefit to all, but it can also be revised and updated at a low cost. Such activity makes Forum not only an information asset to the organisation, but it is also a reliable and efficient means for sharing knowledge and solving common and unique problems.

### Impediments faced by OrganisationA in adopting WebAccounting

In the early stage of WebAccounting implementation, OrganisationA faced three major impediments to its aim of leveraging its collective on-line knowledge repository.

Firstly, some senior personnel felt that competition among certain staff members that worked against the sharing of knowledge. As one senior staff stated:

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Performance appraisals were on an individual basis. Some senior staff felt this was not beneficial to knowledge sharing as others may increase a competitive edge since knowledge has a use as a political basis of power and identity. (SO1, May 2002, file1, p. 2)

This quote highlights how a socio-cultural factor such as reluctance to share knowledge due personal power issues, can affect knowledge management.

Secondly, there existed a lack of trust between management and employees, and also among the employees themselves, and this worked against the sharing of knowledge, whether the Forum was used or not. As one employee stated:

Trust is vital. People cannot share their knowledge with others if there is no trust. People are afraid to share because they do not trust others. (SO2, May 2002, file1, p2)

This employee appears to be aware that trust and the encouragement of cooperation can provide incentives for those engaging in knowledge-sharing processes.

There was even a certain fear felt by some staff. An employee stated:

With the increased competitive situation, people are too much in fear of someone else taking their position to share their knowledge. (SO3, May 2002, file1, p2)

Thirdly, there were fears concerning job security, which could be seen to be a major obstacle to knowledge sharing.

**THE CASE OF OrganisationC**

**Background Information**

From the mid-1990's OrganisationC has existed as a stockbroking company and combines Internet technology with on-line investment to better service its client base. Employing over 30 staff, OrganisationC contains several business

operations most notably; on-line share trading, initial public offerings, and equity capital markets. Its current product and service offerings include:

- Public capital raising services such as public underwriting, providing on-line retail distribution of public offering shares, and other services including initial public offerings.
- Private capital raising services such as private equity, assisting private and public corporate issuers, and joint ventures investment.
- Investment portfolio services and disseminating free research reports on OrganisationC's web site.

By using the Internet to lower transaction costs drastically, OrganisationC has found a niche in the stockbroking industry. Membership is free, but requires a minimum bank balance of at least $1,000 in cash or securities, and the cost of trading begins at $20 for a market order. A Market Order is an order to buy or sell a security at the current market price at the actual time of the sale and has no 'stop loss' value that may prevent the order from completion or "filling." It is one of many types of orders, but is the simplest and cheapest to make and to complete (Training manual OrganisationC, 2001).

OrganisationC's website was designed and implemented by an external consultant and went "live" in August 2000. This WebAccounting GroupWare application implemented in the beginning of 2001 allows management to facilitate communication and electronic commerce by means of their Intranet with staff, clients, and investors.

I worked at OrganisationC as a part time consultant for 2 years, starting in January 1999. This period covered the whole installation time of WebAccounting within OrganisationC until it was fully operational in August 2000. I was able to observe ethnographically and to experience in-depth virtually all the aspects of the WebAccounting software referred to in this thesis from the lived perspective of a knowledge worker. As a reflective practitioner, I kept notes and documents during that time and reflected upon this empirical qualitative data for a research

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purpose. As I did in the case of OrganisationA, I will refer to this research by giving examples and vignettes to illustrate and explain the research issues.

**OrganisationC's commitment to effectively and efficiently managing knowledge**

OrganisationC is not only specialising in providing discount on-line share trading but also offers services of market information and industry analysis to investors. The management of OrganisationC realises that in today's environment it is vital to understand the concept, potential and implications of sharing knowledge and information by using a computer-based interactive technology such as WebAccounting. To control this issue, George, the CEO of OrganisationC anticipated that WebAccounting used as an on-line knowledge management system would allow all of OrganisationC's financial research data available on-line to staff and investors. Annual reports, prospectuses, and press releases were available for downloading and printing. Furthermore, the linking of these financial data allows further evaluation, and analyses using other reporting software, by means of importing the data from WebAccounting databases onto, for example, spreadsheets for greater comprehension.

*I noted that OrganisationC used WebAccounting in a manner that enabled its staff and investors to share useful information that they find on the World Wide Web. For example, when someone " surfed" a web page, the reference to this is an entry in WebAccounting's page store, together with some brief information about the page (eg, a summary of its contents). The user could attach the page to one or more of a number of interest groups. The page is then retrievable from the store in a number of other ways such as through searching for a word or a sequence of words. WebAccounting automatically displayed stored pages based on the user's profile of keywords or his choice of interest groups. When a page of potential interest had been stored, WebAccounting informed the users by e-mail. In this manner, the WebAccounting system was, and still is, useful for storing reports, prospectuses, press releases and financial data where it can be*

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*downloaded, printed and imported into spreadsheets for analysis. This encouraged co-workers to provide information to analysts and alerted interested parties to significant changes in OrganisationC's financial research data. ( Note: Reflection practitioner memo, May 2002, file3, p3)*

**Knowledge Management Architecture of OrganisationC**

In this section, I present an overview of OrganisationC's WebAccounting system. Figure 6.3 illustrates a diagram of OrganisationC's WebAccounting knowledge management architecture. As mentioned above, Due to the fact that the knowledge management architecture of OrganisationC has similar characteristics of another organisation, TRG investigated by Meyer and Zack in 1996, I use their research extensively.

Figure 6.2 outlines the hierarchy of analysis within WebAccounting for OrganisationC. In stage one, a range of knowledge modules examines the current market through the Market Activity process. These knowledge modules consist of the executive summaries, abstracts, main text, graphics, tables, and charts, and are stored in the "repository platform." The WebAccounting repository platform interacts with the WebAccounting Alert processes. This process allows the users to view and edit reports for their own purposes. The company updates its management and operations reports constantly, so the repository is always in an active state. The repository platform helps users reinforce learning by transferring information from short-term memory modules to long-term memory modules by means of the storage processes.

In stage two, knowledge modules are indexed and linked for flexible access, and clients/users can then navigate from one module to the next within a report, and access related modules across reports (eg. executive summaries only), or access particular modules directly. For example, WebAccounting allows client/users to know what is happening to their share trading businesses as well as knowledge about their risk management by means of information that is presented using a uniform and consistent technique.

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In stage three, the system querying, reporting, and the performance monitoring of these repositories enables OrganisationC to integrate its research knowledge across its databases for meta-analysis. These repositories allow OrganisationC to produce its standard monthly reports for internal use, for its customers, and for others. This opens the door to deliver knowledge by means of the Internet as well as building knowledge repositories to enable the research staff of OrganisationC to respond appropriately in their support of virtual research programs. For example, these repositories are accessible through a "Web Browser" where the "Web Browser" provides an interactive process by hypertexting capabilities or by accessing databases external to WebAccounting.

The OrganisationC knowledge Information Refinery Platform includes a five-stage process: acquire, refine, storage, distribution, and presentation as shown in fig. 6.3.

The first stage of the process, the acquisition stage, involves the collecting, evaluating, and interpreting market information, and reporting those results (a research report) by means of the Market Activity process. The second stage of the process, the refinery, involves specialist analysis and investigations. For example, the monitoring of the sizeable traffic of incoming research reports, looking for anomalies or collective trading sequences. In this manner, the refining process would provide to the presenters (research analysts) a powerful tool that is able to enhance greatly the value of these communications by delivering multi-dimensional source reports. The third stage of process, the storage, involves storage of this newly created knowledge for future use. The fourth stage of process, the distribution, involves the delivery of this new knowledge as a new message or as an addendum to a previous message. The fifth stage of process, the presentation, involves re-processing this newly created data into a suitable format to deliver a case analysis report to clients, investors or both using WebAccounting.
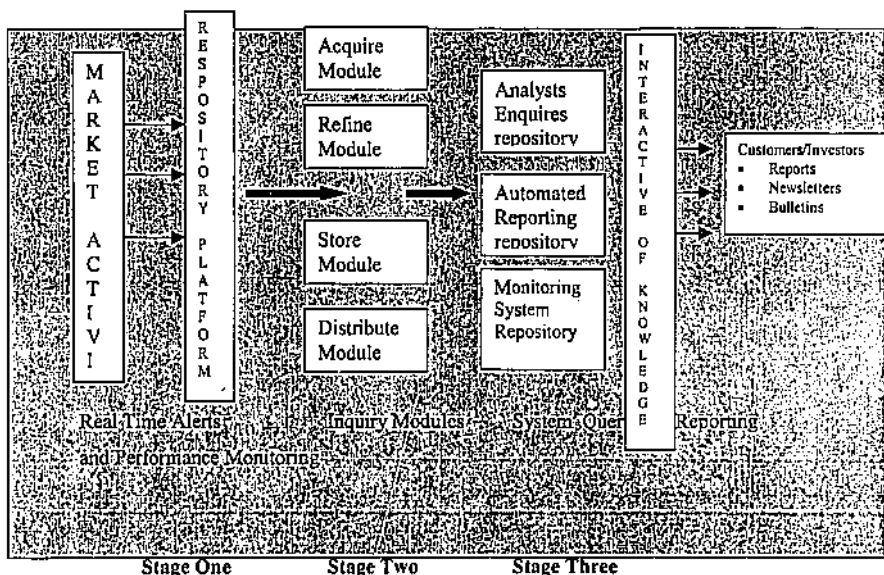
*Figure 6.2.* A diagram showing the hierarchy of analysis within WebAccounting (source: Training Manual of OrganisationC, 2001).
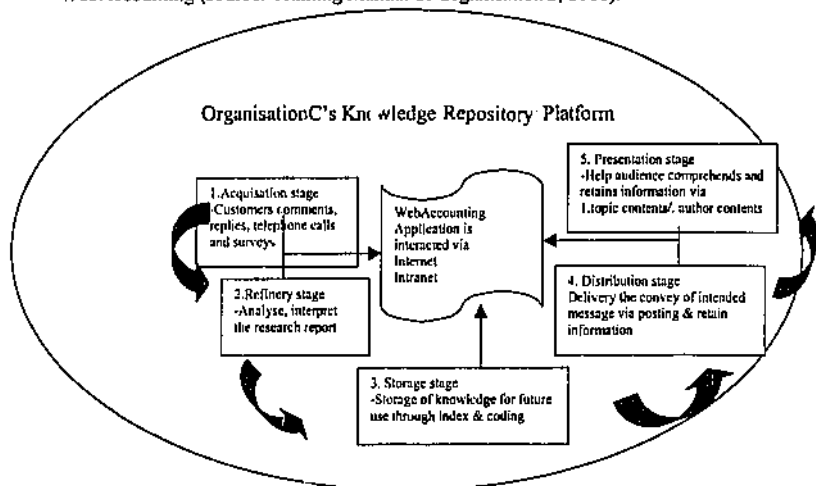


*Figure 6.3.* A diagram showing OrganisationC's Interactive Aspect of Knowledge Management Architecture Model. (Adapted from Meyer and Zack. 1996, p. 47)

These processes are part of the integrative aspect of the Knowledge Management Architecture Model of OrganisationC. The analysts of OrganisationC can communicate with their investors by means of a presentation that becomes more than a simple message. This new type of information transfer displays a sequential flow of explicit knowledge into and out of the repository platform. This integrative aspect of knowledge management has the potential to transform an audience from passive recipients of information to active participants of information creation.

*Reflecting from my experience at OrganisationC, I have concluded that, in order to successfully support knowledge management tasks, WebAccounting must be able to assist analysts in the tasks of (1) collection of information; (2) analysis of information (especially where the analyst requires depth of views), and (3) dissemination of knowledge (especially where the analyst requires a quantity of knowledge that needs to be targeted at a specific audience). WebAccounting is more likely to succeed when analysts work with their customers to identify precisely what are their knowledge requirements. WebAccounting, it would seem, is able to support knowledge management tasks by ensuring that everyone who needs the knowledge has access to it. ( Note: Reflection practitioner memo, May 2002, file3, p3)*

**The Method of Processing Flows of Information within Knowledge Management at OrganisationC**

The purpose of this section is to explore the processing flows of information by means of WebAccounting. I recognise that OrganisationC may appear to have some similar characteristics to that of organisation TRG, which was previously investigated by Meyer and Zack (1997). I will address these issues as follows:

1. According to Meyer and Zack (1997,p. 47): "in the publishing stage, TRG's chief analyst converts the junior analysts' reports to a standard format and decomposes them into knowledge units, assigning standard document

identifiers and keywords and creating links amongst the units". Then, the distribution of electronically published financial research reports to intended readers through LotusNotes systems begin.

As for OrganisationC, WebAccounting allows clients to access a range of reports for each of the ASX listed stocks. These reports can be grouped into three parts: (1) portfolio update (provides snapshots of recent results, ASX reports or director's outlook), (2) Stock summary (this provides a profile of a stock including financial and performance outlook), and (3) shares profile (provides information on stocks including latest trading data). The distribution of all reports is through WebAccounting's knowledge repositories.

2. In providing graphical data of stock performance, WebAccounting allows interactive charting facilities for OrganisationC's clients to view Time-Price relationships, moving average and other analysis tools. Clients may also configure their own charts to analyse their stock performances. For example, clients can view a snapshot of the day's market activity. Intraday graphs reports, money markets, exchange rates reports, ASX compliance and disclosure statements, corporate actions disclosure statements, as well as upcoming dividends for all ASX listed equities, including ex-dividend dates and payment dates are saved separately under different files, and may be viewed as though contained in one big file.

3. In the scope of on-line portfolio management, WebAccounting allows OrganisationC's clients to track the performance of their stocks and examine a "what if" situation with stocks of interest. These approaches enable investors to make individual judgements for investing in the stock market. OrganisationC also distributes on-line documents primarily by means of WebAccounting. Because of the available data bases, the on-line portfolio content enables OrganisationC's clients to exploit the indicated market opportunities for personal investment, by making the most of the flexibility and innovation of the design and delivery of explicit knowledge concerning the financial markets.

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4. In the capacity of Market Information Presentations, WebAccounting allow Clients to view a representation of the day's market activity in the Market Information Knowledge Platform. For example, Intra-day Graphs of the major Australian stocks are available, as well as the news headlines from major news providers. This allows "breaking news," covering such topics as Market Summaries and Political News stories as they happen. Moreover, this computer page allows Clients to view a list of the "movers and shakers" of the day, with the top 10 stocks by volume, value and percentage price movement. Clients can also view a list of all forthcoming dividends for all ASX listed equities, including ex-dividend dates and payment dates.

5. In the capacity of order placing, WebAccounting allows clients to trade securities through a four-step procedure. For example, clients may select Sell or Buy from the WebAccounting Trades menu and then place their orders for any ASX listed stocks. These steps are:
   - Type in Client's Trading Password and click (Submit)
   - Click (Trade) to check the market depth before placing order
   - Click (Sum) to get an estimate of total cost
   - Review the details of trade.

6. In the capacity of setting up "Watchlists" to follow a client's favourite stocks, WebAccounting allows clients to check a stock's details as well as its recent price data. This information is monitored in real time and also allows clients to access market depth, Reuters news, OrganisationC research reports and interactive charts for each stock in the "Watchlist."

7. In the capacity of Transaction Detail Presentation, WebAccounting allows clients to create their portfolio and record the details of their Sell and Purchase transactions.

Finally, there are a number of technical issues surrounding the development of knowledge management systems in creating and managing explicit knowledge of

financial markets. The necessity of a faultless, vigorous and scalable technology infrastructure is required to provide an effective and efficient integrated knowledge management system. The IT infrastructure at OrganisationC is just such a system, and WebAccounting supports OrganisationC in the collecting, indexing and the storing of explicit financial market knowledge electronically.

> *To support the requirement for providing information at the right time, the information must not only be most recent but also "clean" of out-of-date information . To provide information in the right format, the length, style and language must be appropriate for the reader. Reflecting on my experience at OrganisationC, I have concluded that in this case, WebAccounting's integrative network usually provided information at the right time, in the right format, and in a way that was accessible and easily to use. Furthermore, WebAccounting easily provided associated information as a by-product. I found that I could easily update WebAccounting web pages to remain topical, customise the on-line format in a manner suited to my preferences and it was easy to engage in virtual interaction with other staff. (Note: Reflection practitioner memo, May 2002, file3, p. 3)*

**The Integrated Broking System Within the WebAccounting System of OrganisationC**

WebAccounting includes a fully integrated brokerage system that allows clients to trade equities and options on-line. Clients and investors can trade by touch-tone telephone by dialling a toll free number, or by e-mailing through the Internet. Trading securities by means of OrganisationC WebAccounting system require four steps, (1) clicking on the ' trade icon', (2) selecting the security code of the item one would like to buy or sell, (3) approving the real-time price quote, and (4) clicking 'submit'. All confirmed and executed orders and monthly statements use e-mail as the manner of statement distribution. The OrganisationC WebAccounting updates all order records immediately; regardless of whether the

orders use the on-line facility or are directly placed using the telephone. OrganisationC clients and investors can access this information in real time by clicking on the Members Current Position icon, which is found on the web-site. OrganisationC investors have access to the Australian Stock Exchange, real time quotes, company announcements, news, and research. OrganisationC WebAccounting is capable of performing checks to ensure customer validity and to verify that any transaction has not violated legal regulations. OrganisationC also has the ability to stipulate any additional criteria the company wishes to monitor. For example, the company could subject all trades over $25,000 to immediate review. (Source: OrganisationC Training Manual, 2001)

**The Integrated Broking System of OrganisationC's WebAccounting System**

In this section, I address the features that WebAccounting provides for on-line stock broking activities. These on-line stock broking activities include the eight levels of presentations: Alerts Presentation, Online Portfolio Management Presentation, Placing Order Presentation, Graphic Stock Performance Presentation, Stock Watchlist Presentation, Purchase and Sales Record Presentation, Order History Presentation, and the Market Information Presentation
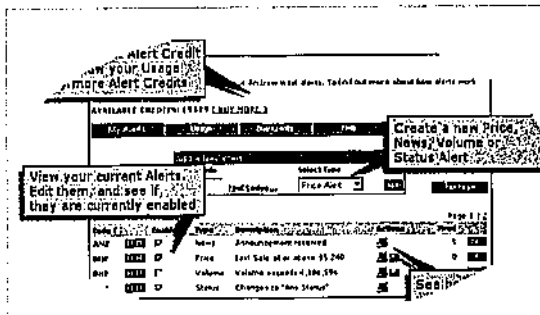


*ALERTS managed by WebLegacy*

This page is where the Alerts and Alert Credits are supervised.

For example, Alerts signs configure Price, News, Volume and Status of a stock.

Alerts E-mail or SMS signs are sent to Clients. Pre-purchasing a number of Alert Credits pays for these actions.

*Figure 6.4.* A diagram illustrates the feature of 'Alert' signs in helping clients to interpret market information. (Source: OrganisationC, 2001)

*Alerts Presentation.* These are the interactive presentations developed using primarily text, graphics clip art, and pictures to relate a problem or a situation to a client. For example, by using Alerts Presentation, clients are able to view his/her account usage and buy to the limit of his/her alert credit balance. In the Alert Presentation, client is also able to monitor, create a new price, read the news, volume, or status alerts. In addition, a client is able to edit the current alerts, and see if they are currently enabled as well as to see how each alert will notify him/her (Source: OrganisationC's Training manual, 2001).



*WebLegacy's ONLINE PORTFOLIO MANAGEMENT*

Clients can use the Online Portfolio Management to track down the performance of their stocks and also to explore "what if" situation with stocks of interest. .
Having provided quantity, purchase date, purchase price and dividend for each stock in the list, Client then are able to calculate relative profits using the current ASX stock prices.
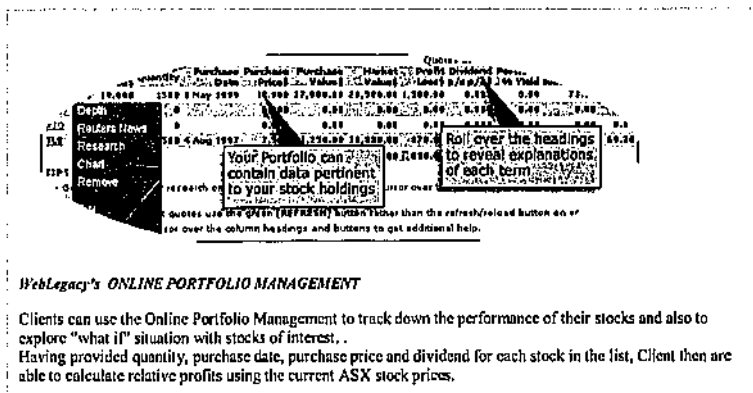
*Figure 6.5.* A diagram illustrating the features of online Portfolio Management Presentation (Source: OrganisationC, 2001)

As mentioned above, WebAccounting allows clients to track down the performance of their stocks and also to explore a "what if" situation through the "Online Portfolio Management Presentation." Clients can track down the

performance of their traded stocks and explore their share portfolio (Source: OrganisationC's Training manual, 2001).



### PLACE AN ORDER via WebLegacy

Trading securities requires four steps.

By choosing Sell or Buy from either the WebLegacy Trades Menu, or from a particular stock in a Stock List, Client of Org B can access the WebLegacy Online Trading Centre where clients can place orders for ASX listed stocks:

Type in your Trading Password and click [Submit]

Click [Trade] to check the market depth before placing their order.

- Click [SUM] to get an estimate of the total cost or net return of Clients trade.
- After clicking [Submit] Clients have the opportunity to review the details before submitting your order.

*Figure 6.6.* A diagram illustrating "Place An Order Presentation" (Source: OrganisationC, 2001).

As mentioned by above, WebAccounting allows clients to place orders through the "Place an Order Presentation," noting that trading securities requires four steps.

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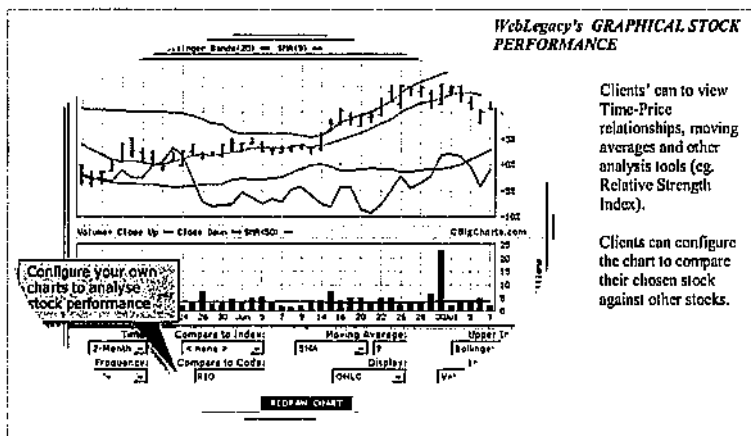
*Figure 6.7.* A diagram illustrating WebAccounting's graphical Stock Performance Presentation (Source: OrganisationC, 2001).

Graphics are essential building blocks for WebAccounting applications. That is, in business and training-related applications, charts or graphs are usually the best way to present related data. WebAccounting allows clients to develop charts with electronic spreadsheets, statistical programs or use some other "presentation" programs that can integrate chart making capabilities into their programs (Source: OrganisationC's Training manual, 2001).

WebLegacy ALLOWS CLIENTS TO SET i P WATCHLISTS TO FOLLOW THE FAVOURITE STOCKS

WebLegacy allows (1) Clients to monitor real time prices, (2) use WebLegacy's Watchlists to view detailed stock information, and (3) access Market Depth, Reuters News, Research Reports and Interactive Charts for each stock in the WebLegacy's Watchlist.
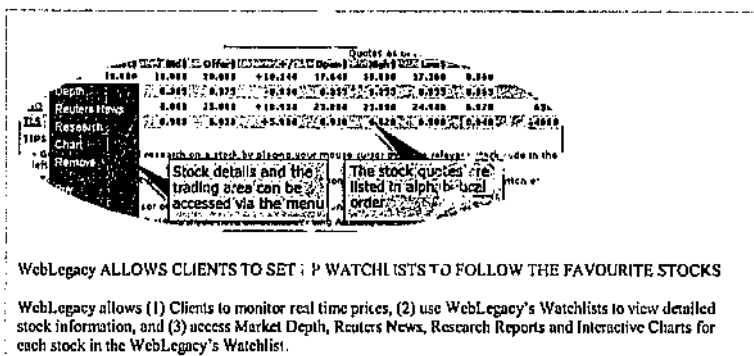
*Figure 6.8.* A diagram illustrating WebAccounting's favourite Watchlist Presentation (Source: OrganisationC, 2001).

As mentioned above, WebAccounting allows clients to set up "Watchlist Presentation" to look for any anomalies of their favourite stocks.



WebLegacy ALLOWS RECORD CLIENTS PURCHASE DETAILS
Through WebLegacy's Portfolio View clients are able to create a Portfolio.

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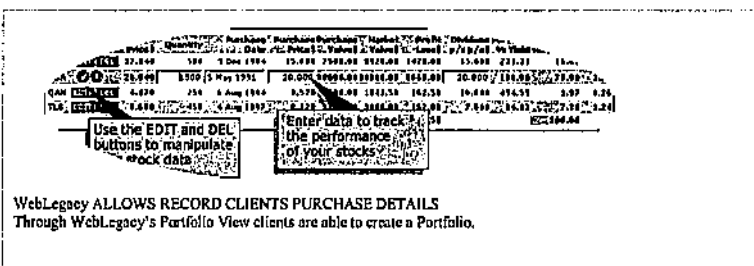
*Figure 6.9.* A diagram illustrating WebAccounting's Record Of Clients Purchase And Sales Details Presentation (Source: OrganisationC, 2001).

As mentioned above, WebAccounting allows clients to record the details of their purchase or sales transactions on the "Records Clients Transaction Details Presentation."
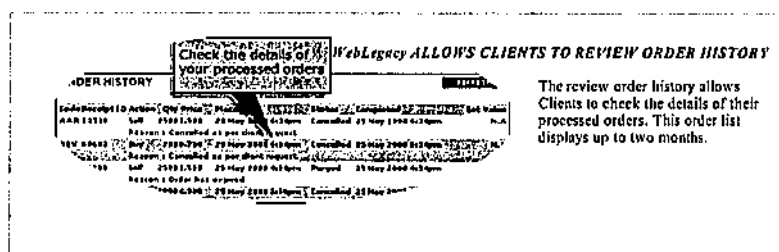


*Figure 6.10.* A diagram illustrating the features of Order History Presentation (Source: OrganisationC, 2001).

As mentioned above, WebAccounting allows clients to check the details of their processed orders through the "Order History Presentation."
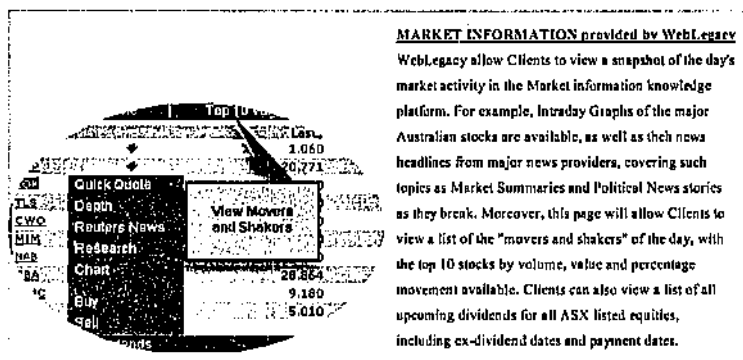
*Figure 6.11.* A diagram illustrating the features of Market
Information Presentation (Source: OrganisationC, 2001).

As mentioned above, WebAccounting allows clients to view a snapshot of the
day's market activity on the "Market Information Presentation."

**Impediments faced by OrganisationC in adopting WebAccounting**

In 2001, OrganisationC faced three major impediments to its aim of becoming a
successful on-line stockbroker.

Firstly, OrganisationC faced considerable criticism from other stockbroking
firms. They were apparently concerned that services offered by OrganisationC
would reduce their market share. As one senior officer of OrganisationC stated:

> We did not receive any orders from other discount brokers,
> although we provided a very competitive price for their clients to
> trade with us. Hence, we gave up the idea of brokers sending us

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orders, and instead focussed our efforts on a marketing campaign. (SO4, June 2002, file2, p. 2)

The fear that OrganisationC would gain a substantial market share in share trading is evident, and was a major issue for traditional stockbrokers.

The Australian Stock Exchange (ASX) demanded a high level of compliance to their regulations. OrganisationC came to be a prime target for investigation in the ASX, even for minor complaints. The management of OrganisationC were willing, however, to co-operate with ASX, which led to a positive relationship with the ASX. As one trader of OrganisationC stated:

> In the beginning stage of adopting WebAccounting for on-line share trading, we often got complaints from clients. These complaints did not relate to any fraud issues, but often pertained to areas of minor dissatisfaction issues. In most cases, the market is dynamic, with changes occurring very fast, so typical of these complaints was "Why didn't my transaction go through instantly at the time I placed the order – now the price has dropped and my trade was not done." Sometimes, we suspected that this rash of minor complaints might have been a backlash from other stockbrokers, as most of the clients who made these complaints to ASX were small traders. (SO5, June 2002, file2, p. 3)

The above quote implies that other stock-broking firms were using small traders to create problems for OrganisationC.

Due to the lack of Internet commerce laws, OrganisationC had to be sure that it was not violating any current securities or other laws and regulations as well as allowing for possible future legal amendments affecting these on-line operations. As OrganisationC's legal officer reported a scenario of a dispute case.

> Assume our company receives an electronic message accompanied by our company digital signature. The message appears to be authorised by our Michael, a customer of ours. Michael's apparent authorship of the message is verified by our IT staff by using the public key certificate.
> Our company acts to its detriment in reliance on the message and belief confirmed by the certificate that Michael has authored the

message. For example, the message instructs our company to pay money to Peter (a third party) against Michael's sales proceed of 5000 units of "Testal" shares.

Michael then claims he never authorised nor sent the message and disclaims liability to our company. No funds are recoverable from Peter.

Michael knows neither how the complete and forged digitally signed message evolved nor its source. It is possible that a third party Mr. X may have obtained access to Michael's private key, which is located in Michael's personal computer, and used it to sign the message. Michael cannot convincingly prove this, and neither can our company persuasively disprove it. (Source: Organisation C's Training manual; SO6, June 2002, file2, p. 3)

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*On reflection, the legal officer was confirming that there are some degrees of uncertainties in the Electronic Transactions Act 1999, Australian law. Michael would be legally responsible for the message if a court was convinced that in fact the digitally signed message originated from Michael or by a person acting with Michael's authority. Usually, OrganisationC would need to establish that Michael was legally responsible for the message, and therefore OrganisationC would have the burden of proving this.*

*On the other hand, to disprove this, Michael could press forward as to how the message evolved with his key, but without his authority. In such a dispute, there is always some grey issue involved. From OrganisationC's legal adviser analysis there are always some legal issues such as:*

1. *What would be the liability of a third party [Mr X] for inaccurate identification?*

2. *What would be the liability of the signer of a message who loses the private key?*

*In each of the cases, it will again be a question of what evidence OrganisationC can produce to convince a court that Michael was responsible for the message or liable in negligence. However, there is also a question as to whether Organisation C can hold Michael legally responsible on these grounds. The application of law in these cases is not always clear.* (Note: source OrganisationC Training manual: Reflection practitioner memo, May 2002, file4, p4)

**FINDINGS AND RESULTS**

**Dialogue Vignettes**

In the following section, I discuss a range of strategies in regard to the sharing and managing of Organisation A's and C's tacit knowledge. It is intended to facilitate and assist the reader in having a deeper understanding of the development, activities and pertinent issues revealing the epistemology and practice in a narrative fashion, which has elements of a confessional ethnography (Van Maanen, 1995, p. 8). The dialogue underpins the epistemological issues and assumptions that highlight the professional practice of staff members, of OrganisationA and C, in adopting the role of knowledge facilitators. In this light, the manifestation of a lived research setting experience is revealed through the participant's dialogue from OrganisationA, OrganisationC, and myself, the *reflexive practitioner*, with the voice of my own psyche (at times representing in Jungian terms, the innate wisdom of the anima) referred to as the *action-researcher*. Each voice expresses a personal perspective and interpretation of the research action. In this writing, I believe that I may be able to capture the important qualities of lived research experience as well as a sense of the appearance of truth. Discovering a meaning and its appearance by means of dynamic questions and answer dialogues with my readers creates this emergence. The voices of participants from OrganisationA and C are interspersed throughout the dialogue to help to create a sense of authenticity. Occasionally, hearing the voice of my own psyche (as action-researcher) adds other authenticating issues to the research findings.

## Research Interviews

The following section describes and analyses all the research interviews conducted with OrganisationA and OrganisationC. The analysis was based on systematic content coding (Morgan, 1998) and largely utilised a participant approach, which relies on interviewee quotations to illustrate themes and support key findings (Geissler and Zinkhan, 1998). The ensuing headings are the essential identified themes and, where appropriate, I provide supporting quotations. I use the following code to differentiate between the different sections within the organisations. (See Table 6.1)

| | Organisation A | Organisation C |
|---|---|---|
| Finance staff | OrgAFinance | OrgCFinance |
| Sales staff | OrgASales | OrgCSales |
| Administration staff | OrgAAdmin | OrgCAdmin |
| IT staff | OrgAIT | OrgCIT |
| Workshop staff | OrgAWkshop | |

*Table 6.1.* A table showing the coding matrix of participants for the research interviews.

As detailed in Chapter 5 the three major themes pertaining to the first major research question: "For managing organisational and individual knowledge, what are the impacts of the adoption and use of WebAccounting, in the conversion of tacit knowledge to explicit knowledge?" are

1. What is the role of WebAccounting's knowledge repositories in the conversion of tacit knowledge into explicit knowledge?
2. The role of WebAccounting's on-line formats in converting tacit knowledge to explicit knowledge.
3. The organisational changes resulting from the conversion of tacit knowledge to explicit knowledge through the WebAccounting system

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**THEME 1: THE ROLE OF KNOWLEDGE REPOSITORIES WITHIN WEBACCOUNTING SYSTEM IN CONVERTING TACIT KNOWLEDGE TO EXPLICIT KNOWLEDGE**

Knowledge repositories are a crucial resource for creating and distributing knowledge through WebAccounting. As detailed in Chapter 2, knowledge repositories facilitate the integrative and interactive aspects of knowledge management architecture. Broadly speaking, the recording and archiving of knowledge exchanges such as e-mail and on-line group discussion, into knowledge repositories for future knowledge management purposes is a valuable process by-product.

All but one of the five research participants indicated that WebAccounting's knowledge repositories enabled effective and efficient knowledge management by allowing flexibility in arranging, selecting, and integrating knowledge content. The following quotes describe the use of knowledge repositories for a specific knowledge management process.

The chief mechanic from OrganisationA recounts that WebAccounting knowledge repositories are used by the interactive Forum, which supports the sharing of knowledge through the process of explicating tacit knowledge in the mechanical area.

| Eddie: | What do you think about the role of WebAccounting's knowledge repositories in supporting knowledge sharing through the process of explicating tacit knowledge in the mechanical area? What do you think of the proposition that "knowledge equals power" in the context of the political infrastructure of your organisation? |
|---|---|
| Chief mechanic: | Initially, I have to define my core skills and knowledge for my business. For example, as a chief mechanic, I know that knowledge relating to fixing motor vehicles is very valuable, but it is all stored in the heads of the best-informed people, the experienced mechanics. Such knowledge is mostly tacit, and the formulation of some parts of it is necessary. Through WebAccounting, I see that such tasks can be performed, and I have seen that the organisational knowledge can be proactively managed. Our new Forum knowledge repositories achieved a modest but noticeable |

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growth in participation. Without the WebAccounting
Forum, OrganisationA's capacity to encourage
collaboration among all knowledgeable staff would have
been seriously restricted. I also noticed that these highly
knowledgeable and skilled individuals hold positions in
high levels of management. (OrgAWkshop, May 2002,
file1, p1)

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*Reflexive Practitioner:*

*In the above quote, the chief mechanic describes the way
that the creation and use of WebAccounting knowledge
repositories explicated tacit knowledge in the mechanical
area. His point that the most experienced mechanics are
the best-informed people appears to be consistent with
McClane and Mento (1991), and Fitzsimmons (2000) (see
Ch 2). They found that by converting tacit knowledge to
explicit knowledge would enable an individual to learn
and acquire the relevant information, thereby increasing
his or her personal knowledge. They further suggested
that knowledge is power and argued that management
and interest groups that control information indirectly
control power.*

*The Chief Mechanic's last sentence supports the
assertion that WebAccounting knowledge repositories
support collaboration within the process of explicating
tacit knowledge. His statement about the need for tacit
knowledge to be formulated and proactively managed
seems to be in a similar vein to the philosophy of
Zimmerman (1999) and Kanter (2000), who argue that
control of information is often seen to be crucial to the
sustainability of management structures within an
organisation. Thus, embedding ideology into knowledge
and information to achieve ulterior intentions are
frequent organisational practices (Personal reflection,
May 2002).*

> **Action-researcher (to add other authenticating perspective):**
>
> In the above reflexive verisimilitude (appearance of truth), the voice of the Chief mechanic captured vital qualities of Habermas' context of lifeworlds. He viewed best-informed people lifeworlds concerns as management issues. These issues created a compromise between senior managers (who had managerial control and power) in the head office and the staff at the workshop floor. The perception of the Chief mechanic was that they should secure some forms of representative positions in the head office when involved in making decisions regarding the service and maintenance issues. The Chief mechanic realised that the key to such resources lay in the hands of best-informed people in their organisation. The WebAccounting Forum has already opened the door showing all workshop staff members a way to increase their knowledge and to use this knowledge to the advantage of their employer and mostly, themselves. An unimaginable opportunity that was unthinkable just a few years ago.

A Senior Finance Office from OrganisationA states that WebAccounting addresses the issues of direct and emergent exchange of knowledge through the Forum knowledge repository, au interactive aspect of the knowledge architecture model (as shown in fig. 6.1). For example, by means of an electronic discussion space like the Forum, people are able to either search for knowledge or share their expertise. In addition, the use of knowledge repositories involves the process of acquisition, refinement, and storage in order to create or update the content of knowledge. The retrieval, distribution, and presentation platforms create and present various views of that knowledge.

**Eddie:**          To what extent do you think that WebAccounting's knowledge repositories address the issues of direct and emergent exchange of knowledge through the process of interactive Forums?

**Senior finance officer from OrganisationA:**

Our aim is to manage and share tacit knowledge that is highly organisation-specific, residing within individuals and forming part of their social interactions within the organisation. Naturally, we try to understand subconscious knowledge, as it is a totality of personal opinions and beliefs. Hence, we require a scheme for linking, cross-referencing, and explicating such tacit knowledge to allow meaningful sharing. We need a system capable of recording such complexity. For example, by using WebAccounting, this allows us to integrate the entire tacit and explicit knowledge and store this into one main knowledge repository. We also believe WebAccounting Forum knowledge repositories enable us to review other tasks performed by our colleagues. This knowledge will help us in the discussions with clients, defining what is feasible and what is not. (OrgAFinance, May 2002, file1, p1)

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**Reflexive Practitioner:**

*In the above quote, the senior finance officer identifies that WebAccounting's knowledge repositories address the issues of the direct and the emergent exchange of knowledge through the processes of interactive Forums. Her point about how WebAccounting enables interactive Forums to act as the primary medium for knowledge exchange within the process of explaining tacit knowledge appears to be consistent with Meyer and Zack's (1996) work on the knowledge management architecture framework. There they comment that the interactive aspect of their knowledge architecture model allows the processes of acquisition, refinement, and storage of knowledge to create and update that knowledge whenever and wherever needed. (Personal reflection, May 2002).*

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> **Action-researcher (to add other authenticating perspective):**
>
> In the above reflexive verisimilitude, the voice of the senior finance officer captured the practice of employing Habermas' communicative action, particularly the categorisation of instrumental rationality. It represented a technical or instrumental knowledge culture oriented to assist the reader in tracing the development of knowledge exchanges within a constructivist-oriented environment. That is, it allows the senior finance officer to express her personal voice, perspective, and interpretation on how she encounters her experience through manifestation based upon mainly in her day to day work in adopting WebAccounting systems.

An IT officer from OrganisationC, reflecting on the explaining of tacit knowledge through WebAccounting, provides an example of knowledge management in supporting decision-making where tacit knowledge is recorded and distributed through WebAccounting's knowledge repositories.

**Eddie:** To what extent do you think that WebAccounting's knowledge repositories support the process of knowledge creation by tapping tacit knowledge?

**IT officer from OrganisationC:**

Well, we are living in an information-driven society. I suggest that the need to highlight the significance of knowledge management is becoming widespread. Other knowledge such as understanding, skills, experience and the values involved in performing a task are significant. Knowledge is difficult to articulate but it is a time-consuming activity to share knowledge, however, if not shared, then most tasks are impossible to delegate. Yeah, I

suppose WebAccounting knowledge repositories can provide the context for interpreting knowledge as they enables users to dynamically alter and interactivity combine views of the knowledge being stored in the repositories. At any stage, tacit knowledge helps to solve problems and yield superficial opportunities for the Organisation concerned. In this way, my boss can access internal and external information in making his decisions for maximising productivity in my department. (OrgCIT, May 2002, file1, p1)

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*In the above quote, the IT officer states that WebAccounting's knowledge repositories support the process of knowledge creation by tapping tacit knowledge, often highly subjective or individual insights, intuitions and hunches or individual. His point about his superior using 'external and internal knowledge' in making decisions seems to be consistent with the Zack (1996) and Zwass (1998) concept of knowledge transfer. There they argue that knowledge management helps to elaborate and disseminate external knowledge, and to bring that knowledge to solve problems and yield superficial opportunities for the organisations concerned (Personal reflection, May 2002).*

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**Action-researcher to add another authenticating perspective:**

In the above reflexive verisimilitude, the voice of the IT officer captured the practice of employing Habermas' communicative action, particularly the categorisation of strategic rationality. That is, it addresses the way a person is forcing another person by means of the tapping of his/her tacit knowledge by manipulation, coercion, and propaganda.

The Senior Sales Manager from OrganisationC recounts that WebAccounting's knowledge repositories enable refining, archiving and recording of explicit knowledge for facilitating the distribution of research to intended readers.

**Eddie:** To what extent do you think that WebAccounting's knowledge repositories enable refining, archiving and recording of explicit knowledge for facilitating the distribution of research to intended readers?

**Senior Sales Manager from OrganisationC:**

The explanation of tacit knowledge is becoming more complex and less easily understood, for example, issues ranging from effective ways to explicate tacit knowledge, to the selection of the knowledge to be made explicit. Thus, we need to understand the current market situation and the trends that will affect future stock markets. This might involve studying the demographic trends and socio-economics forecasts, to ensure that we can meet future demand. I believe the storage in electronic repositories of explicit knowledge about investors market opinions, market indicators, financial products, and business knowledge, is a productive use of such a facility. Such repositories, when indexed using appropriate concepts and categories, such as rationale for actions, conclusions, intentions of knowledge development, meaningful strategies, or recording the sequences of events, can be carried out by WebAccounting (OrgCSales, May 2002, file1, p. 1).

*Reflexive Practitioner:*

*This quote from the Senior Sales Manager from OrganisationC suggests that WebAccounting's knowledge repositories facilitate forecasting functions. His last sentence supports the assertion that WebAccounting knowledge repositories help the explanation and presentation of meaningful concepts and categories of events, including the archiving of underlying tacit knowledge for future use. His point regarding "such repositories...meaningful and sequences of events" appears to be in similar vein to Aadne, Krogh,*

> and Roos, (1996) whose concept of cooperative strategies suggests that cooperative strategies can be translated into common ventures, alliances, mergers, acquisitions and virtual enterprising. I see such transformation processes as a powerful way of accessing and transferring organisationally embedded knowledge (Personal reflection, May 2002).

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**Action-researcher (to add other authenticating perspective):**

The following conversations illustrate some difficulties encountered by Senior Sales Manager from OrganisationC within the practice of employing Habermas' communicative action, particularly the categorisation of social knowledge interest (refer Chapter five). Social knowledge interest results from a manifestation based mainly in language and based on ethical or moral issues. In light of this, the involvement of demographic trends and socio-economic forecasts, say to us, that in order to understand the development of any activity related to the effective and efficient sharing both the tacit and explicit knowledge, one needs to understand the social relationships that are built around it.

The administration officer from OrganisationC recounts that WebAccounting addresses the issues of supporting, refining and archiving the records of knowledge exchange, since staff members are able to contribute their best practices and skill into a knowledge repository where it provides a means to integrate and build on collective knowledge.

**Eddie:** What do you think of WebAccounting's role in addressing the issues of supporting, refining and archiving the records of knowledge exchange?

**Administration Officer from OrganisationC:**

The business knowledge in my organisation includes elements of "know how", "know what" and "know who." These elements frequently influence my decision-making. I also need to apply knowledge-sourced expertise in performing my job. Such skills would involve formulating, codifying, and documenting things that are stored in the repository (a process of simultaneously knowing and acting). It requires a tool. I believe the role of WebAccounting knowledge repositories enable the management and sharing of such knowledge. For example, iu my admiuistratiou department, operation manuals, that is, guiding notes on how to perform tasks are crucial. New people are able to learn quickly and achieve job consistency at the same time. (OrgCAdmin, May 2002, file1, p1)

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*Reflexive Practitioner:*

*In the above quote, the administration officer thus asserts that WebAccounting enables staff to contribute their best practices skill into a knowledge repository where the collective knowledge are collected, integrated, and shared among people and can be used for confronting similar problems. Her opening remark appears to be in similar vein to Quin, Anderson, and Finkelstein (1996) with their concept of four distinctions between the types of knowledge. There are the "know-what, know-how, know-why and care-why." Her last sentence suggests that the importance of knowledge and its role in helping an orgonisatlon become competitive through the concept of the learning organisation. As mentioned by Senge (1990, 1992) who describe that the ability of transfer knowledge quickly and effectively from one part of the organisation to other is an importont area of knowledge management. Hence, the possibility of management of effective knawledge transfers in an organisation by means of WebAccounting's repositories. (Personal reflection, May 2002).*

Action-researcher (to add other authenticating perspective):

The following conversations provide rich comments and reflections on the issues of supporting, refining and archiving the records of knowledge exchange. These communication compose of rich, thick contextual descriptions, and is encouraged by Denzin and Lincoln (1994) to strengthen the immediacy and individual nature of people's communication. It also recognises the truthfulness, completeness, sincerity, and contextuality of the messages spoken by the recipient to warrant the emancipation of unwanted beliefs, assumptions, and constraints. It also recognises that in reflecting a person's perspective (whether on organisational context or technical context), it is necessarily to explore the social activity surrounding him or her.

The finance officer from OrganisationC recounts the limitations faced by WebAccounting's knowledge repositories particularly in the speed of disseminating research in a rapidly changing stock markets environment to intended readers through the process of presenting both the tacit and explicit knowledge.

**Eddie:** What do you think of the limitations faced by WebAccounting's knowledge repositories particularly in regard to the speed of disseminating research in a rapidly changing stock markets environment to intended readers through the process of presenting both the tacit and explicit knowledge?

**The finance officer from OrganisationC:**

I do not think that the digitised content from knowledge repositories is adequate for flexibility and for easily

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accessible explicit knowledge delivery. The repositories are not flexible enough to provide a rich content of knowledge views and supporting multi-media research documents due to the limitations of technology infrastructure. These limitations affect the ability to collect, index, and store research reports. When created, knowledge is stored in the repositories, and there, it tends to grow. When it reaches a point at which knowledge begins to become saturated, then knowledge needs culling, that is, archiving or reviewing. The management must repeatedly assess the knowledge to ensure that it applies to current context and situations. These aspects frequently influence the volatility of the context as well as content of knowledge. For example, the storage repositories covering knowledge such as Market Summaries and Political News stories as they break in a rapidly changing market may differ enormously from managing that knowledge in a stable market environment. Certain knowledge such as a Treasury Report announced in the morning may be obsolete within the next three hours. Investors depending on such knowledge to make decisions may find themselves exposed to high risk. We need a system that is designed to accept information or data presented to an AI, KBS, ES or DSS technology infrastructure to enable the flexibility required for our integrative knowledge management processes. However, our WebAccounting knowledge repositories do not provide sufficient aspects of such flexibility. (OrgCFinance, May 2002, file1, p2)

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*Reflexive Practitioner:*

*In the above quote, the Finance Officer from OrganisationC asserts that WebAccounting is confronted by challenging problems, particularly in the speed of disseminating relevant real-time research to investors in a highly volatile and rapidly changing stock markets environments. Her point about "The repositories are not flexible enough to ...scalable technology infrastructure" appears to be consistent with Meyer and Zack (1996) concept of technology infrastructure role in knowledge management. They state that a technology context addresses only 10 percent of requirements in supporting*

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*knowledge management whereas 90 percent is people related. In my analysis, OrganisationC's existing information technology infrastructure and capabilities may be much lower than 10 percent who support the knowledge management architecture. Hence, the Finance Officer from OrganisationC's justification in complaining that in her company, WebAccounting is inadequate in meeting her expectations (Personal reflection, May 2002).*

**Action-researcher (to add other authenticating perspective):**

The following conversations obviously reflect the beliefs about the three dimensions (objective, social and subjective) of the worldviews attained through Habermas' philosophical understanding of lifeworlds. This approach involves employing Habermas technical knowledge interest (refer to Chapter five), where it is geared towards building effective information systems applications to support organisational processes. For example, reconciled through the worldview of the finance officer and embedded in her personal lifeworld experience is the culture of the organisation.

**Summary of Theme 1**

Analysing the interviews in the previous section, I highlight the following points:

1. The WebAccounting knowledge repositories enable the transformation of tacit knowledge into explicit knowledge by means of the process of accessing, evaluating, managing, organising, filtering and distributing information in a manner useful to knowledge workers.

2. The WebAccounting knowledge repositories further facilitate this transformation of tacit knowledge into explicit knowledge by means of the integrative or interactive aspect of knowledge management architecture. (Both integrative and interactive approaches provide a broad set of knowledge processing capabilities, and they support well-structured repositories for the management of explicit knowledge, at the same time facilitating interactions that can assist in the integration of tacit knowledge.)

3. The WebAccounting knowledge repositories enable tacit knowledge to become explicit knowledge by means of the process of creating, storing, managing, accessing and sharing tacit knowledge and explicit knowledge that has been documented in an electronic repository and made available to knowledge worker in various situations.

4. The are several different ways in which WebAccounting knowledge repositories enable effective and efficient creation and distribution of knowledge, including the following:

   (a) Meaningful concepts, categories of events (procedural knowledge);
   (b) Processes, actions, and sequences of events (procedural knowledge);
   (c) Rational for actions or conclusions (casual knowledge);
   (d) Circumstances and intentions of knowledge development and application (specific contextual knowledge);
   (e) Linkages among the various types of knowledge.

   (Adapted from Zack, 1996 p. 48)

**Reflection on Theme 1**

As a reflective practitioner, I can now reveal and explore my interpretation of Habermas' theory of communication action in providing a framework for analysing changes within social-cultural contexts for knowledge management practice (Ngwenyama, 1997b). Habermas' theory of communicative action provided a fruitful framework for practitioners to understand human behaviour that is oriented to attaining rational thinking. This human activity may allow a

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sustaining knowledge sharing culture within an organisation. Furthermore, the knowledge sharing culture can become more meaningful because a person using a communicative action in trying to enact coherent meaning of the action and the action situation, this person will involve intersubjective and cooperative reflexivity (Ngwenyama, 1997a, p. 150). In doing so, it allows a person to express his/her personal voice, perspectives, and interpretation on how s/he encounters his/her experience through manifestation based upon mainly in his/her day to day work in adopting WebAccounting systems.

In addition, I see communication as an emotional as well as an intellectual act. Therefore, communicative action involves not only understanding what the speaker or writer means, but how well a person recreates a meaning that another person intends. In light of this, it is important to understand how the sharing of tacit knowledge evolved and developed as knowledge was interpreted, questioned, constrained, and used in various social-cultural contexts. As mentioned in the previous section, in my experience, WebAccounting's knowledge repositories have often enabled the transformation of tacit knowledge into explicit knowledge.

## Limitations of WebAccounting's knowledge repositories

At the beginning of this study, I acknowledged that I perceived WebAccounting's knowledge repositories to have often successfully supported the process of knowledge management. However, I found that WebAccounting's knowledge repositories were facing some challenging problems in regard to the speed of disseminating relevant real-time research for OrganisationC's investors, particularly in the highly volatile and rapid changing stock market environments. I noted that the finance officer from OrganisationC asserted that WebAccounting's knowledge repositories did not adequately provide the seamless access of knowledge as required by investors. This implies that in order for WebAccounting knowledge repositories to support fully the process of knowledge management, they must provide a more vigorous, faultless, and scalable technology infrastructure to secure the flexibility required for an integrative knowledge management process.

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**THEME 2: THE ROLE OF WEBACCOUNTING ON-LINE FORMAT
IN CONVERTING TACIT KNOWLEDGE TO EXPLICIT
KNOWLEDGE**

In this section, I examine the on-line format of WebAccounting concerning the
conversion of tacit knowledge to explicit knowledge. I demonstrate that the on-
line format plays a significant role in organisational learning in the following
ways:

1. The enabling of interactions which continuously update organisational
   knowledge;

2. The ability to provide access to the company's accumulated
   knowledge over diverse time zones and physical locations;

3. The enabling of both direct and indirect exchange of knowledge
   among employees;

4. The ability to trace employees' development; and

5. The recording and presentation of staff conversations, contributions,
   collaborations and exchanges of knowledge, (adapted from Zack, 1996
   p. 50).

The following quotes describe the use of WebAccounting on-line formats for
specific knowledge management processes.

The Finance Officer from OrganisationA recounts that the WebAccounting on-
line format enables staff to integrate explicated tacit knowledge across research
reports for meta-analysis, investigations, and creating new knowledge through
continuous updating of the on-line presentation of information for knowledge
workers.

Eddie:              What do you think of the WebAccounting on-line format in
                    regard to enabling staff to integrate explicated tacit
                    knowledge across research reports for meta-analysis,
                    investigations, and creating new knowledge through

                                                                        259

continuous updating of the on-line presentation of information for knowledge workers?

**The Finance Officer from OrganisationA:**

> The necessity of easy access to an organisation's knowledge by relevant staff, and the classification of knowledge into "know-why," "know-how," "know-who" and "know-when" is crucial. These achievable tasks use WebAccounting's on-line format. The on-line format enables me to update the market information knowledge, client lists, accounting information's and staff payrolls continuously. I believe such classification of knowledge should include both tacit and explicit knowledge; that is, "who knows about what", "who needs to know", and an indication of the importance of that knowledge to the organisation, and the risks attached. (OrgAFinance, May 2002, file2, p2)

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*Reflexive Practitioner:*

*The Finance Officer appears satisfied that WebAccounting's on-line presentation is enhancing the conversion of tacit knowledge to explicit knowledge through the process of interaction and with the continuous updating of relevant knowledge. On my reflection, it is apparent that his statement "[that] classification of knowledge should include both tacit and explicit knowledge; who knows about what, who needs to know, and an indication of the importance of that knowledge to the organisation, and the risks attached" appeared to relate to Senge's Fifth Discipline (Senge, 1990). Senge argues that there is a need for "learning organisations" whereby people are continually expanding their capacity to create the results they desire, where new and expensive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together. In my analysis, WebAccounting can indeed help to realise these expectations. (Personal reflection,*

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> **Action-researcher (to add other authenticating perspective):**
> In the above reflexive verisimilitude, the voice of the finance officer captured Habermas' concept of lifeworld particularly in exposing how he claims his perspective on justifying the classification of knowledge into "know-why," "know-how", "know-who" and "know-when". His lifeworld consists of the interpretation of his daily actions in the organisation. It also signals his ways of coping as a reflexive practitioner.

An Administration Officer from OrganisationA asserts that the WebAccounting on-line presentation enables interactive Forums, which can focus on supporting collaborative discussion and interaction among staff. The contents of the Forums are dynamic since staff continually contribute and read messages, and from these activities, new themes of knowledge emerge. Staff members are able to explicate the tacit knowledge across the organisation through the WebAccounting on-line presentation. These processes are part of the interactive aspect of the knowledge architecture model (as shown in fig. 6.1).

**Eddie:** What do you think of the WebAccounting's on-line interactive Forums, regarding their ability to support collaborative discussion and interaction among staff?

**An Administration Officer from OrganisationA states:**

Well, in terms of what knowledge should be made by WebAccounting on-line presentation: firstly one needs to define where does the key knowledge resides, who should have access to it and who is responsible for its accuracy and security. I personally see that on-line presentation within WebAccounting is crucial for facilitating such tasks. Once an organisation understands what its employees are doing, the norm would be easier and achievable improvements for the future. On-line presentation within WebAccounting is able to trace the process of an

employee's knowledge development. Thus, the ability to absorb new knowledge depends on the process of replacing an employee's existing behaviour with new, improved behaviour. (OrgAAdmin, May 2002, file2, p2)

*Reflexive Practitioner:*

*In the above quote, the Administration Officer reports that WebAccounting on-line format facilitates the process of direct exchange of knowledge among employees and enables the tracing of the employee's knowledge development. Her point that "WebAccounting is able to trace the process ...behaviour with new improved behaviour" appears to be consistent with Argyris (1976) concept of organisational memory. Argyris suggests that "organisational memory" refer to data stored in the organisation's knowledge repositories to assist in decision-making. Organisational memory is one of the essential factors affecting organisational and individual learning. In my analysis, WebAccounting is seen as the centralised data warehousing and management information system that is widely deployed to assume the roles of facilitator in the processes of an organisation's memory explication, storage of codified knowledge, and decision-making based on such storage (Personal reflection, May 2002).*

**Action-researcher (to add other authenticating perspective):**

In the above reflexive verisimilitude, the voice of the administration officer provides a breadth and depth of rich conversations that may help reader to evaluate the verisimilitude and authenticity of his interpretation. It appears to be in similar vein to Habermas' Critical Social Theory, which Hirschheim et al (1992) argue that

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> emancipatory research in organisations focuses on human
> wellbeing and emancipation in information systems
> development and use. In doing so, the administration
> officer expose and explore the good reason and causes of
> WebAccounting's on-line format that facilitates the
> process of direct exchange of knowledge among
> employees and enables the tracing of the employee's
> knowledge development.

The sales manager from OrganisationA states that the WebAccounting's on-line
presentation enables interactive Forums to act as a significant medium for
knowledge exchange, providing a vehicle for all relevant staff to contribute their
explicated tacit knowledge through collaborative discussion. Note that these
processes are part of the interactive aspect of the knowledge architecture model
(as shown in fig. 6.1).

**Eddie:** What do you think of the WebAccounting's interactive
Forum's ability to act as a significant medium for
knowledge exchange, providing a means for all relevant
staff to contribute their explained tacit knowledge through
collaborative discussion?

**The Sales Manager from OrganisationA states:**

Prior experiences may also influence the success of
knowledge transfers between different departments within
an organisation. For example, group discussion of staff's
prior experiences through on-line presentations within
WebAccounting can contribute to a faster and more
efficient exchange of knowledge once initial uncertainty
had been overcome. For example, WebAccounting
develops horizontal communication flows, which
encourages cross-functional teams and teamwork in the
organisation. Cross-functional collaboration forces
individuals and groups away from the "silo mentality" and
to begin learning to communicate horizontally, that is with
each other. These exchanges result in more trust between
customers and staff, thereby increasing the likelihood that
involving parties will be more willing to undertake further

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significant collaborative discussions and to share knowledge. (OrgASales, May 2002, file2, p2)

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*Reflexive Practitioner:*

*In the above quote, the Sales Manager suggests that the WebAccounting on-line format enables a more efficient and effective organisational learning for converting tacit prior experience knowledge to explicit knowledge through the process of on-line conversations, contributions, and collaborations. His point that "Prior experiences may also influence the success of knowledge transfers between different departments within an organisation" appears to be consistent with the Huber (1991) and Lyles and Schwenk (1992) concept of prior experience in the literature of cooperative strategy. They emphasise that past experiences that are transferred into knowledge and stored into the organisational memory provide the ability to discriminate between different situations, and to select the actions that might be most appropriate to future problem solving (Personal reflection, May 2002).*

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**Action-researcher (to add other authenticating perspective):**

The Sales Manager has crystallised his perspective by answering the questions: "How does WebAccounting's interactive Forums contribute to collaborative discussions and what warrants these claims"? To answer these questions, we need to backtrack briefly Habermas' Critical Social Theory phenomena. As mentioned by Ngwenyama and Lee (1997, p. 152), who claim that in order to realise the intricacies and complexities of interpreting each participant's perceptions of information systems development, the participants need to consider both the subjects of the inquiry and the organisational context

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The Finance Officer from OrganisationC suggests how a challenging problem could have been overcome by the use of WebAccounting on-line presentations, since they enable easy access to the organisations shared knowledge.

**Eddie:** How can we overcome challenging problems by the use of WebAccounting on-line presentations, due to its enabling easy access to the organisations shared knowledge?

**The Finance Officer from OrganisationC states:**

We had a problem recently during our office fire drills. Although the descriptions of the symptoms and events are in the hard copies of safety procedures, it took more than 2 hours to find them. Transforming such critical knowledge to an on-line format may be very important. Knowledge can be critical, not only for safety reasons, but also because of timing or easy accessibility. In this instance, I believe that the on-line presentation of this knowledge within WebAccounting could be an asset in presenting that safety knowledge when required. One of the challenging problems faced by the WebAccounting on-line format, however, is that the contents or topic areas of digitized research tend to grow rapidly to saturation point. The system begins to collapse under its own weight. In order to solve this problem, I need to delete the contents that are

obsolete as well as archiving contents that are still useful, but less active. I believe that WebAccounting could be a very useful tool in circumstances such as teaching fire drill. Nevertheless, in order for WebAccounting's on-line format to produce the flexibility required for integrative knowledge management processes, there is a need for a high level of technological infrastructure. (OrgCFinance, May 2002, file2, p2)

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*Reflexive Practitioner:*

*The finance officer thus identifies a potential use for WebAccounting, as well as pointing to the kind of challenging problems that the OrganisatianC can resolve by using the WebAccounting on-line format. He recounts that in order for WebAccounting on-line to provide the flexibility required for integrative knowledge management processes, the requirement is for a high level of technological infrastructure, and this must be continually updated to eliminate out-of-date content. Only if such technology is in place will the WebAccounting system be able to fulfil its purpose in providing access to those multimedia digitised research documents and embedded hyperlinks to provide an efficient yet flexible distribution channel (Personal reflection, May 2002).*

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**Action-researcher (to add other authenticating perspective):**

The finance officer has crystallised his perspective by means of Habermas' Communicative action. This is where Habermas based his assumptions upon the understanding and recognition of the social conflict inherent in our society and is justifiable by an individual's self-reflection process in dealing with human emancipation.

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The sales manager from OrganisationC recounts that WebAccounting's on-line presentation enables the process of supporting, refining and archiving the records of knowledge exchange. Note that these processes are part of the integrative aspect of the knowledge architecture model (as shown in fig.6.2). For example, knowledgeable staff of OrganisationC can contribute their skills and best practices to a WebAccounting electronic repository, where it becomes part of the integrated collective knowledge of the organisation. Hence, by taking advantage of using both tacit and explicit knowledge through WebAccounting, the solution of the above problems is possible.

Eddie:               To what extent does the WebAccounting's on-line
                     presentation enables the process of supporting, refining and
                     archiving the records of knowledge exchange?

**The Sales manager from OrganisationC states:**

> In our organisation, we regard information as revenue. For
> example, prior experiences of certain events or cycles that
> are reflected on the stock markets can be transformed into
> knowledge and presented in the WebAccounting on-line
> format, and it is the diversity and depth of this past
> experience that impact on such knowledge transfers. This
> fundamental need for diversity and depth is the soul of our
> learning, because each relevant experience enhances the
> probability of a similar event occurring in the future. Such
> knowledge, stored in WebAccounting, provides us with the
> ability to discriminate between different decision situations
> and to select the actions that might be most appropriate.
> (OrgCSales, May 2002, file2, p2)

*Reflexive Practitioner:*

*In the above quote, the sales manager infers that the*
*WebAccounting on-line format enables organisational*
*learning for converting tacit knowledge to explicit*
*knowledge through the process of interaction and*
*continuous update of knowledge. His point "Such*
*knowledge, stored in WebAccounting, provides us with*
*the ability to discriminate between different decision*
*situations, and then to select the actions that might be*

> *most appropriate," appears to be in a similar vein to*
> *Hamel's (1991) concept of internalisation. Hamel argues*
> *that internalisation supports organisational ability and*
> *capacity to learn. In my analysis, WebAccounting*
> *should indeed provide such mechanisms in the form of*
> *cross-functional teamwork and inter-business*
> *coordination (Personal reflection, May 2002).*

> **Action-researcher (to add other authenticating**
> **perspective):**
>
> The sales manager has crystallised his perspective by
> means of Habermas' Communicative action, where he
> translates his practical reasoning into practical
> knowledge that is potentially useful to promote
> verisimilitude and authenticity qualities.

An IT staff member from OrganisationC mentions that WebAccounting exhibits a
sequential flow of explicit knowledge into and out of an electronic repository to
enable staff to interact on-line with repositories rather with each other directly.
The on-line presentations then become a significant medium for knowledge
exchange. Note that these processes are part of the integrative aspect of the
knowledge architecture model (as shown in fig. 6.2).

**Eddie:**          To what extent does WebAccounting exhibit a sequential
flow of explicit knowledge into and out of an electronic
repository, enabling staff to interact on-line with
repositories rather than directly with each other?

**An IT staff member from OrganisationC states:**

Another factor that determines the success of
WebAccounting in managing an effective knowledge
transfer is the "openness" created by WebAccounting
between collaborating departments. "Openness" in this
context means the willingness to share knowledge assets
including statistical data, industry research, historical sales
data, and company information. WebAccounting may
provide a means for the swaying of partnership and
development activities towards the distinguishing of the
importance of knowledge sharing and away from

individual or financial motives. Thus WebAccounting provides knowledge gained through unconstrained working relationship and been seen to value individual's knowledge and skills. (OrgCIT, May 2002, file2, p2)

*Reflexive Practitioner: In the above quote the IT officer states that the WebAccounting on-line format enables an efficient and effective platform for organisational learning through a process of converting tacit knowledge to explicit knowledge by direct exchange of knowledge among employees.*

*His point "WebAccounting may provide a means for partnership and development activities to be swayed towards the distinguishing of the importance of knowledge sharing and away from individual or financial motives" appears to be consistent with Aadne, Krogh, and Roos (1996). Particularly with their concept of cooperative strategies for understanding and managing knowledge. They emphasise that openness and trust are two of the main determinants of success in the field of knowledge transfers (Personal reflection, May 2002).*

**Action-researcher (to add other authenticating perspective):**

The IT officer has crystallised his perspective by means of Habermas' Communicative action. This is where he takes a critical retrospective view about his lived experiences in creating a rich contextual and personal description of WebAccounting as a means of supporting the importance of knowledge sharing and away from individual or financial motives.

From the above interviews, the following extensions to the 5 points made in the introduction to this section, can be made:

1. The WebAccounting on-line presentation format plays an important role in supporting the organisation's intent and capability to use both its tacit and explicit knowledge and learning capabilities through continuous updates of organisation knowledge through interaction.

2. WebAccounting, through the on-line presentations, enables the staff members in the organisation to articulate among themselves or with other staff members in different time zones and from various physical locations.

3. The WebAccounting on-line format in supporting knowledge management of both tacit and explicit knowledge through the processes of creating, storing, managing, accessing, and sharing documents in an electronic repository form enables staff to communicate among themselves both directly or indirectly.

4. The WebAccounting system, with its on-line presentations enables effective and efficient creation and distribution of knowledge, by means of the integrative and interactive knowledge management architecture, thus allowing the tracing of an employee's knowledge development.

5. The WebAccounting on-line presentation supports knowledge processes with explicated tacit knowledge through various staff interactions in various situations, such as on-line conversation, contributions, collaborations, and knowledge exchange.

## Reflection on Theme 2

As a reforming practitioner, I can now see that I could revealed and explore my interpretation of Habermas' theory of communicative action through the processes of self-reflection, self-understanding, and self-development (Ngwenyama (1997b, p. 154). If the uses of WebAccounting systems are to enhance social-culture development efforts, it is important to understand the patterns of behaviour of people through their communicative actions, ie, in the Habermas' concept of "lifeworlds." In Habermas' thinking, language is a part of one's lifeworld. Language may include the pre-rational aspects of unconscious knowing (tacit knowledge) and communicating (Taylor and William, 1993, Whitehead, 2002). For Habermas, self-reflection and a bringing to consciousness (or making explicit) that which was unconscious (tacit) is crucial to the individual as well as the group. Additionally, social knowledge interest may result from the manifestation based mainly in the language, and on ethical or moral issues. In light of this, the involvement of demographic trends and socio-economic forecasts preview us that to understand the development of any activity related to the effective and efficient sharing of both tacit and explicit knowledge, one needs to understand the social relationships that are built around it. As mentioned in the previous section, the WebAccounting on-line presentation format has played an important role in supporting the organisation's intent and capability to use both its tacit and explicit knowledge and learning capabilities. This illustrates that Habermas' theory is able to serve as a powerful framework to understand sharing of knowledge from the context of social activity and process.

## Limitations of WebAccounting on-line format

At the beginning of this study, I acknowledged that WebAccounting's on-line format has certain limitations. The management of the digitised content of WebAccounting's knowledge repositories has to be an ongoing activity; otherwise, its utility slowly degrades. During the research, I found that the WebAccounting system was facing some challenging problems in proactively managing and organising the content of its digitised research as an ongoing activity. I noted that the Finance Officer from OrganisationC asserted that the

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WebAccounting on-line format did not sufficiently support the process of expediting and editing the discussion databases to allow rapid exchange as required by investors. This implies that WebAccounting must have a sufficiently robust, seamless, and scalable technology infrastructure, for without such a technology platform, WebAccounting is unable to provide the multitude of views required, including multimedia digitised documents, embedded hyperlinks, and efficient, yet flexible distribution channels.

## THEME 3: THE ORGANISATIONAL CHANGES RESULTING FROM THE CONVERSION OF TACIT KNOWLEDGE TO EXPLICIT KNOWLEDGE THROUGH THE WEBACCOUNTING SYSTEM

In this section, I examine the organisational changes resulting from the conversion of tacit knowledge to explicit knowledge by means of the WebAccounting system. As detailed in chapter 2, effective knowledge creation, sharing, and leveraging requires an organisational climate and a reward system that values and encourages cooperation, trust, and learning for those engaging in knowledge-based roles, activities, and processes. As mentioned by Storck et al (2000, p. 64), in order for an organisation to become effective and efficient, it needs to create an "intellectual web," which provides lasting value through learning, innovation, and knowledge transfer. A company can create an intellectual web if the following essential factors are present: regular interaction, mutual interest, recognition of the intrinsic value of learning, and incentives for sharing. Storck et al (2000, p. 72) has also developed a model in analysing the principles of effective strategic knowledge management, in which these authors include six important principles (which I describe in detail in the following section). Their model of analysing knowledge framework (Table 6.2) was used to investigate two US based companies in managing knowledge diffusion through strategic communities.

- Chase Manhattan Bank Inc, a leading international bank, in which the bank has successfully developed a common back-office processing system for its overseas branches. The bank has achieved its objective of operating on a common infrastructure, and;

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- Xerox Corp., a successful large multi-national corporation with more than fifty IT management professionals, who were responsible for managing about 70,000 desktop workstations, nearly 1,200 servers, with various types of networking hardware (source: Storck et al, 2000, p. 70).

| Community Characteristic | Actions |
|---|---|
| Interaction format | Organise regular face-to-face meetings. Stimulate candid dialogue. Structure for serendipity. |
| Organisational culture | Leverage common training, experience, and vocabulary. Facilitate working around constraints. |
| Mutual interest | Build commitment by demonstrating visible progress towards a common goal. Promote continuous improvement of the community's processes. |
| Individual and collective Learning | Recognise and reward teaching others and learning from others. Leverage knowledge and experience of respected peers. Provide an environment in which reflection about learning occurs. |
| Knowledge sharing | Embed knowledge sharing into work practices. Reinforce its value with immediate responses. |
| Community processes And norms | Permit establishment of a "zone of safety" that builds trust and community identity. Minimise linkage to the formal control structure. Motivate the community to establish its own governance processes. |

*Table 6.2.* A table showing six key principles that are critical to the success of evaluating effective strategic communities. (Source: Storck et al 2000, p. 72.).

Staff from OrganisationA and OrganisationC testify that the effective creation and use of organisational knowledge plays a significant role in organisational changes that Storck et al (2000, p. 73) refer to as:

1. The design of an interaction format that promotes openness and allows for serendipity or favourable unexpected events;
2. The building of a common organisational culture;
3. Awareness of the existence of mutual interests;
4. The leveraging aspects of the organisational culture that respect the value of collective learning;

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5.  The entrenching of knowledge sharing practices into the work processes of the group;

6.  The establishment of an environment in which the basis of knowledge sharing relies upon the processes and cultural norms defined by the community, rather than other parts of the organisation (Source: Storck et al, 2000, p. 73.).

The following quotes describe how organisational change results from the creation and use of organisational knowledge by means of the WebAccounting processes including conversion of tacit knowledge to explicit knowledge.

The mechanic from OrganisationA recounts that organisational changes resulting from the conversion of tacit knowledge to explicit knowledge through WebAccounting can be affected through interaction that promotes openness and allows for serendipity or fortuitous events. Staff interaction by means of WebAccounting, through such means as e-mails and group discussion, allows virtual face-to-face meetings, stimulate staff dialogue, and supports a structure that encourages serendipity in interactions.

**Eddie:**      To what extent can organisational changes resulting from the conversion of tacit knowledge to explicit knowledge by means of WebAccounting be effected through interaction that promotes openness and allows for serendipity?

**The mechanic from OrganisationA:**

For example, when our organisation rethought its vehicle workshop maintenance processes, the adoption of new maintenance principles stretched our previous, established, goals. For example, by moving inventories of vehicle parts into headquarters, using teams, having a common budget, linking individual performance to vehicle repair success, and establishing a "platform team" that brings together service maintenance workers, counter sales staff, administration staff and uew car sales staff created new problems. The details of these activities and steps in coordinating the tasks involved were clearly distinguished in an electronic interactive format such as an e-mail distribution list, promoting community awareness of the agenda. Initially, there was a team of senior staff who felt

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that there was a level of competition amongst certain individuals, which worked against the sharing of knowledge. We then discovered that the interactive format of WebAccounting assisted in overcoming of these barriers. WebAccounting not only influenced the organisational culture but also encouraged the deeper knowledge of colleagues and mutual trust that are positive signs indicating effective group work. These promote openness and the development of a workable approach system for improving our work. Openness promotes wide exposure and broadcasting through on-line interactions. This provides space for serendipity. (OrgAWkshop, May 2002, file3, p. 3)

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*Reflexive Practitioner:*

*The mechanic from OrganisationA states that organisational changes resulting from the conversion of tacit knowledge to explicit knowledge by means of WebAccounting can be effected through its interactive format. He further suggests that WebAccounting facilitates and fosters the sharing of knowledge on a widespread scale. I note that radical changes affecting organisational culture involve organising regular meetings and stimulating candidate dialogue. The mechanic's contribution supports the assertion that the interactive format design promotes openness and allows for serendipity (Personal reflection, May 2002).*

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**Action-researcher (to add other authenticating perspective):**

The mechanic has crystallised his perspective through Habermas' Critical Social Theory where he reflects his thoughts about his lived experience in dealing with serendipity situations. These serendipitous actions form an integral part of his learning action.

> *An example of serendipity occurred when I was interviewing the mechanic from OrganisationA, the case involved a computer system malfunction in a particular high performance vehicle where no one in the workshop knew what to do. Not even the consultant engineer at the headquarters in the eastern states had a solution. The problem was broodcast over the WebAccounting. Three days later, a new employee posted a solution through WebAccounting on-line. Without WebAccounting, such a problem might not have been solved. <(Note: Reflection practitioner memo, April 2002, file4, p4) (note: the case appears to be consistent with the Morshall case study on British Airways, where it was claimed that a differentiation strategy promotes openness and allowed for serendipity. (source: S.E. Prokesch, Competing on customer service, Harvard Business Review, vol 73, no. 6 (1995), pp. 100-116.)*
>
> *Another example of serendipity, from OrganisationC, was a case where an investor purchased overseas shares. The purchase monies were sent to the overseas sales stockbroker but after two months the investor complained that he still had not received his share certificate. The manager from OrganisationC was aware of the problem. Follow up calls were made to trace the shares. The overseas stockbroker confirmed that they had delivered the share by registered post one month previously. None of the team dealing with the case knew how to make an overseas share replacement. The problem was then posted on-line over the WebAccounting. A week later someone from another department provided a solution to the problem. The situation was solved serendipitously through WebAccounting. (Note: Reflection practitioner memo, May 2002, file3, p3)*

An IT staff member from OrganisationA recounts that the organisational changes resulting from WebAccounting knowledge management process can be influenced by the underlying organisational culture. He asserted that the building of a common organisational culture could play an important role in transforming radical changes in an organisation. Organisational culture involves leverage of common training, experience, and vocabulary.

**Eddie:**　　　　　　To what extent can organisational changes resulting from WebAccounting knowledge management process can be influenced by the underlying organisational culture?

**An IT staff member from OrganisationA:**

Unselfish contributions of knowledge by people at all levels of the Organisation are necessary to facilitate extensive knowledge sharing. To achieve this level of sharing would probably require a substantial cultural shift. In reality, staff must participate in the company's WebAccounting training program where they can learn interaction and facilitation skills. They must internalise the use of a common vocabulary that reinforces a strong sense of organisational culture. This provides a common ground for effective communication and development of mutual understanding. There must be greater involvement from high levels of management to develop and maintain *effective* infrastructure management practices. (OrgAIT, May 2002, file3, p3)

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*Reflexive Practitioner:*

*In the above quote, the IT officer states that the WebAccounting's knowledge management process may result in radical changes in an organisation's culture through building upon common organisational elements, leveraging WebAccounting training, and experience that imparts a common vocabulary and new skills such as facilitation and on-line dialogue. His point about maintaining effective infrastructure management through greater high-level management is interesting. Is he subtly pointing out that present high-level management is not contributing sufficiently and thus laying the seeds for future failure, antagonism, and frustration? Is he implying that WebAccounting will be seen as a low level tool only, in that high-level management have neither a common vocabulary nor "interaction and facilitation skills". Is this why he emphasises "must internalise" for reinforcing a strong sense of organisational culture". In my analysis, high level management of OrganisationA should heed this insightful warning (Personal reflection, May 2002).*

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> **Action-researcher (to add other authenticating perspective):**
>
> The IT officer has crystallised his perspective through Habermas' Communication action where he reflects his understanding of reflexive thinking about WebAccounting's knowledge management process, which affect radical changes in organisational culture through building upon common organisational elements. To him, the ability to understand the underlying of Organisation culture learning and apply them in a different way indicates deeper understanding in pursuing the role of an action-researcher.

An administration officer from OrganisationA recounts that organisational changes, resulting from WebAccounting knowledge management processes, can be fostered by the unselfish sharing of knowledge, willingness to reconcile differences, and recognition that working together reduces uncertainty. In so doing, the promotion, and establishment of team-based cooperation, sourced on the accommodation of mutual interests, supports collaborative individualism. This mutual interest can assist in fostering commitment.

**Eddie:**       To what extend does the organisational changes, resulting from WebAccounting knowledge management processes, can be fostered by the unselfish sharing of knowledge, willingness to reconcile differences, and recognition that working together reduces uncertainty?

**An administration staff member from OrganisationA:**

As the economic values of information and knowledge continue to grow, there is snpport for the view that knowledge management, whether tacit or explicit, is crucial for organisations to excel. We need a system with explicit procedures for commmunicating such knowledge. We came to realise that in the task of nurturing the developments of closer and more interactive relationships among knowledge

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workers, and the company and also among the various departments, it is necessary to solicit that hidden know-how. The mutual interests of the unselfish sharing of knowledge and team-based cooperation can be seen as powerful ways of accessing and transferring organisationally embedded knowledge. For example, WebAccounting can foster the sharing of knowledge by pulling individual members into an environment in which they learn from each other. These processes stimulate the emergence of mutual influence systems. (OrgAAdmin, May 2002, file2, p2)

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*Reflexive Practitioner:*

*This administration staff member asserts that the WebAccounting system can lead to changes within his organisation. He notes that WebAccounting fosters mutual interests and increased positive attitudes and behaviour where staff members learn from each other by means of transfers of knowledge into WebAccounting knowledge repositories, and a willingness to apply what they learned. For example, by building commitment through demonstrating visible progress towards a common goal, WebAccounting can promote continuous improvement of the community's processes. Thus, used wisely, WebAccounting can facilitate the development and maintenance of effective management practices (Personal reflection, May 2002).*

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**Action-researcher (to add other authenticating perspective):**

The administration officer has crystallised his perspective through Habermas' Communication action where he explores his reflexive thinking by explaining, questioning and checking his ideas about organisational changes, resulting from WebAccounting knowledge management processes. He explored and constructed his ideas further by active participation in a range of collaborative

> investigation into the concept of unselfish sharing of knowledge, willingness to reconcile differences and the recognition that working together reduces uncertainty. The underpinning of all these ideas and thinking processes was his positive attitude illustrated by his commitment, engagement, and enthusiasm.

A sales officer from OrganisationC recounts that the aspect of valuing collective learning can stimulate organisational changes. He considers that the WebAccounting system recognises and rewards the teaching of others, the learning from others, the leveraging the knowledge and the experience of respected peers, and that it provides an environment in which reflection about learning occurs.

Eddie: To what extend does the aspect of valuing collective learning can stimulate organisational changes as a result from WebAccounting's knowledge management processes?

A sales officer from OrganisationC:

WebAccounting encourages mutual engagement. Junior staff members become team members by virtue of their organisational function. Through the WebAccounting system, a fostering of an established community of practices and relationships through the way people engage and interact with each other is a possibility. Many of us characterise the mutual engagement as a set of activities using individual involvement stemming from our own initiative, supported, rather than directed by our manager. In so doing, the WebAccounting system encourages voluntary participation, which implies higher motivation, which in turn leads to faster, deeper internalisation of learning among us. It also recognises and rewards teaching others and learning from others. (OrgCSales, May 2002, file3, p. 3)

> *Reflexive Practitioner:*
> *It can be noted that the sales officer mentions that effective*

*creation, sharing, and leveraging of knowledge by means of WebAccounting requires an organisational climate and culture that values and encourages cooperation, trust, individual development and collective learning. His point about individual involvement stemming from one's own initiative, rather than through direction, is particularly interesting in light of his further comments on "higher motivation" and "faster, deeper internalisation of learning." In the previous quote, the OrganisationA officer lamented the lack of high-level management initiatives. In the above quote, I present a different angle in terms of staff initiative. He seems to imply that WebAccounting provides its own rewards by enabling the group processes of sharing and dialogue and even through the on-line format providing supportive screen comments like "posting accepted". This reward system does not require increased high-level management commitment or time (Personal reflection, May 2002).*

**Action-researcher (to add another authenticating perspective):**

The sales officer has crystallised his perspective through Habermas' Communication action where he interprets the aspect of valuing collective learning in stimulating needed organisational changes. As a reflexive and reforming sales person, he generates his practical knowledge in a heuristic manner. That is, throughout his interpretative process he has actively suppress his voice and experience within the vignettes he has submitted, to judge the merits and demerits of a reflective and collective learning strategy used to determine how it might best be employed to facilitate reward systems in the future.

OrganisationA's IT staff recount that WebAccounting supports the firm's community processes and norms that effect the underlying organisational changes. For example, the basis on which an Organisation can establish a knowledge-sharing environment comes from the processes and cultural norms defined by the community rather than by the few top executives. Through the establishment of a 'zone of safety,' that builds trust and community identity through motivating the community to establish its own governance processes, WebAccounting enables effective knowledge sharing and creates value to the organisation.

**Eddie:** To what extent does WebAccounting support the firm's community processes and norms that affect the underlying organisational changes?

**An IT staff member from OrganisationA:**

We have seen WebAccounting as an extension of GroupWare Information systems. It utilises the exchange of business information through an Internet network. This network entails the exchange of information electronically (eg. e-mail between staff members, between different departments, or between separate organisations and its customers.) Such networks of exchanging information are crucial to support my businesses. As an IT contact, where I have to oversee daily help desk functions, I have discovered that where staff are granted the unusual autonomy to operate outside the formal control structure, intense knowledge sharing among staff members can be achieved. This community, over time, has established a 'zone of safety' for candid communication. Regular solicited responses from their activities support knowledge sharing, and this provides motivation for the community to establish its own governance. I imagine such an environment would provide significant positive changes to the Organisation concern. (OrgAIT, May 2002, file1, p. 1)

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*Reflexive Practitioner:*

*In the above quote the IT officer states that community processes and norms plays an important role in influencing the organisational changes resulting from the*

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> *conversion of tacit knowledge to explicit knowledge by means of WebAccounting. This is accomplished through permitting the establishment of a 'zone of safety' that builds trust and community identity. His point about how WebAccounting can make significant positive changes to organisations is noted. WebAccounting helps to accomplish organisational objectives through the structuring of people, technology, and the motivation of the community to establish their own governance processes. This appears to be consistent with the concept of Aadne et al (1996), concerning inter-organisational knowledge, where they emphasise that the flow of such knowledge supports mutual and beneficial inter-organisational gains (Personal reflection, May 2002).*

**Action-researcher (to add other authenticating perspective):**

The IT officer has crystallised his perspective through Habermas' Communication action where he sees to acknowledge the idealistic focus on the firm's community processes and the norms that affect the underlying organisational changes. That is, his practical reasoning for wanting to utilise the exchange of business information through an Internet network has led him to reflect on the efficacy of supporting knowledge sharing, and providing motivation for the community to establish its own governance.

**Summary of Theme 3**

From the forgoing interviews, it is possible to see that organisational changes arise as a result of the conversion of tacit knowledge to explicit knowledge using WebAccounting. The manner in which this occurs appear to be in line with the

six points made by Stock et al (2000, p. 72.) and quoted in section Theme 3 of this chapter.

1. Concerning the interaction format, WebAccounting systems assist in organising regular meetings, stimulating candid dialogue and providing structure for serendipity.

2. Concerning the building of an organisational culture, WebAccounting allows facilitation of advantage in staff training, experience, vocabulary, and in problem solving.

3. In regard of the context of mutual interest, WebAccounting allows the building of staff commitment by demonstrating visible progress toward a common goal and promoting continuous improvement of the organisation's processes.

4. In regards to the context of individual and collective learning, WebAccounting recognises and rewards the teaching of others and learning from others-- leveraging the knowledge and experience of respected peers, and providing an environment in which the reflection about learning occurs.

5. In regards to the entrenching of knowledge sharing into work practices, WebAccounting allows reinforcement of the values of knowledge sharing with immediate responses to the participants of OrganisationA and OrganisationC.

6. In the context of the community processes and norms, WebAccounting permits the establishment of a 'zone of safety' that builds trust and community identity and further motivates the participants of OrganisationA and OrganisationC to establish their own governance processes.

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Finally when discussing the issues of knowledge transformation, all interviewees except one indicated that WebAccounting is seen as a tool for facilitating the creation of knowledge; a process of providing objective information by tapping the tacit and often highly subjective, insights, intuitions and hunches of individuals.

## Reflections on Theme 3

At the beginning of this study, I acknowledged that WebAccounting knowledge management process has generally been acknowledged by participants and myself to have proactively fostered the sharing of knowledge to accommodate knowledge management practices. However, I found that this process was facing challenging obstacles. Employing various techniques that support knowledge management practices had the danger of precariously altering the underlying organisational culture.

As noted by administration staff from OrganisationA, the sharing of knowledge can be promoted by unselfish team based cooperation, accommodating an environment that engenders collaborative individualism. This implies that WebAccounting must able to support the mapping of the firm's organisational and technical capabilities and constraints to its knowledge processing requirements. In order to support such mapping, the following must be incorporated: (a) understanding of the organisation's strategic knowledge requirement; (b) the devising of a knowledge strategy appropriate to the organisation's business strategy; and (c) the implementation of an organisational and technical architecture appropriate to the organisation's knowledge processing needs. In meeting these criteria, I therefore tentatively assert that WebAccounting can assist an organisation to derive significant benefits from consciously, proactively, and aggressively managing the link between tacit and explicit knowledge.

**REFLECTION ON THIS CHAPTER**

As a reforming practitioner, I have been Habermas' critical social theory to undergird the research presented in this chapter, especially regarding the nature and interaction of social, human, and technical systems stimulate changes (Ngwenyama and Lee, 1997a, p. 153). This would include different dimensions, human (subjective world), social (inter-subjectively shared world), and technical (objective world). It is interesting to reflect on the often implicit way in which I have researched and analysed the participant's interpretation and their holistic view towards WebAccounting systems in managing organisational tacit knowledge within OrganisationA and OrganisationC. From the forgoing interviews in this chapter I have exposed the development of my "action-researcher living reflexive practise-theory" (Whitehead, 2002) through a multi-voice dialogue about the life-world of my participants. The "action-researcher" reflexive perspective has provided an alternative, authenticating perspective on the interview actions recorded in the interview transcript dialogues. These dialogues showed thoughtfulness as a fundamental part of personal sense making of participants from OrganisationA and B. Their dialogues were comprehensive, continuous, informative, and provocative.

That said, I am left with the nagging insight that critical theory is eventually inadequate. Although critical theory does occasionally profess to contain elements of both heuristical inquiry and reflective practitioner inquiry (Williams 1996), in my reading and research experience, these elements have not been widely accepted or employed. Only Williams (1996), Taylor (1993,1995), and the scholars at the Centre of Action Research Professional Practice, to my knowledge, have managed to illuminate critical theory research by using its own insights into the importance of the unconscious and tacit knowledge, and the importance of reflective practice. I address these issues in the following chapter.

## SUMMARY, THEORISATION, CONCLUSION AND EXTENDED EPILOGUE

*The heuristic researcher is not only intimately and autobiographically related to the question but learns to love the question. It becomes a kind of song into which the researcher breathes life not only because the question leads to an answer, but also because the question itself is infused in the researcher's being. It creates a thirst to discover, to clarify, and to understand crucial dimensions of knowledge and experience.*

*Clark Moustakas (1990, p. 43)*

### OVERVIEW OF THE CHAPTER

The above quote from Moustakas's book *Heuristic Inquiry* is a quantum leap beyond Habermas's astonishing quote beginning the previous chapter. With this development in understanding the nature of research within the two and half thousand year Socratic project of creating a better world through the use of liberating human reason, I am led to conclude my thesis. Using Moustakas's mind-boggling insight and in similar fashion in which Williams (1996) used Leonard Cohen's song "Allelulia" as the post-structural metaphor for his doctoral thesis, I am using Cohen's song "Bird on a Wire." I not only demonstrate that I "have tried, in my way, to be free" but in the epilogue I fulfil the quest and "I swear by this song, and by all that I have done wrong, I will, make it all, all up to thee".

In this final chapter, I present a cross-case analysis of the three major themes, providing an analysis and discussion of the similarities and differences to the existing literature. Firstly, I discuss a bridging of the gap between my

psychological self-study and my reflections, and philosophical inclinations as an action-researcher. Secondly, I summarise the implications of the research findings. I then present an account of theorising about the knowledge management of tacit knowledge whilst addressing research challenges. I conclude the more formal section of this thesis with some recommendations concerning managing tacit knowledge, making an overall conclusion and suggesting recommendations for future research.

Finally, in a Tentative Epilogue, I consider it necessary to round off this thesis by employing the more construction and playfully creative side of Derrida's tool of deconstruction. Presenting recent developments in Williams' and Wong's (2002, 2003) theory of ethical action, I centre on the last research question: "In the context of my researching WebAccounting based knowledge management, what insights can be gained using Williams' and Wong's (2003) theory of ethical action applied to the case study of my own practice as an heuristically critical reflective practitioner investigating knowledge explication?" Further, I use fuzzy logic and non-parametric mathematics to analysis an interesting corollary of the theory expressed in the equation: "$E = A_\Omega C^2$ (if and only if occurring through a human critically reflective decision in a locality of injustice (where $E$ stands for a potentially Enormous Impact, $A_\Omega$ for ethical Action at a critical moment of decision $\Omega$ brought about by a human critically reflective decision in a locality of injustice, and $C$ for the speed of light constant)" (Williams & Wong, 2002).

## IMPLICATIONS OF THE STUDY TO THE OUTER WORLD OF ORGANISATIONAL DYNAMICS

In this section, I identify three major themes of my study. Each theme was based on the theoretical pathway presented in chapter five by examining:

1. The role of knowledge repositories in WebAccounting's task of converting tacit knowledge to explicit knowledge.

2. The role of WebAccounting on-line formats in converting tacit knowledge to explicit knowledge.

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3. The organisational changes resulting from the conversion of tacit knowledge to explicit knowledge using the WebAccounting system.

Additionally, I have revealed each theme to explore various aspects of the progressive development of managing tacit knowledge via WebAccounting systems. Taken together, these findings can provide a comprehensive and unique perspective on the role of managing both tacit and explicit knowledge within an organisation. Moreover, these findings may give substance to a number of claims supporting organisations for managing both their tacit and explicit knowledge (Davenport et al. 1998, The IMPACT Programme, 1998, Daniel & Graeme, 1999). The results of each evaluation are summarised below.

1. The findings related to the role of knowledge repositories in WebAccounting's task of converting tacit knowledge to explicit knowledge.

The roles of knowledge repositories in WebAccounting's task of converting tacit knowledge to explicit knowledge have identified the needs, barriers, possibilities and resources, has examined relevant literature and documentation, and been involved in interviews with key participants from OrganisationA and C. The findings indicated that all the research participants were satisfied with WebAccounting systems in facilitating effective and efficient knowledge management by allowing flexibility in arranging, selecting, and integrating knowledge content. The findings were summarised as follows:

1. WebAccounting's knowledge repositories have supported collaboration within the process of explicating tacit knowledge (consensus from Chief mechanic of OrganisationA). This consensus accords to the philosophy of Zimmerman (1999) and Kanter (2000), who argue that control of information is often seen to be crucial to the sustainability of management structures within an organisation.

2. WebAccounting's knowledge repositories have addressed the issues of direct and emergent exchange of knowledge through the process of interactive Forums (consensus from senior fiance officer from OrganisationA). This consensus accords with Senge's thinking, who describes that the ability of transfer knowledge quickly and effectively from one part of the organisation to other is an important area of knowledge management. Hence, effective knowledge transfer can be managed in an organisation by means of WebAccounting's repositories.

3. WebAccounting's knowledge repositories support the process of knowledge creation by tapping unstated, tacit knowledge, often composed of highly subjective or individual insights, intuitions and hunches (consensus from IT officer from OrganisationC). This consensus accords with Zack (1996) and Zwass (1998) concept of knowledge transfer, where they argue that knowledge management helps to elaborate and disseminate external knowledge, and to bring that knowledge to solve problems and yield superficial opportunities for the organisations concerned.

4. WebAccounting's knowledge repositories facilitate forecasting functions (consensus from Senior Sales Manager from OrganisationC). This consensus accords with Zack (1996), Aadne, Krogh, and Roos, (1996) whose concept of cooperative strategies suggests that cooperative strategies can be translated into common ventures, alliances, mergers, acquisitions and virtual enterprising. Such transformation processes can be seen as a powerful way of accessing and transferring organisationally embedded knowledge.

5. WebAccounting's knowledge repositories enables staff to contribute their best practices skill into a knowledge repository where the collective knowledge are collected, integrated, and shared among people and can be used for confronting and resolving similar problems (consensus from Administration Officer from OrganisationC). This consensus accords to be in similar vein to Quin, Anderson, and Finkelstein (1996) with their concept of four

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distinctions between the types of knowledge. There are the "know-what, know-how, know-why and care-why." It also suggests that the importance of knowledge and its role in helping an organisation become competitive through the concept of the learning organisation.

6.  WebAccounting's knowledge repositories are confronted by challenging problems, particularly in the speed of disseminating relevant real-time research to investors in a highly volatile and rapidly changing stock markets environments (consensus from finance officer from OrganisationC). This consensus appears to be consistent with Meyer and Zack (1996) concept of technology infrastructure role in knowledge management, whom state that a technology context addresses only 10 percent of requirements in supporting knowledge management whereas 90 percent is related to people.

2.  **The findings related to the role of WebAccounting on-line formats in converting tacit knowledge to explicit knowledge.**

    1.  WebAccounting's on-line presentation is enhancing the conversion of tacit knowledge to explicit knowledge through the process of interaction and with the continuous updating of relevant knowledge (consensus from finance officer from OrganisationA). This consensus appears to be appeared to relate to Senge's Fifth Discipline (Senge, 1990). Senge argues that there is a need for "learning organisations" whereby people are continually expanding their capacity to create the results they desire, where new and expensive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together. In my analysis, WebAccounting can indeed help to realise these expectations.

    2.  WebAccounting on-line format facilitates the process of direct exchange of knowledge among employees and enables the tracing of the employee's knowledge development (consensus from an administration officer from OrganisationA). This consensus appears to be consistent with Argyris (1976) concept of organisational

memory. Argyris suggests that "organisational memory" refer to data stored in the organisation's knowledge repositories to assist in decision-making.

3. WebAccounting on-line format enables a more efficient and effective organisational learning for converting tacit prior experience knowledge to explicit knowledge through the process of on-line conversations, contributions, and collaborations. (Consensus from sales Manager from OrganisationA). This consensus appears be consistent with the Huber (1991) and Lyles and Schwenk (1992) concept of prior experience in the literature of cooperative strategy. They emphasise that past experiences that are transferred into knowledge and stored into the organisational memory provide the ability to discriminate between different situations, and to select the actions that might be most appropriate to future problem solving.

4. WebAccounting's on-line format was confronted by some challenging problems, particularly in providing the flexibility required for an integrative knowledge management processes (consensus from finance officer from OrganisationC). In order to provide access to multimedia digitised research documents a high level of technological infrastructure is needed, and must be continually updated to eliminate out-of-date content.

5. WebAccounting on-line format enables organisational learning for converting tacit knowledge to explicit knowledge through the process of interaction and continuous update of knowledge (consensus from Sales manager from OrganisationC). This consensus accords to Hamel's (1991) concept of internalisation. Hamel argues that internalisation supports organisational ability and capacity to learn.

6. WebAccounting on-line format enables an efficient and effective platform for organisational learning through a process of converting

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tacit knowledge to explicit knowledge by direct exchange of knowledge among employees (consensus from an IT staff member from OrganisationC). This consensus accords to Aadne, Krogh, and Roos (1996), particularly with their concept of cooperative strategies for understanding and managing knowledge, where they emphasise that openness and trust are two of the main determinants of success in the field of knowledge transfers.

3. **The findings related to the organisational changes resulting from the conversion of tacit knowledge to explicit knowledge through the WebAccounting system.**

1. WebAccounting's knowledge management process facilitates and fosters the sharing of knowledge on a widespread scale. Organisational changes resulting from the conversion of tacit knowledge to explicit knowledge by means of WebAccounting can be effected through the interactive format (consensus from a mechanic from OrganisationA). This consensus accords to Aadne, Krogh, and Roos (1996), particularly with that the interactive format design promotes openness and allows for serendipity.

2. WebAccounting's knowledge management process may result in radical changes in an organisation's culture through building upon common organisational elements, leveraging WebAccounting training, and experience that imparts a common vocabulary and new skills such as facilitation and on-line dialogue (consensus from an IT staff member of OrganisationA). This consensus accords to Habermas' Communication action where the IT staff member reflects his understanding of reflexive thinking about WebAccounting's knowledge management process, which effect radical changes in organisational culture through building upon common organisational elements. To him, the ability to understand the underlying of Organisation culture learning and apply them in a different way

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indicates deeper understanding in pursuing the role of an action-researcher.

3.  WebAccounting systems foster mutual interests and increased positive attitudes and behaviour where staff members learn from each other by means of transfers of knowledge into the WebAccounting knowledge repositories, and a willingness to apply what they learned (consensus from an administration staff of OrganisationA). This consensus accords to Habermas' Communication action where the administration staff explores his reflexive thinking by explaining, questioning and checking his ideas about organisational changes, resulting from WebAccounting knowledge management processes. He explored and constructed his ideas further by active participation in a range of collaborative investigation into the concept of unselfish sharing of knowledge, willingness to reconcile differences and recognition that working together to reduce uncertainty. All these ideas and thinking processes were underpinned by his positive attitude that was illustrated by his commitment, engagement, and enthusiasm.

4.  WebAccounting systems encourage cooperation, trust, individual development, and collective learning (consensus from a sales officer of OrganisationC). This consensus accord to Habermas' Communication action where the sales officer explores his reflexive processes where he interprets the aspect of valuing collective learning in stimulating needed organisational changes. As a reflexive and reforming sales person, he generates his practical knowledge in a heuristic manner. That is, throughout his interpretative process he has actively suppressed his voice and experience within the vignettes he has submitted, to judge the merits and demerits of a reflective and collective learning strategy used to determine how it might best be employed to facilitate reward systems in the future.

5. The conversion of tacit knowledge to explicit knowledge by means of WebAccounting systems allows the community processes and norms to play an important role in influencing the organisational changes. This is accomplished through permitting the establishment of a 'zone of safety' that builds trust and community identity (consensus from an IT staff member of OrganisationA). This consensus accords with the concept of Aadne et al (1996), concerning inter-organisational knowledge, where they emphasise that the flow of such knowledge supports mutual and beneficial inter-organisational gains. Additionally, the consensus is also in a similar vein to Habermas' Communication action where the IT staff member sees to acknowledge the idealistic focus on the firm's community processes and the norms that affect the underlying organisational changes. That is, his practical reasoning for wanting to utilise the exchange of business information through an Internet network has led him to reflect on the efficacy of supporting knowledge sharing, and providing motivation for the community to establish its own governance.

The above implications are from findings that were sourced from the participants' inner and outer worlds and can be seen as important to the understanding of their personal thoughts and reflections. These views allow the readers to understand the processes that determine people's involvement in the creation and application of knowledge through the adoption of the WebAccounting system.

Having discussed the implications of the findings, the next section provides a commentary on the study methodology.

## COMMENTARY ON THE STUDY METHODOLOGY

In Chapter 3, I address the following research question using a largely positivist research approach:

In the context of making possible knowledge sharing, how successful is WebAccounting as a knowledge management system, judged in

accordance with Moody and Shanks' success factor model for analysing knowledge management system?

In Chapter 3, I employed a largely positivist perspective approach relying on what I took to be objective measurements. I regarded social structures of reality within a positivist paradigm as being modelled rather than being interpreted or recreated (Guba, 1990, Chu, 1986). As a "practitioner-observer" researcher, I generated insights of the findings from my participants of OrganisationA through my daily interactions over the period of my employment with OrganisationA. I construct my interpretation of the described positivist findings as deductive. However, I came to understand that the research fails to capture important humanistic issues (Guba, 1990). My described findings are thus limited to a few variables constrained by the available data (Gaffikin, 1984, Chu, 1986, Guba, 1990). These described findings are subscribed to a realist ontology, objectivist epistemology with the use of controlled experiments as methodology (Guba, 1990). Although limited, this positivist approach did operate as a knowledge-yielding enterprise (Chua, 1986) in which I obtained only narrowly circumscribed results too narrowly formulated research questions.

In Chapter 4, I addressed the following question using a largely interpretive research approach:

*To what extent do Porter's value chain model (1986) and Popozoglou & Yang (2000) value chain integration model provide insight regarding competitive advantage and the management of knowledge in an organisation by the adoption and use of WebAccounting?*

In chapter 4, I have taken an interpretative perspective on justifying the insights of the findings. I have been influenced by Checkland's (1972) soft-system methodology (SSM). This SSM allows the development of an impression of the situation of concern, and the accommodation of large numbers of ideas making progress towards a consensus of ideas (Duczynski, 2001, p. 21). This approach directs me towards the "what" of knowledge management and knowledge learning rather than the emphasis of the "how" of managing knowledge. For me,

this interpretative approach allowed me to understand human behaviour through social constructions such as language, conscious and shared meaning from the participants. No doubt, it allowed me to understand how staff of Org B, through their participation in knowledge management processes, enacted their particular realities and endowed them with meaning. However, I found that this did not sufficiently address the critical thinking perspective. Hence, I have had to focus on an integrative theoretical framework, combing interpretative and critical elements (Walsham, 1993, 1995; Orlikowski et al, 1991). Employing critical social theory has led me to realise the importance of subjective meaning about the nature and the interaction of social (inter-subjectively shared world), human (the subjective world), and technical (the objective world) (Ngwenyama & Lee, 1997b, p. 5). This synthesis of critical social theory also led me to broaden the my major research question to the following: "For managing organisational and individual knowledge, what are the impacts of the adoption and use of WebAccounting, in the conversion of tacit knowledge to explicit knowledge?" I also address the third subsidiary research question: " To what extent does Habermas's critical social theory provide insights regarding knowledge management through the adoption and use of WebAccounting?

It is in this research phase that I can see retrospectively the questions that the research has illuminated, and thus understand and explicate the evolution of the research questions (Whitehead, 2001, p. 4).

In chapter 6, I exposed the development of my "living reflexive theory" (Whitehead, 2002) through a multi-voice dialogue about the life-world of my participants of OrganisationA and C. Firstly, as a journeying practitioner researcher I describe my "big picture" view of managing organisational tacit knowledge through the adoption of WebAccounting. In this section, I translate and interpret the transcripts of my participants. Secondly, in the reflexive practitioner's perspective I describe my development journey towards the evaluative criteria for judging the merit of the research by addressing my understanding of knowledge management and compare it with the literature. I then highlight the dilemma I faced in translating theory into practice, and relate it

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to the organisational knowledge sharing culture. Thirdly, in the action-researcher's perspective I discuss the influence of the philosophical framework with the provision of other authenticating point of views. These three viewpoints relate the research outcomes from the thoughts and reflections from a personal life-world to the broader setting of the practitioner's world. Through this action-researcher perspective I have come to understand the local situation by thinking reflexively, analysing evidence and writing my story of this inquiry (Richardson, 1994, p. 518).

## IMPLICATIONS FOR FURTHER RESEARCH.

In this study, I have examined the adoption of a Web-based knowledge management system, WebAccounting, in the conversion of organisational tacit knowledge (largely unconscious) into explicit knowledge (largely conscious) from a strictly Australian perspective. Hence, to enable further comparison across global organisations, additional studies using a methodology similar to that in this research are needed. For example, Australia has a strong learning culture relation's basis that could affect organisational outcomes. Other issues that could have an influence on the business performance and competitiveness of an organisation include the legal framework, the human-resource and management perspective, the technology advancement perspective, government intervention, and the national culture.

Further research is also required in order to analyse the effects of short-term and longer-term organisational learning culture. This research may be based upon the knowledge-related concept of cooperative strategy, the context of inter-organisational knowledge flow, individual knowledge flow, and individual learning. As mentioned by Aadne et al (1996), organisations are facing the problem of keeping pace with technology, particularly in the transition from industrial era to the information era. This problem often results in strategies oriented toward short-term interventions designed to achieve competitiveness turnaround for organisations. This suggests that organisations need to explore, in-depth, the issues of cooperative strategies of a learning culture involving the

explicating of organisational tacit knowledge to problem solving (Andersoll et al.1983, Alvesson et al.1992b, Alter, 2000).

Danvenport et al (1997), Hussein (1997) discusses the various aspects of the development of knowledge management and the role of both tacit and explicit knowledge to organisational learning. They mentioned that the ability to capture and manage organisational learning, which means that effective knowledge management through explaining and leveraging tacit knowledge, could provide competitive benefits for an organisation. In doing so, the ability to channel and nurture knowledge and knowledge workers would also enable organisations to operate under a condition of "increasing returns" (Nonaka et al.1995, Remenyi, 1999a, Malhotra, 2000). This suggests that knowledge transformation processes that support collect, share, elaborate, and disseminate external knowledge can be applied to solving problems and exploiting opportunities for the organisations concerned.

Several researchers (Nonaka, 1995; Davenport et al, 1996; The IMPACT Programme, 1998; Daniel et al, 1999; Remenyi, 1999a; Hansen, 1999; Zack, 1999; Standing, 2000; Smith, 2001; Burn, 2000; Williams, 2000; Fink, 2000), have argued that management, in order to bind an organisation together, may use integrating and sharing distributed knowledge strategies that other researchers suggest. Management of explicit knowledge, which includes accessing, evaluating, managing, organising, filtering and distributing information in a manner that is useful to recipients, can also provide strategic value to the organisation. The results of this study, however challenge this, in that the insights of how the organisational tacit knowledge repository in which WebAccounting systems function enhance the process of learning and behaviour of practitioners in understanding the nature and interaction of social (the inter-subjectively shared world), human (the subjective world), and technical (the objective world) (Ngwenyama & Lyytinen, 1997b).

The results of this study suggest the effective and efficient and empowering conversion of tacit knowledge to explicit knowledge, augmented by a system

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such as WebAccounting, could enable organisations to manage organisational learning, and also to apply that knowledge to the solution of problems and the fulfilment of new opportunities. I also suggest that the explication of individuals' tacit knowledge, albeit not necessarily through a system such as WebAccounting, can lead to lead to the solution of problems and the fulfilment of new opportunities in personal and organisation and community life. The first suggestion has been supported by this whole thesis, and, in a manner, so has the second suggestion. However, to further explore and justify the second suggestion, I now present a Derridean inspired Epilogue as Chapter Eight.

# CHAPTER EIGHT

## TENTATIVE EPILOGUE

In this epilogue, acting as a reflexive review and synthesis of this study, I weave a postmodern web of words around the final research question. Restating for clarity, the question is: "In the context of my researching the explication of tacit knowledge, what insights can be gained from a postmodern inspired rendering of the case study of my own practice as an heuristically critical reflective practitioner, which resulted in and was informed by Williams' and Wong's (2003) theory of ethical action?"

I present an outline of the theory of ethical action that has directly resulted from this research and Williams (1996-2002) post doctoral research and practice. Exploring a corollary jingle of the theory using fuzzy logic and non-parametric mathematics, I conclude with a post-modern deconstructive and confessional account of the research, including some insights arising from some inner discourse.

## BRIDGING THE GAP: THIS RESEARCH AND MY INNER SELF STUDY

In this thesis, I have provided a detailed description of the research approach. This includes elements of heuristic inquiry to solicit inner and open discourse responses using one-on-one interviews within a phenomenological, reflective practitioner methodology to experience the facilitation of knowledge sharing through WebAccounting. Using a critical social theory perspective has proved to be a useful method for exploring and understanding the social contradictions and conflicts inherent in the existing social structures of both organisations and society through self-reflection in the hope of human emancipation (Alvesson &

Willmott, 1992, p. 434; Orlikowski & Baroudi, 1991, p. 19). Such an approach has allowed me to describe and explain my professional and personal growth over a period of three years, through the creation of my own "lived reflexive experience" (Whitehead, 2002).

My research story forms an episode where I disclose aspects of my worldview and personality type. This perspective allows me to include elements of open dialogue between theoreticians and practitioners through a methodology employing reflexive practice research (Appignanesi et al, 1995, Van Manen, 2000 Taylor and Wi.. .. , 1993, Williams, 1996, Whitehead, 2002). In doing so, I find that I am able to reveal personal and anecdotal comments about my psychological reflections. Although my intentions may have been to understand and to impose meanings by analysing the evidence and then integrating the formed ideas, I eventually found that I was able to shape a convincing response from this methodology. This response may have subconsciously allowed me to crystallise my findings (Taylor and Williams, 1993; Williams, 1996, Whitehead, 2002; Wong & Williams, 2002).

As demonstrated in the definitions of terms in the glossary, I take reflexive practice as an ethically acted reflective practitioner research. I favour the notion of reflexive practitioner research as a *self-study* processes (Guba, 1978, Appignanesi et al, 1995, Van Manen, 2000). This approach serves to recognise and bring both the precise views of the world (ontology) and the views of the relationship between the inquiry and the world (epistemology) (Guba, 1978; Appignanesi et al, 1995; Van Manen, 2000). It also allows me to set a method for finding knowledge about the world with their corresponding ways of interpretations (Guba, 1994).

I embrace research that serves to bridge the gap between theory and practice (Taylor and Williams, 1993; Guba, 1990; Van Manen, 2000; Whitehead, 2002) and I see my reflexive research as providing an impetus to synthesise a method, and to allow me to elicit new knowledge. I also hope to alert others to the new proposed learning reforms, in particular the conversion of tacit knowledge

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(largely unconscious) into explicit knowledge (largely conscious). I hope my role may generate reinforcing learning behaviours such as motivation and commitment amongst the participants of OrganisationA and OrganisationC. This is in the hope of encouraging meaningful learning for those involved so that the individual can make positive use of these new behaviours (response learning) and make sense of them. They then may be incorporated into an individual's belief and personal growth as a natural by-product of this learning process (Ellis, 2000; Whitehead, 2002). I will touch upon these topics in my epilogue.

## REFLECTING ON MY PHILOSOPHICAL INCLINATIONS AS AN ACTION-RESEARCHER

Use Moustakas's (1990, Pp. 32-34) notion of validity in heuristic research, I continue to seriously enact Schon's (1983) admonition to be a reflective practitioner. In endeavouring to act as a reflexive practitioner, I used the approach of self-reflection throughout my professional practice to portray visually and symbolically the elements and relationships that bind the subject together (Ellis, 2000; Whitehead, 2002). This allows me simultaneous expression of "what is", "what could be" and the choice of possible paths that one may take.

I became increasingly aware that, when I was researching the impacts of organisational tacit knowledge becoming explicit in the outer organisation domains through WebAccounting system, I was explicating my own tacit knowledge in my inner domains. Through the spirit of reflexive practice research informed by critical and heuristic inquiry, I was living out in my own life and practice, in a psychological and personal sense, the very thing that I was researching (Taylor and Williams, 1993, Guba, 1990, Van Manen, 2000, Whitehead, 2002). In this manner, I am able to look for some inner insights that augment the research findings. For example, what are the inner factors in my own lived experience that correspond to the following major factors on the research in the outer world of organisational dynamics:

1. The organisation's commitment to the effective and efficient management of knowledge;

2. The organisation's knowledge management architecture;

3. The organisation's method of processing flows of information within knowledge management (integrative or interactive application);

4. The challenges faced in adopting WebAccounting;

5. The impediments faced in adopting WebAccounting?

Would I enact, in my own professional practice that political empowerment demanded by a reflexive practice deepened by an amalgam of *reason* from critical theory and tacitly explicative *eureka* from heuristic (words of the same Greek root word) inquiry? When eureka insight coupled with emancipatory reason to enable me to see the necessity of acting against oppression and threat, would I respond by appropriate action in this omega moment of decision? Would I enact, in a locality of oppressive injustice and threat, just, fair, and honest ethico-socio-political action informed by both reason and intuition?

## WILLIAMS' AND WONG'S (2003) THEORY OF ETHICAL ACTION

Williams' and Wong's (2002) theory of ethical action suggests that enacting in one's own practice the insights one gains from reflection on that practice brings about *awareness of injustice*, which brings about a *moment of decision* wherein, if a person does indeed *take action* against injustice there will be *potentially enormous impact*. Williams (2003) explains that no matter how small the act, even a single word against injustice, the potential impact upon the person and the socio-cultural context is enormous, as if multiplied by the square of the speed of light. Metaphorically, and with postmodern allusiveness, Williams refers to this outcome of the theory of ethical action as in accord with the following postmodern fuzzily approximate jingle:

$$E = A_{ct}C^2$$

*if and only if occuring through reflexive*
*decision in a locality of injustice*

Where E stands for Enormous impact, $A_{ct}$ for Action ethical at
a critical moment of decision ($\Omega$) brought about by a reflexive
decision in a locality of injustice, and C for the speed of light
constant.

(Apologies to Einstein for we were inspired by his $E=MC^2$,
from his theory of relativity, which formulates that a small
amount of matter converts to an enormous amount of energy.
In a similar yet metaphorical way, a small ethical action
converts to a potentially enormous impact according to the
above postmodern and fuzzily approximate jingle.)

**Analysing the Theory of Ethical Action Equation $E = A_{ct}C^2$ Using Fuzzy
Logic and non-Parametric Mathematics**

### Introduction

In the past year, as part of our development of the theory of ethical action
(Williams & Wong, 2003), my supervisor and I were thinking of some techniques
that may perform the task of modelling nonlinear functional relationships of an
unknown form. We were searching for some techniques which could be applied
to the corollary mathematical equation (I use equation rather than jingle due to the
need for mathematical formulation) from our theory ($E = A_{ct}C^2$ as stated above).
During that time, following on from my Masters degree, we have been
researching models from the literature of nonparametric estimation and
prediction[1].

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[1] My supervisor, Dr. Mark Williams holds both a B. Sc. (Mathematics) and a B.
Arch. (hons) (UWA) and Ph.D. (Curtin). I came to understand many of the
mainly non-parametric mathematical models (fuzzy-logic, genetic algorithms,
simulation equations, etc.) whilst I was reading for my Masters at UWA.

While many statistical models are well developed, largely due to econometricians (Stinchcombe and White, 1989; Wang, 1992), the techniques to support our ethical action functions remain somewhat mysterious. This situation is alleviated somewhat by Williams' heuristically inspired insight to use Einstein's corollary mathematical equation from his theory of relativity ($E=MC^2$ where E refers to energy, M to matter, and C to the speed of light constant).

Using this intuitive insight, I was able to employ fuzzy logic and non-parametrical mathematics in probing for a unified mathematics framework. Loosely speaking, Einstein formulates that a small amount of matter, in the right locality under the right conditions, can convert to an enormous amount of energy due to the multiplying factor of the square of the speed of light constant. In an analogous and metaphorical way, an ethical action in the right locality under the right conditions can convert to an enormous impact according to the ethical action equation (Williams & Wong, 2002).

The following section sets out an outline of my work to explore the formula using fuzzy logic in the language of non-parametric mathematics.

*Fuzzy Logical and Non-parametric Mathematical Exploration*

*Definitions:*
(Note: Above equation was rewritten from Sandberg & Park (1989) and Wang's (1992) theorem of fuzzy logic equation).

Enormous impact - function set: Let E be the universe of discourse (for our purposes $\underline{E} = A^n$, a set A is a subset of a matrix space **Action** and is a fuzzy set if its membership function is multivalued (eg. $\Omega_A : \Omega \rightarrow [0,1]$, where $\Omega_A(X)$ is the membership grade X of in A). Then a collection of subsets $\{X_i\}$, $i=1,2...,n$; $X_i \subset A$ is an ε-covering of $\underline{E}$ if the diameter of each $X_i < 2\varepsilon$ and $\underline{E} \subset \cup X_i$ (ie. $\underline{E}$ is covered by $A^n$).

$\underline{E}_\varepsilon = \{ e_1, .... e_k \}$ is an ε-net for $\underline{E} = \{\theta_j\}$, $j \in J$; if for each θ in E there is at least one element $e_i$ of $\underline{E}$ such that $\rho (\theta, e_i) \leq \varepsilon$.)

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The points $S_1, ..., S_n$ are ε-separate if the pairwise distance $\rho\,(S_i,S_j\,) < \varepsilon\,\forall\,I \neq j$.

*Mathematical Exploration:*
(adapted from Sandberg & Park's Theorem, 1989 and Wang's Theorem, 1992)

The minimum number $n$ that is sufficient to cover $\underline{\mathbf{E}}$ for a given $\varepsilon > 0$ is a function of only its logarithm $H_\varepsilon\,(\underline{\mathbf{E}}) = \log N_\varepsilon$ where $N_\varepsilon\,(\underline{\mathbf{E}}) \equiv \min n$ which is thus called the metric entropy of the set $\underline{\mathbf{E}}$.

Thus:

$$|\,\theta\,(X) - e\,(X)\,| = |\Omega_\sigma + \textstyle\sum_{j=1}^{i}\Omega_j\,[]^i_{\,n=1}\Psi(\varpi\,\gamma_{js}) - b_\sigma - \textstyle\sum_{j=1}^{i}\Omega_j\,[]^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\,|$$

$$\leq |\Omega_\sigma - b_\sigma + \textstyle\sum_{j=1}^{i}(\Omega_j - b_j)\,[]^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\,| + |\,\textstyle\sum_{j=1}^{i}b_j\,\{[]^i_{\,n=1}\Psi(\varpi\,\gamma_{js}) - []^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\}\,|$$

Where:

$$|\,[]^i_{\,n=1}\Psi(\varpi\,\gamma_{js}) - []^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\,| \leq |\,\{\,\{\Psi(\varpi\,\gamma_{js})\,\} - \{\Psi(\varpi\,\copyright_{js})\}\,\}^r\,|$$

$$|\,[]^i_{\,n=1}\Psi(\varpi\,\gamma_k)\,| \leq |\Psi(\varpi\,\gamma^\sigma)\,|^r \text{ where } \gamma^\sigma \text{ denotes max } \Psi(\varpi\,\gamma_k)$$

$$|\,[]^i_{\,n=1}\Psi(\varpi\,\copyright_k)\,| \leq |\Psi(\varpi\,C^\sigma)\,|^r \text{ where } C^\sigma \text{ denotes max } \Psi(\varpi\,C_k)$$

When $\gamma^\sigma$ denotes max $\Psi(\varpi\,\gamma_k)$ which reaches maximum $= \Omega_A$

When $C^\sigma$ denotes max $\Psi(\varpi\,C_k)$ which reaches maximum $= C^2$.

Hence, the final equation turns to:

$$|\,\theta\,(X) - e\,(X)\,| = |\Omega_\sigma + \textstyle\sum_{j=1}^{i}\Omega_j\,[]^i_{\,n=1}\Psi(\varpi\,\gamma_{js}) - b_\sigma - \textstyle\sum_{j=1}^{i}\Omega_j\,[]^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\,|$$

$$\leq |\Omega_\sigma - b_\sigma + \textstyle\sum_{j=1}^{i}(\Omega_j - b_j)\,[]^i_{\,n=1}\Psi(\varpi\,\copyright_{jk})\,| + |\,\textstyle\sum_{j=1}^{i}b_j\,\{[]^i_{\,n=1}\Psi(\varpi\,\gamma_{js}) - []^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\}\,|$$

$$|\,\theta\,(X) - e\,(X)\,| = |\Omega_\sigma + \textstyle\sum_{j=1}^{i}\Omega_j\,[]^i_{\,n=1}\Psi(\varpi\,\gamma_{js}) - b_\sigma - \textstyle\sum_{j=1}^{i}\Omega_j\,[]^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\,| \text{ equal to } \underline{\mathbf{E}}$$

$$|\Omega_\sigma - b_\sigma + \textstyle\sum_{j=1}^{i}(\Omega_j - b_j)\,[]^i_{\,n=1}\Psi(\varpi\,\copyright_{jk})\,| + |\,\textstyle\sum_{j=1}^{i}b_j\,\{[]^i_{\,n=1}\Psi(\varpi\,\gamma_{js}) - []^i_{\,n=1}\Psi(\varpi\,\copyright_{js})\}\,| \text{ equal to } A_\Omega C^2$$

Resolving both sides of the equation provides the new equation:

$$E = A_f C^2$$

So it is that a fuzzily logical non-parametrical mathematical exploration seems to support the equation arrived at through postmodern playful allusive creativity. Subject to further research and mathematical justification, we are content to refer to the equation neither as a law or a formula, but as still the same old jingle, albeit which now has a little more credence as a corollary of the theory of ethical action (Williams & Wong, 2002).

### Comments:

Due to the number of permutations that exist in a chaotic environment, especially in today's rapidly changing business world, Williams' and Wong's (2002) ethical action equation is explored by using notions of quantum mechanics and Einsteinian theory. One such notion is that the quantum of kinetic energy resulting from a fusion or fission of an element changing state into another state (which, as in the case of the element Uranium, may be stable or unstable depending on the nature of the changed element) involves enormous numbers of permutation sequences which actually approach infinity (at least in the order of half a billion).

In the human realm, the actions of a person taking ethical action in their life may be equated to the number of permutation sequences as in the case of the fusion of matter. In other words, in the human realm, the enormous impact of an ethical action (taken in the locality of injustice perceived by an emerging ethical awareness directly soured from the reflexive practices of the person concerned), can be mapped onto the case of kinetic energy released by fusion or fission of matter according to Einstein's famous equation $E = MC^2$.

Another notion is the question of why the speed if light constant is central to both Einstein's equation and to the ethical action equation $E = A_f C^2$. Due to the fact

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that fusion or fission taking place in the matter-energy transformation occurs in at least approximately half a billion permutation sequences and sometimes approaches infinity, it is necessary to include the speed of light constant in the equation as this is the nearest constant to infinity in our universe. Hence in the ethical action theory, the impact can be mapped onto the kinetic energy released during the fusion of matter. Einsteinian and quantum theory paradigms are used in mathematically exploring the ethical action equation as described in the previous section.

Another notion is that for fusion of matter to take place, certain conditions must exist in the locality of that matter to create a chain reaction. Such conditions include an external catalyst in the form of heat and critical mass in the right environment to create the conditions and velocity necessary for the chain reaction to enable the process to continue through the matter involved.

In the case of the human action equation, creating a chain reaction requires the action to take place in a critical mass of human thoughts or intrapersonal actions or within either a critical mass of persons in the locality or within the social environment of the actioner. Only in these conditions can the permutation sequences describing human behaviour be resolved to create the necessary equations.

The human action creates a chain reaction by an initial human action influencing human thought or behaviour which in turn influences other human behaviour and so on, in an exponential manner. This exponential effect leads to the chain reaction of human thought or behaviour that creates an enormous impact upon humanity.

Thus the speed of light constant is employed because the permutation sequences of human thought and behaviour approach infinity, correspondingly as in the case of fusioning or fissioning matter where the permutation sequences of quantum states also approaches infinity. As the speed of light constant is the closest

velocity mapping to infinity, it has to be used in both Einstein's equation and in the ethical action equation.

## MY COMMITMENT AND DEDICATION

In epilogue, I explain the previously veiled description of my decisions to change to the ECU Doctor of Philosophy programme from my previous university doctoral programme and why I decided to include this episode in my thesis. Why does this action deserve to be included as part of a research thesis investigating the explication of tacit knowledge? The short answer is that I was a participant in the research and I was explicating tacit knowledge in my life and in the research process itself. By including this episode in my thesis I am exploring research material relevant to the area under investigation. Indeed, I have come to think that this case study, of the explication of tacit knowledge in the largely inner world of my own practice, may well come to be the most significant part of the research.

In terms of Williams' and Wong's theory of ethical action, what was the ethical action? What were the critical moments of decision? What was the locality of injustice? What was the emerging ethical awareness? What were the insights gained through my practice that I enacted in my own practice? More importantly in some ways, what was the enormous impact? (Williams & Wong, 2002).

Thinking of the last question, perhaps for me the most existentially important aspect of the theory of ethical action for me at the moment, I quote from the renowned psychiatrist-psychologist-philosopher Carl Jung. Speaking of empowerment of one's belief in order to justify one's value, Carl Jung (1975) writes:

> Too many men and women reach middle age without achieving psychological maturity and it is therefore necessary to help them through the neglected phases of their development. If a person is afraid of life and finds it hard to adjust to reality, he might prefer to dwell in his fantasies or to remain a child. In such a person (especially if he is introverted) one can sometimes discover unexpected treasures in the unconscious, and by bringing them to consciousness strengthen his ego and give him the psychic energy

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he needs to grow into a mature person. This constitutes the neglected phase.

<div style="text-align: right">Carl Jung (1975, p. 325)</div>

Perhaps answering my own question by which I end this thesis, it could just be that that I am just such a person, that the enormous impact that accrues to me is my maturity. The question still remains, though, what is the enormous impact on others?

## VIGNETTE OF MY MOMENT OF DECISION

Briefly put, in terms of Williams' and Wong's (2003) theory of ethical action:

1. What were the actions? The first action was that my supervisor and I decided to proceed with our heuristically critical reflective practitioner research in the face of undue interference in this research by senior administrators and academics.

2. What were the critical moments of reflexive decision? The critical moments were, when confronted by serious oppressive actions, both my supervisor and I took an ethico-socio-political decision by enacting the insights we were achieving by reflecting on our practices of academic research into tacit knowledge explication. This was to test if there were substantial reasons to support withdrawing from this project. After much reflection and examination, my supervisor and I decided to carry on with this project convinced that we had examined all important and relevant points and found our case to be soundly based for a research project as this one using the stated methodology.

3.  What was the source and locality of this injustice? The source of this injustice, unexpectedly, was the university department (my previous university) where I was conducting this supervised research, and at the same time apparently, other senior academics and administrators openly and possibly covertly as well, harassed and ridiculed the research and the result was an imposition of strict procedures in an attempt to block and impede the research and its methodology.

4.  What was the emerging ethical awareness? The emerging ethical awareness was that my supervisor and I became aware of new levels of ethical importance from within our research processes using the methodology of heuristically critical reflective practices. We were developing our theory of ethical action. If we gave up and succumbed to this academic pressure and restricted our research, we would be betraying not only to our research participants and ourselves, but, in our minds, the Socratic project of creating a better world through the use of liberating human reason.

5.  What were the insights gained and enacted in my new set of practices? My basic practices were that of a full-time professional academic researcher and university tutor. This thesis bears witness that I was researching the explication of tacit knowledge and that my insights gained from my professional practices are    integrated within this work. My theoretical frameworks included the German critical social theorists writing after World War I, and then after World War II (eg. Habermas's work). They had spent their lives not only researching why individual persons and sometimes whole nations could sink to levels of ethical corruption but also, for them, the more pressing concern was how to prevent itre-occurring in any civilised nation.   With these common insights gained through my practices, how could I meekly capitulate to political pressure from those that would restrict academic freedoms for

whatever reasons, especially to those opposing research methodology and research writing styles? It could be said that this was a small price, but for me it was very traumatic.

6.    What was the impact of all this? I find this difficult to state fully at the present moment because the impact is still on-going. Suffice to say that in my own life, in the life of my supervisor, in the lives of those who had harassed us, in the political structures of my then university, and in the power and vigour of this thesis, the impact has been greatly disruptive and of no advantage to any of the parties. (It should be noted that Williams and Wong (2002) assert that the enormous impact referred to in their theory of ethical action can occur in ways which, unlike my own experience, are not immediately obvious.)

As hinted at in Chapter One, I am carrying a set of beliefs which undergirded my ethico-political action to transfer my thesis to ECU's Doctor of Philosophy programme.

As a student from a non English speaking background, I became increasingly aware of some of the issues faced by me in writing my thesis using storytelling and narrative in expressing personal experience (Clandinin & Connelly, 1994). I believed such approach would allow me to embark upon a form of inquiry process where I can consciously move between reflection and action, and inner and outer awareness (Marshall, 1995). Using such an approach also allows me to pay attention to my purposes, intentions, behaviour and the outcomes that follow (Reason, 2001). My story has been constructed using my journal writing, reflections, vignettes, and a form of research diary in which I write inner personal discourses. This allows me to have a space into which I express my thoughts, feeling, reflections, and stories about what I am encountering. In writing in this

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way, I am aware that I am not just reporting my experiences but also taking action to safeguard my authenticity during "critical moments of decision" (Williams & Wong, 2002; Whitehead, 2002).

I wondered whether I really would be able to conduct the research in a state of stress, feeling trapped and personally and professionally disempowered. I was in a state of disquiet and lamentation. As Trapedo-Dorosky and Cole (1996) cited in Shobbrook's dissertation (1997, p. 21), comment, seeming to comprehend my situation as they describe:

When standing on the outside of something, looking in, it's sometimes easy to criticise, it doesn't hurt the critic, and I must confess it comes almost naturally to me. But when I'm the one on the inside being looked at, then I realised the PAIN that can come from such a common exercise. That's why I build up my means of protection, either in the form of barriers, or by ensuring that I can control the criticism by influencing the relationship between myself and the critic. I have to enable the other parties to understand my boundaries when it comes to being challenged just as I have to understand their boundaries.

The decision to transfer to the ECU Doctor of Philosophy programme enabled me to proceed with full academic, racial, and cultural status, equity, and freedom.

CLOSING CONFESSIONAL COMMENTS

Thus, as an epilogical postmodern trace, I conclude by wondering whether (or not) I (or we) did (or did not) benefit (HARP RAVO (or otherwise)) according to Williams' and Wong's (2002) jingle? But by exploiting this fear, am I not realising that the potential enormous benefit might not be for me. Indeed, reflecting on my experience and reading of history, I realise that it is not always they that act

ethically, or even their immediate group, who receive the potentially enormous benefits ... n'est pas?

In a personal conversation in the early hours of 2003, my supervisor stated that not only was it a new year but that I was a newly empowered person and researcher and that I should fully live this out. He summarised my research as not only as a comprehensively deep appropriation of critical social theory to research the organisational explication of tacit knowledge, but moreover as an appropriation of many philosophical frameworks, including touches of Postmodernism, to research and communicate my explication of tacit knowledge as a heuristically reflective practitioner. He stated that I had deepened and expanded and fulfilled much of the promise of his own academic project begun with his doctoral research in the development of our theory of ethical action.

What is more, he gently urged me to consider whether on not I had sufficiently included all of the relevant major modes of being in the research thesis. Referring to these aspects as forms of intelligence, he listed the following:

1.   Logical intelligence: in using and demonstrating logically rational, intellectual planning, organisation, and execution of the thesis (Dooyeweerd, 1979)

2.   Communicative intelligence: by writing my thesis in a suitably clear yet evocatively powerful style of English that compliments and brings out the essence of the research (Eisner, 1985)

3.   Emotional intelligence: by appropriately communicating something of my emotions during the research. (Whitehead, 1993, 1996; Williams, 1993, 1996, 200, 2002; Taylor, 1993; Moustakas, 1990, 1993etc)

4.   Aesthetic intelligence: in using and communicating a rich allusiveness, perhaps by including art, poetry, dreams, intuitions, hunches, songs, perhaps springing from what Taylor refers to as "the wellsprings of the

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unconscious" (Williams,1993, 1996, 2000, 2002; Moustakas, 1990, 1994; Tesch, 1990)

5.  Faith intelligence: by communicating my belief system not only as part of the ontology of the research, but with confessional elements in the thesis, in which I appropriately express my devotional or faith commitments relevant to the thesis (Williams, 1993, 1996, 2000, 2002; Cupitt, 2000; Moustakas,1990, 1994; Goudzwaard, 1985).

My supervisor, Dr. Williams mentioned that he was informed by the philosophy of the Cosmonomic Idea developed over the last century, and still being developed, by the School of Amsterdam (Dooyeweerd, 1979; Goudzwaard, 1985). But going into more detail is beyond the scope of this thesis.

However, such a challenge did embolden me to use Leonard Cohen's song, "Bird on a Wire" as a post-structural metaphor for my project. I quote it now, as at the beginning, so at the end of this thesis:

> Like a bird on the wire,
>> like a drunk in a midnight choir,
>>> I have tried in my way to be free.
> Like a worm on a hook,
>> like a knight from some old fashioned book,
>>> I have saved all my ribbons for thee.
> If I,
>> if I have been unkind,
>>> I hope that you can just let it go by.
> If I,
>> if I have been untrue
>>> I hope you know it was never to you.
> . . . . . . . . . .
> But I swear,

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by this song,

and by all that I have done wrong,

I will,

make it all,

All up to thee.


Excerpts from Leonard Cohen, Bird on a Wire, 1969


I was like that bird, exposed, threatened, and surrounded by danger above and below and in the wire on which I perched. The research was carried out under pressure by hostile senior administrators, like birds of prey above. I was in the process of changing careers from banking and accounting information systems consulting to take up my commitment to the Socratic project. I was learning the use of sophisticated language within what Wittgenstein (1922) might term the word game of the world academic reflective practitioner community. But whenever I used this language in my immediate academic environment I was scorned and belittled. This led to me losing confidence and even, at times, the ability to communicate.

I was "like a worm on a hook" but I realise now that I did, Sophia, "save all my ribbons for thee." I found allies, principally my supervisor, and in the midst of a deep appropriation of liberal Christianity's empty radical humanism (Cuppit, 2001) with my loosely Buddhist faith, I was "like a knight."

And like a knight, I sought strength by wandering deep into my tacit knowledge, into the vast storehouses and caverns of the unconscious, bringing some of what I had absorbed from the many teachers in my life, making explicit what was implicit knowledge. What is more, as just may happen to organisations as they use systems to explicate the implicit knowledge of their knowledge workers, I lay the foundations for my ethical emergence.

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What is more, from the wellsprings of the unconscious and consciousness themselves, I found dedication and love and renewing courage and inner strength to, as Paul of Tarsus exhorts "fight the good fight" (Bible, Timothy 4:7; 1870). I began, dimly and fitfully it is true, to catch fleeting understandings of why Socrates drank the hemlock.

So now, "I swear, by this song, and by all that I have done wrong, I will, make it all, all up to thee".

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# APPENDIX

## APPENDIX 1- CHAPTER THREE

## Organisation A : Pilot Survey 1

The responses presented to the questions of this pilot survey were analysed to claim the qualitative values of employing the positivist approach (Chapter Three) in investigating the adoption of WebAccounting.

I am interested in your opinions about various aspects of using knowledge management support tools. Remember there are no right or wrong answers; and everyone's responses will probably be different.

### PART A

Please supply the following information about your current employment position and the extent to which you use knowledge management tools;

In which department or section do you work? (Tick one)

| Sales | _____ | Public Relation | _____ |
|-------|---------|-----------------|---------|
| Marketing | _____ | Transport | _____ |
| Finance & Administration | _____ | R & D | _____ |
| HR or Personnel | _____ | After sales support | _____ |
| Production | _____ | Information Services | _____ |

Other _____, please specify.

| | |
|---|---|
| 1) What is the title of your position? | |
| 2) How many years in total have you been working in the organization? | |
| 3) Do you have access to internal email? | |
| 4) Do you have access to external email? | |
| 5) Do you access to the world wide web? | |
| 6) How many emails per week do you typically send and/or receive? | |
| 7) How many hours per week do you use in sending information using the world wide web? | |

| | |
|---|---|
| 8) How many months have you had access to the world wide web in this organization? | |
| 9) How many hours a week do you use your Intranet system? | |
| 10) How many months have you had access to your Intranet in this organization? | |
| 11) Ho you have access to video conferencing? | |
| 12) How many times a month would you typically use your video-conferencing facilities? | |
| 13) What would you consider is the most needed Knowledge Management capability in your organization? | |
| 14) Are you aware of any tangible benefits to your organization from it's Knowledge Management program? If so, what are they? | |

**PART B**

Please respond to the statements in this questionnaire by ticking the number that corresponds to how much you agree or disagree with the following statements.

| | Strongly Disagree | | | | | | | | Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|
| 1) We have a successful suggestion scheme for improvements to processes and practices, etc. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2) Our staff gets time off to learn. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3) We have a shared understanding of knowledge management. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4) Our staff willingly help each other to solve problems. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 5) Knowledge management has a senior sponsor and champion | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 6) We share knowledge from all parts of the firm. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 7) We have a way of minimizing knowledge erosion, which occurs when somebody leaves. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 8) Our staff have free access to the knowledge holders inside the firm. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9) Our staff have free access to the knowledge holders outside the firm. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10) Our staff are encouraged to talk (face to face or ear to ear to each other). | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 11) We are able to measure our accumulation of knowledge. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 12) Our staff is evaluated on their learning. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 13) Our staff is evaluated on sharing. | | | | | | | | | |

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|

## PART C
## Stage One

### The Objectives of WebAccounting

| | Strongly Disagree | | | | | | | Strongly Agree |
|---|---|---|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 14) Our operations staff has access to explicit knowledge through the WebAccounting knowledge repositories in a timely and accurate manner. We are able to access the knowledge repositories at any time we wish (providing a 24 hr service) to provide information. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15) Our existing customers are able to be provided with quick responses to requests and queries | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 16) Our staff are encouraged to talk about their own work and the business in general in the future | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 17) Our marketing staff is encouraged to access information regarding past and prospective customers' details. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 18) In terms of improving knowledge access, WebAccounting helps to facilitate the explication and transfer of tacit knowledge between individuals. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 19) Concerning enhancement of the knowledge environment - WebAccounting helps to establish a favourable environment for the sharing of knowledge by creating knowledge repositories.. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 20) WebAccounting is able to manage knowledge as an asset. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 21) We make sure that lessons in learning are passed onto others. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 22) We supply information to our customers to allow them to be partners in the value chain. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 23) We use information obtained from our | | | | | | | | | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| customers to allow us to improve our performance in the industry value chain. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 24) We supply information to our suppliers to allow them to be partners in the value chain. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 25) We use information obtained from our suppliers to allow us to improve our performance in the industry value chain. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 26) Our staff is evaluated during their appraisals on their learning achievements. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

## PART D
**Stage Two**

**The Strategies of employing WebAccounting**

|  | Strongly Disagree |  |  |  |  |  |  | Strongly Agree |  |
|---|---|---|---|---|---|---|---|---|---|
| 27) Our staff is evaluated during their appraisals on their demonstrated ability of knowledge sharing. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 28) We reward our staff for making good use of knowledge management resources. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 29) Video conferencing is an important tool for us in keeping in touch and sharing knowledge. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 30) The world wide web is an important tool for us in our knowledge management activities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 31) We have useful communities of knowledge sharers[1]. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 32) Our communities of knowledge sharers are well supported by appropriate technology. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 33) Our Intranet is easily accessible to all staff who have need of it. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 34) It is important to have a chief knowledge officer leading the knowledge management initiative. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 35) We ensure that our Intranet is kept right up to date. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

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[2] A communities of knowledge sharers could be any group of staff comprising of two or more individuals who are sharing their knowledge and learning in order to help each other perform more efficiently and more effectively in their professional roles.

## PART E
### Stage Three

**Success Indicators for employing WebAccounting**

| | Strongly Disagree | | | | | | | | Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|
| 36) With respect to the growth in resources attached to the project, there is an increase in the growth in knowledge content and usage during the **pre-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 37) With respect to the growth in resources attached to the project, there is an increase in the growth in knowledge content and usage during the **post-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 38) With respect to the growth in resources attached to the project, there is an increase in the growth in knowledge content and usage **after one year from post-adoption** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 39) With respect to the extent of organisational initiative, there seems to be a greater level of satisfaction on the part of end users during the **pre-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 40) With respect to the extent of organisational initiative, there seems to be a greater level of satisfaction on the part of end users during the **post-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 41) With respect to the extent of organisational initiative, there seems to be a greater level of satisfaction on the part of end users **after one year from post-adoption** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 42) With respect to the financial return, there seems to have some reduction in costs during the **pre-adopting period** of | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| WebAccounting. WebAccounting is able to integrate web EDI with their inventory, accounting, and order entry systems. | | | | | | | | | |
| 43) With respect to the financial return, there seems to have some reduction in costs during the post-adopting period of WebAccounting. WebAccounting is able to integrate web EDI with their inventory, accounting, and order entry systems. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 44) With respect to the financial return, there seems to have some reduction in costs after one year from post-adoption of WebAccounting. WebAccounting is able to integrate web EDI with their inventory, accounting, and order entry systems. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

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**PART F**
**Stage Four**

**Success Factors for employing**
**WebAccounting**

| | Strongly Disagree | | | | | | | | Strongly Agree |
|---|---|---|---|---|---|---|---|---|---|
| 45) With respect to the linking to economic performance, there is an indication of improving in financial savings **during the pre-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 46) With respect to the linking to economic performance, there is an indication of improving in financial savings **during the post-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 47) With respect to the linking to economic performance, there is an indication of improving in financial savings after one year from post-adoption of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 48) With respect to the technical and organisational infrastructure, there is an indication of increased involvement in both Intranet & Internet technology & WWW infrastructure **during the pre-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 49) With respect to the technical and organisational infrastructure, there is an indication of increased involvement in both Intranet & Internet technology & WWW infrastructure **during the post-adopting period** of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 50) With respect to the technical and organisational infrastructure, there is an indication of increased involvement in both | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Intranet & Internet technology & WWW infrastructure after one year from post-adoption of WebAccounting. | | | | | | | | | |
| 51) With respect to the flexible knowledge structure, there is an indication of increasing levels of satisfaction during the pre-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 52) With respect to the flexible knowledge structure, there is an indication of increasing levels of satisfaction during the post-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 53) With respect to the flexible knowledge structure, there is an indication of increasing levels of satisfaction after one year from post-adoption of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 54) With respect to the knowledge-friendly culture, there is an indication of an increasing positive attitude towards knowledge, with an organisation learning increase, and an innovation increase from staff during the pre-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 55) With respect to the knowledge-friendly culture, there is an indication of an increasing positive attitude towards knowledge, with an organisation learning increase, and an innovation increase from staff during the post-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 56) With respect to opinions expressed and the language used, there is an indication of increasingly positive attitude from staff to the company mission statement after one year from post-adoption of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 57) With respect to opinions expressed and the language used, there is an indication of increasingly positive attitude from staff to the company mission statement during the post-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 58) With respect to opinions and the language used, there is an indication of an increasingly positive attitude from staff to the company mission statement during the post-adoption period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 59) With respect to the change in motivational practices, there is an indication of staff being motivated by incentives and the system during the post-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 60) With respect to the change in motivational practices, there is an indication of staff being motivated by incentives and the system during the post-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 61) With respect to the change in motivational practices, there is an indication of the staff being motivated by incentives and system after one year from post-adoption of WebAccounting | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 62) With respect to the senior management support, there is an indication of the staff being motivated by management support during the post-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 63) With respect to the senior management support, there is an indication of the staff being motivated by management support during the post-adopting period of WebAccounting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 64) With respect to the senior management support, there is an indication of the staff being motivated by management support after one year from post-adoption of WebAccounting | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

**Thankyou**

## APPENDIX 2:- CHAPTER FOUR


## Organisation B: Evaluating the competitive advantage of organisation B adopting WebAccounting Workshops

The responses presented to the questions of this survey were analysed to claim the qualitative values of employing the interpretive approach (Chapter Four) in investigating the adoption of WebAccounting.


The information set out here is a compilation of discussions and debates surrounding the issues of Organisation B's competitive advantage by its adoption of WebAccounting. The comments were sourced from a structured workshop setting designed to achieve specific outcomes for this research. Other comments were the thoughts of interested individuals and groups when the information was relayed throughout the organisation. The experience or event may have affected the participants' attitude, interest, or understanding in either a positive or a negative way.

Remember there are no right or wrong answers; as everyone's responses will probably be different.


## Part A: Recollections, attitudes, and events
## Extracts from Significant Events

### Facilitator

"The greater the ability of an organisation in extending its WebAccounting applications, the higher the value of the model's applications, leading to higher returns (refer to figure 4.5). Although the lower level applications deliver cost savings and efficiencies, the upper level applications create increased organisational advantages for resource use and efficiency of operations. For example, the publishing of quarterly & annual reports, the member's directory, a diary of events and activities etc, by electronic means using an electronic publishing application, can provide high value savings in many areas such as time, paper, printing and postage costs."

**Participant**

"That may be so. WebAccounting may allow customers to purchase online our products, make contributions online and save on the expenses arising from such activities as collection expenses. We also use [the Internet] to advertise. Mostly though, it is just to promote our organisation and we now only do this through our Web site and web portals (Yahoo, Ozemail etc). By using banner ads, recently, our market segment growth has increased significantly. We rely on WebAccounting systems very heavily though. Through WebAccounting, we established ourselves as a virtual business. People know that we are on-line and the only way one can effectively tell these people is by advertising through the Internet."

**Facilitator**

"There is another purpose of our action. My concern is to look at the means of improving the interoperational support for e-commerce of organisation B. That is, that the integration of security, encryption, indexing, messaging, scheduling and database services be included in WebAccounting system. This has enabled Organisation B to look beyond the electronic publishing application to the business processes and opportunities at the lower end of the model."

**Participant**

"You're exactly right. For the first time in Organisation B's history we used The WWW Internet media for a fundraising campaign. The campaign was also designed to raise public awareness of Organisation B's concerns with the East Timor crisis and to build long-term support for our organisation through obtaining new contributors. By using WebAccounting Systems, we implemented the design and media placement, which we have been working with for some time. The results from this campaign easily surpassed any recent fundraising campaign undertaken by Organisation B. Overall we secured 845 new members and received donations from 442 individual who had not given previously to Organisation B. A total of over $240,000 was raised from members through a direct Internet mail appeal"

**Facilitator**

"In general, profitability from organisational activity on the Web comes from productivity savings, information management savings, and incremental or new revenue streams (eg. The simplified collection of membership fees). Productivity savings arise from a reduction in order and processing costs, and more efficient information resource management. Improvements in information management make information easier to find and to share with colleagues. For Organisation B, WebAccounting supported more efficient intellectual property management, document management, the correlation and indexing of information, and dynamic publishing on The World Wide Web. The database management system in WebAccounting allows for profiling of customers, which facilitates target marketing and specialised customer service. Such customer profiling allows for customer integration and participation, which leads to further

productivity gains for Organisation B. For example, in the area of information sharing it involved content/document management, correlating and indexing information from activist groups, volunteers speaker groups, staff interactions, information gathered from members and the community as a whole."

## Participant

" I think you are directing us to look into the WebAccounting's abilities in enabling intellectual property management, document management, correlation and indexing information and dynamic publishing on The World Wide Web?"
"During the peak of the crisis, a crisis response network team was set up in Darwin. The principle objective of the Darwin team was to gather information about the crisis in East Timor and then sending this information to head office. This information was then used to produce press releases, public documents and action materials for Organisation B members. WebAccounting systems helped the completion of the design and media placement of these materials. Throughout the year, Organisation B increased its lobbying of the Australian government with delegations and submissions to ministers and government departments. Our advocacy efforts continue to be successful. Our new recruitment of members achieved a modest growth. Without the WebAccounting system, Organisation B's capacity to raise the level of collaboration among members in advocacy, particularly in an increasingly complex world, would be seriously restricted."

## Facilitator

"Savings have been realised from improved efficiencies in the marketing, services and public activities organised by Organisation B. WebAccounting allows for information dissemination to customers or members over The WWW. This allows more marketing or public activities being organised by the customers/members themselves. This lowers marketing costs through reduced brochure printing and distribution. In addition, expenditure reductions related to business and public functions resulted from making information easily and widely available. Due to more efficient information access, customers/members of Organisation B feel more involved and more satisfied with the organisation's level of service."

## Participant

"That may be true. One of the major public activities of Organisation B is Star Day. The essential function of Star Day is to raise awareness of current campaigns. As a member of Organisation B, we can play a vital role by acting to support our campaign. I would like to see more effort put into publicising Star Day on The WWW. We rely on digital posters, media ads, and making contact with people through the Internet. I am not overly worried about producing publications that meet all of the member needs. Such task can easily be taken care of through WebAccounting systems."

**Facilitator**

"Incremental or new revenue streams are available for organisations participating in digital commerce, through, for example, online sales, advertising revenues, or information brokering in this case Organisation B. Incremental revenue has been achieved by using the Web to expand into new channels of collaboration with external parties and supplying new market segments through electronic commerce."

**Participant**

" You're exactly right. But we need to look into how WebAccounting may expand into new channels of collaboration with external parties and supplying new market segments through e-commerce."

"My wife Kelly, and I have successfully created and maintained a vast retail card-selling network through the Internet. In the early 90s, we used to travel far north from Gympie in Queensland to South Woomera in South Australia. We regularly visited retail outlets and made friends for Organisation B along the way. We worked on all levels of the card-selling business, from the commissioning of the original work of Australian artists, to printing, packaging, and distribution. With the implementation of WebAccounting systems in the beginning of 2001, we have expanded our market segments. Through the Internet, we have successfully increased our sales into thousands of dollars. The result of these labours to date has been thousands of cards sold, and over $200,000 raised for Organisation B, and the employment of a permanent card coordinator in the Victoria Branch."

**Facilitator**

"In fact, I am sure that your stories about your memorable experiences within organisation B regarding the successful implementation of WebAccounting in making virtual its supply chain and other competitive advantages would be highly meaningful for my research."

## Appendix 2 (cont'd): Chapter Four

## PART B: Extracts from Pilot Survey 2.

Please supply the following information about your role and the extent to which you see your knowledge workers adopting in an e-commerce environment. A blank response is valid.

| WebAccounting's technologies that triggered competitive advantages of and increased revenue for Organisation B | Business Transactions | Process Automation | Information Sharing | Information Access |
|---|---|---|---|---|
| By improving management, planning, forecasting and replenishment from reduced stock outs, lower cost through reduced inventory and reduced returns | Yes/ Strongly Agree | Yes/ Slightly Agree | Yes/ Strongly Agree | Yes/ Strongly Agree |
| By increasing the revenue base through faster product introductions and decreasing marketing costs and increasing revenue from higher quality goods for sale; | Yes/ Slightly Agree | Yes/ Slightly Agree | Yes/ Strongly Agree | Yes/ Slightly Agree |
| By improving design, product management, through faster time to market and lower distribution cost; | Yes/ Strongly Agree | Yes/ Slightly Agree | Yes/ Strongly Agree | Yes/ Strongly Agree |
| By improving the management of the merchandising/category through the use of more advantageous and effective pricing and promotional strategies | Yes/ Strongly Agree | Yes/ Slightly Agree | Yes/ Strongly Agree | Yes/ Slightly Agree |

## Appendix 2 (cont'd): Chapter Four

## PART C: Significant Events

Were there any activities or incidents that you particularly remember?

If so, I'm interested to know what impact they had on your thinking. When answering the following questions please explain as much as you can about the incident and its effect using the space on the other side of this.

Did any significant event change your:

a) Attitude to the implementing, utilising of WebLegacy? If yes, please explain.

b) Interest in the integrating marketing functions with the Internet of WebAccounting? If yes, please explain.

c) Understanding in the nature of markets and distribution channels through WebAccounting? If yes, please explain.

d) Understanding of the organisational structure and process? If yes, please explain.

e) Attitude and understanding of the internal and external power influences and the implementation of WebAccounting with the organisation's suppliers, members, and customers? If yes, please explain.

## PART D: Extracts from Significant Events

This case study explores the relationship between the analysis framework of the integrated value chain adapted from Porter (1986) and the architectural framework proposed by Papazoglou (2000).

I am interested in your personal stories about any memorable experience that examines the factors that drove the integrated value chains and the interoperability of WebAccounting systems in the context of Knowledge Management.

To help remind you I've listed below some topics used to answer my research questions. I am particularly interested in any significant events, large or small, that you can remember about the adoption of WebAccounting. The experience or event may have affected your attitude, interest, or understanding in either a positive or a negative way. When you describe any memorable event please also

say whether the experience helped or hindered your work in the adoption of WebAccounting.

| | Method |
|---|---|
| 1. To what extent does WebAccounting allow customers to purchase products, make contributions on-line, and how does integrating the customer service application with the purchase process save money? | Semi-structured interview with the regional co-ordinator, Observation during activity time, Fieldnotes. |
| 2. What is your opinion of WebAccounting as a means of improving interoperational support for e-commerce, and its evolution from the current simple page-serving environment to rich application platforms providing server-side application runtime engines? | Semi-structured interview with administration officer No 1, Observation during activity time, Fieldnotes. |
| 3. What is your opinion of WebAccounting's abilities in enabling intellectual property management, document management, correlation, and indexing information and dynamic publishing on The World Wide Web? | Semi-structured interview with field officer No 1, Observation during activity time, Fieldnotes. |
| 4. What is your opinion of WebAccounting's abilities in allowing information dissemination to customers or members over The WWW, which results in more marketing or public activities being organised by the customers/members, themselves? | Semi-structured interview with administration officer No 2, Observation during activity time, Fieldnotes. |
| 5. What is your opinion of using WebAccounting to expand into new channels of collaboration with external parties and supplying new market segments through electronic commerce? | Semi-structured interview with field officer No 2, Observation during activity time, Fieldnotes. |

**Thankyou**

## APPENDIX 3: CHAPTER SIX

## Organisation A and C: Evaluating the Business Plan through the Criteria of Action Research Approach.

## Workshops: Investigating the adoption of WebAccounting

> The responses presented by this compilation were analysed to claim the qualitative values of employing heuristically critical reflective practitioner approach (Chapter Six) in investigating the adoption of WebAccounting.

## Part A

## Recollections, Attitudes, and events

The list below sets out the order in which a heuristically critical reflective practitioner approach were achieved through realignments to augment my ethnographic experience of being professionally involved in the development of knowledge sharing through WebAccounting in organisation A and C.

The information set out here is a compilation of discussions and debates surrounding the issues of knowledge sharing through WebAccounting in organisation A and C.
The comments were from structured workshop settings designed to achieve specific outcomes for this research.

The analysis was based on systematic content coding (Morgan, 1998) and largely utilised a participant approach, which relies on interviewee quotations to illustrate themes and support key findings (Geissler and Zinkhan, 1998). The ensuing headings are the essential identified themes and, where appropriate, I provide a supporting criteria list of action research.

I set out the full list of criteria of action research (Introduction and Conclusion chapters of the *Handbook of Action Research*: Participative Inquiry and Practice by Peter Reason and Hilary Bradbury. Sage Publications)

A1:    be both aimed at and grounded in the world of practice
A2:    be explicitly and actively participative: research *with, for* and *by* people
       rather than *on* people

A3:   draw on a wide range of ways of knowing—including intuitive, experiential, and presentational as well as conceptual—and link these appropriately to form theory.

A4:   address questions that are of significance to the flourishing of human community and the more than human world;

A4:   aim to leave some lasting capacity amongst those involved, encompassing first, second and third person perspectives.

A5:   critically communicate the inquiry process instead of just presenting its results and some reflections on it.

## ACTION RESEARCH REVIEW FORM
(Introduction and Conclusion chapters of the *Handbook of Action Research: Participative Inquiry and Practice* by Peter Reason and Hilary Bradbury. Sage Publications)

Please rate the manuscript on the following criteria (1=low, 5=high):

| | Low          High |
|---|---|
| AR1: The extent to which the researcher explicitly addresses the qualities they believe relevant to their work and the choices they have made in their work. | 1  2  3  4  5 |
| AR2: The extent to which the quality criteria choices manifest in the finding link with and contribute to the literature in the field the researcher are qualified to review | 1  2  3  4  5 |
| AR3: The extent to which the finding speaks with clarity to a true interdisciplinary audience. | 1  2  3  4  5 |
| AR4: The extent to which the manuscript exhibits overall (academic) quality. | 1  2  3  4  5 |
| AR5: The extent to which the insights in the manuscript are significant in content and process. By significant we mean having meaning and relevance beyond their immediate context in support of the flourishing of persons, communities, and the more than human world. | 1  2  3  4  5 |
| AR6: The extent to which the manuscript helps define *Action Research* in a way that the researcher wants. | 1  2  3  4  5 |
| AR7: The extent to which the manuscript has an acceptable "contribution to length" value or ratio. | 1  2  3  4  5 |
| AR8: The extent to which the research process is articulated and clarified | 1  2  3  4  5 |
| AR9: The relevance and significance of the paper for the world of practice | 1  2  3  4  5 |
| AR10: The extent to which the work has appropriate relevance for second and third person perspectives | 1  2  3  4  5 |

To help remind the reader I've listed below the following section describes and analyses all the research interviews conducted with OrganisationA and OrganisationC.

I use the following code to differentiate between the different sections within the organisations. (See Table 6.1)

| | Organisation A | Organisation C |
|---|---|---|
| Finance staff | OrgAFinance | OrgCFinance |
| Sales staff | OrgASales | OrgCSales |
| Administration staff | OrgAAdmin | OrgCAdmin |
| IT staff | OrgAIT | OrgCIT |
| Workshop staff | OrgAWkshop | |

*Table 6.1.* A table showing the coding matrix of participants for the research interviews.

**Q1:Facilitator**

" The role of WebAccounting's knowledge repositories in supporting knowledge sharing through the process of explicating tacit knowledge in the mechanical area. The proposition that "knowledge equals power" in the context of the political infrastructure of your organisation."

**Participant : (OrgAWkshop, May 2002, file1, p1)**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgAWkshop, May 2002, file1, p1 | 1.McClane and Mento (1991), 2. Fitzsimmons (2000) | A1, A2, A3, A4, A5 (*Strongly Agree*) AR1, AR4, AR6, AR8, AR9, AR10 (*Strongly Agree High 5*) | 1. Habermas' context of lifeworlds 2. People lifeworlds concerns as management issues. | The philosophy of 1.Zimmerman (1999) 2. Kanter (2000), |

## Q2: Facilitator

" WebAccounting's knowledge repositories address the issues of direct and emergent exchange of knowledge through the process of interactive Forums."

**Participant : (OrgAFinance, May 2002, file1, p1)**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|--------|-----------------|-------------------------------|-----------------------------------------------|------------------------------|
| OrgAFinance, May 2002, file1, p1) | Meyer and Zack's (1996) work on the knowledge management architecture framework. | A1, A2, A3, A4, A5 *(Strongly Agree)* AR1, AR2, AR6, AR7,AR8 AR9, AR10 *(Strongly Agree High 5)* | 1. Habermas' communicative action, Particularly the categorisation of instrumental rationality. | In tracing the development of knowledge exchanges within a constructivist-oriented environment. |

## Q3: Facilitator

" WebAccounting's knowledge repositories support the process of knowledge creation by tapping tacit knowledge."

**Participant : (OrgCIT, May 2002, file1, p1 )**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|--------|-----------------|-------------------------------|-----------------------------------------------|------------------------------|
| OrgCIT, May 2002, file1, p1 | Zack (1996) and Zwass (1998) concept of knowledge transfer | A1, A2, A3, A4, A5 *(Strongly Agree)* AR1, AR4, AR6, AR8, AR9, AR10 *(Strongly Agree High 5)* | Habermas' communicative action, particularly the categorisation of strategic rationality. | The way a person is forcing another person by means of the tapping of his/her tacit knowledge by manipulation, coercion, and propaganda. |

## Q4: Facilitator

"WebAccounting's knowledge repositories enable refining, archiving and recording of explicit knowledge for facilitating the distribution of research to intended readers."

**Participant : (OrgCSales, May 2002, file1, p. 1 )**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|--------|-----------------|-------------------------------|------------------------------------------------|------------------------------|
| OrgCSales, May 2002, file1, p. 1 | Aadne, Krogh and Roos's, (1996) concept of cooperative strategies | A2, A3, A4, A5 (*Strongly Agree*) AR2, AR3, AR4, AR7,AR8 AR9, AR10 (*Strongly Agree High 5*) | Habermas' communicative action, particularly the categorisation of social knowledge interest | the involvement of demographic trends and socio-economic forecasts around us. |

### Q5: Facilitator

" WebAccounting's role in addressing the issues of supporting, refining and archiving the records of knowledge exchange."

**Participant : (OrgCAdmin, May 2002, file1, p1 )**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|--------|-----------------|-------------------------------|------------------------------------------------|------------------------------|
| OrgCAdmin, May 2002, file1, p1 | Quin, Anderson, and Finkelstein's (1996) concept of four distinctions between the types of knowledge. There are the "know-what, know-how, know-why and care-why | A1, A2, A3, A4, A5 (*Strongly Agree*) AR1, AR4, AR5, AR7,AR8 AR9, AR10 (*Strongly Agree High 5*) | Denzin and Lincoln (1994) the immediacy and individual nature of people's communication. | 1.recognises the truthfulness, completeness, sincerity, and contextuality of the messages spoken by the recipient to warrant the emancipation of unwanted beliefs, assumptions, and constraints. 2.explore the social activity surrounding him or her. |

### Q6: Facilitator

"The limitations faced by WebAccounting's knowledge repositories particularly in regard to the speed of disseminating research in a rapidly changing stock markets environment to intended readers through the process of presenting both the tacit and explicit knowledge."

**Participant : (OrgCFinance, May 2002, file1, p2 )**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgCFinance, May 2002, file1, p2 | Meyer and Zack (1996) concept of technology infrastructure role in knowledge management. | A1, A2, A3, A4, A5 (*Strongly Agree*) AR1, AR2, AR3, AR5, AR6,AR8 AR9, AR10 (*Strongly Agree High 5*) | Habermas technical knowledge interest (refer to Chapter five), where it is geared towards building effective information systems applications to support organisational processes. | The three dimensions (objective, social and subjective) of the worldviews attained through Habermas' philosophical understanding of lifeworlds. |

## Q7: Facilitator

"WebAccounting on-line format in regard to enabling staff to integrate explicated tacit knowledge across research reports for meta-analysis, investigations, and creating new knowledge through continuous updating of the on-line presentation of information for knowledge workers."

## Participant : (OrgAFinance, May 2002, file2, p2 )

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgAFinance, May 2002, file2, p2 | Senge's Fifth Discipline (Senge, 1990). | A1, A2, A3, A4, A5 (*Strongly Agree*) AR1, AR2,AR3, AR5, AR7,AR8 AR9, AR10 (*Strongly Agree High 5*) | Habermas' concept of life | 1. His perspective on justifying the classification of knowledge into "know-why," "know-how", "know-who" and "know-when". 2. His lifeworld consists of the interpretation of his daily actions in the organisation. It also signals his ways of coping as a reflexive practitioner. |

## Q8: Facilitator

"WebAccounting's on-line interactive Forums, regarding their ability to support collaborative discussion and interaction among staff "

## Participant : (OrgAAdmin, May 2002, file2, p2 )

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgAAdmin, May 2002, file2, p2 | Argyris (1976) concept of organisational memory. | A1, A2, A3, A4, A5 (Strongly Agree) AR1, AR2,AR3, AR5, AR7,AR8 AR9, AR10 (Strongly Agree High 5) | Habermas' Critical Social Theory, which Hirschheim et al (1992) argue that emancipatory research in organisations focuses on human wellbeing and emancipation in information systems development and use. | provides a breadth and depth of rich conversations that may help reader to evaluate the verisimilitude and authenticity of his interpretation |

## Q9: Facilitator

"WebAccounting's interactive Forum's ability to act as a significant medium for knowledge exchange, providing a means for all relevant staff to contribute their explained tacit knowledge through collaborative discussion."

## Participant : (OrgASales, May 2002, file2, p2)

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgASales, May 2002, file2, p2 | Huber (1991) and Lyles and Schwenk (1992) concept of prior experience in the literature of cooperative strategy | A1, A2, A3, A4, A5 (Strongly Agree) AR1, AR2,AR3, AR5, AR7,AR8 AR9, AR10 (Strongly Agree High 5) | Habermas' Critical Social Theory phenomena. | In order to realise the intricacies and complexities of interpreting each participant's perceptions of information systems development, the participants need to consider both the subjects of the inquiry and the organisational context within which they are situated. |

## Q10: Facilitator

" To overcome challenging problems by the use of WebAccounting on-line presentations, due to its enabling easy access to the organisations shared knowledge "

**Participant : (OrgCFinance, May 2002, file2, p2)**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgCFinance, May 2002, file2, p | Habermas' Communicative action. | A1, A2, A3, A4, A5 *(Strongly Agree)* AR2, AR3, AR4, AR5, AR7, AR8 AR9, AR10 *(Strongly Agree High 5)* | Habermas' Communicative action. | The understanding and recognition of the social conflict inherent in our society and is justifiable by an individual's self-reflection process in dealing with human emancipation. |

### Q11: Facilitator

"The extent does the WebAccounting's on-line presentation enables the process of supporting, refining and archiving the records of knowledge exchange. "

### Participant : (OrgCSales, May 2002, file2, p2)

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgCSales, May 2002, file2, p2 | Hamel's (1991) concept of internalisation | A1, A2, A3, A4, A5 *(Strongly Agree)* AR1, AR3, AR5, AR6, AR7, AR8 AR9, AR10 *(Strongly Agree High 5)* | Habermas' Communicative action | Translates his practical reasoning into practical knowledge that is potentially useful to promote verisimilitude and authenticity qualities |

### Q12: Facilitator

"The extent does WebAccounting exhibit a sequential flow of explicit knowledge into and out of an electronic repository, enabling staff to interact on-line with repositories rather than directly with each other "

### Participant : (OrgCIT, May 2002, file2, p2)

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgCIT, May 2002, file2, p2 | Aadne, Krogh and Roos's (1996) concept of cooperative strategies for understanding and managing knowledge | A1, A2, A3, A4, A5 (*Strongly Agree*) AR1, AR2,AR5, AR6, AR7,AR8 AR9, AR10 (*Strongly Agree High 5*) | Habermas' Communicative action | A critical retrospective view about his lived experiences in creating a rich contextual and personal description of WebAccounting as a means of supporting the importance of knowledge sharing and away from individual or financial motives |

## Q13: Facilitator

"To what extent can organisational changes resulting from the conversion of tacit knowledge to explicit knowledge by means of WebAccounting be effected through interaction that promotes openness and allows for serendipity."

**Participant : (OrgAWkshop, May 2002, file3, p. 3)**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgAWkshop, May 2002, file3, p. 3 | Habermas' Critical Social Theory | A1, A2, A3, A4, A5 (*Strongly Agree*) AR1, AR2,AR3, AR5, AR7,AR8 AR9, AR10 (*Strongly Agree High 5*) | Reflecting his thoughts about his lived experience in dealing with serendipity situations | Serendipitous actions form an integral part of the learning action. |

## Q14: Facilitator

" To what extent can organisational changes resulting from WebAccounting knowledge management process can be influenced by the underlying organisational culture "

**Participant : (OrgAIT, May 2002, file3, p3)**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgAIT, May 2002, file3, p3 | Habermas' Communication | A1, A2, A3, A4, A5 (*Strongly Agree*) | Reflecting the understanding of | 1.high-level management is not |

| | | action | AR1, AR3,AR4, AR5, AR7, AR8, AR10 *(Strongly Agree High 5)* | reflexive thinking about WebAccounting's knowledge management process, which affect radical changes in organisational culture through building upon common organisational elements | contributing sufficiently and thus laying the seeds for future failure, antagonism, and frustration 2. ability to understand the underlying of Organisation culture learning and apply them in a different way indicates deeper understanding in pursuing the role of an action-researcher |
|---|---|---|---|---|---|

## Q14: Facilitator

" To what extend does the organisational changes, resulting from WebAccounting knowledge management processes, can be fostered by the unselfish sharing of knowledge, willingness to reconcile differences, and recognition that working together reduces uncertainty."

**Participant : (OrgAAdmin, May 2002, file2, p2 )**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|---|---|---|---|---|
| OrgAAdmin, May 2002, file2, p2 | Habermas' Communication action | A1, A2, A3, A4, A5 *(Strongly Agree)* AR1, AR3,AR4, AR5, AR7,AR8 AR9, AR10 *(Strongly Agree High 5)* | explores his reflexive thinking by explaining, questioning and checking his ideas about organisational changes, resulting from WebAccounting knowledge management processes. | Active participation in a range of collaborative investigation into the concept of unselfish sharing of knowledge, willingness to reconcile differences and the recognition that working together reduces uncertainty. |

## Q15: Facilitator

" To what extend does the aspect of valuing collective learning can stimulate organisational changes as a result from WebAccounting's knowledge management processes. "

**Participant : (OrgCSales, May 2002, file3, p. 3)**

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|--------|-----------------|-------------------------------|-----------------------------------------------|------------------------------|
| OrgCSales, May 2002, file3, p. 3 | Habermas' Communication action | A1, A2, A3, A4, A5 (*Strongly Agree*) AR1, AR3,AR5, AR6, AR7,AR8 AR9, AR10 (*Strongly Agree High 5*) | Interprets the aspect of valuing collective learning in stimulating needed organisational changes. As a reflexive and reforming sales person, he generates his practical knowledge in a heuristic manner. | Throughout his interpretative process he has actively suppress his voice and experience within the vignettes he has submitted, to judge the merits and demerits of a reflective and collective learning strategy used to determine how it might best be employed to facilitate reward systems in the future |

## Q16: Facilitator

" To what extent does WebAccounting support the firm's community processes and norms that affect the underlying organisational changes."

## Participant : (OrgAIT, May 2002, file1, p. 1 )

Rate the manuscript on the Action Research criteria list

| Source | Bouncing Theory | Action Research Criteria list | Reflexive verisimilitude (appearance of truth) | Cases/ Philosophy/ Approach |
|--------|-----------------|-------------------------------|-----------------------------------------------|------------------------------|
| OrgAIT, May 2002, file1, p. 1 | Aadne et al (1996), concerning inter-organisational knowledge, where they emphasise that the flow of such knowledge supports mutual and beneficial inter-organisational gains. | A1, A2, A3, A4, A5 (*Strongly Agree*) AR2, AR4,AR5, AR6, AR7,AR8 AR9, AR10 (*Strongly Agree High 5*) | Habermas' Communication action where he sees to acknowledge the idealistic focus on the firm's community processes and the norms that affect the underlying organisational changes | His practical reasoning for wanting to utilize the exchange of business information through an Internet network has led him to reflect on the efficacy of supporting knowledge sharing, and providing motivation for the community to establish its own governance. |

*Thankyou*

# APPENDIX 4: COMMENTS FROM BERTRAND RUSSELL ON WITTGENSTEIN'S TRACTATUS:

**The article below In its entirety was down loaded from http://www.kfs.org/~jonathan/witt/tlph.html [Feb. 20, 2003]**

The article below presents the comments from Bertrand Russell in relation to Wittgenstein's 100 line doctorial thesis (1922). The article may serve my justification in which I consider that I have written enough to become a Doctor of a Philosophy in my chapter 1.

The readers may draw some parallels between Wittgenstein's theory of Symbolism and Wong & William's Theory of Ethical Action, based on deconstructive critique through an inquiry of logically perfect language.

## Wittgenstein's Tractatus:
## Logico- Philosophicus: The importance of a clearly arranged representation
## Tractatus was Wittgenstein's PhD dissertation (1922)

**Introduction**
**By Bertrand Russell**

Mr Witgenstein's *Tractatus Logico-Philosophicus*, whether or not it prove to give the ultimate truth on the matters with which it deals, certainly deserves, by its breadth and scope and profundity, to be considered an important event in the philosophical world. Starting from the principles of Symbolism and the relations which are necessary between words and things in any language, it applies the result of this inquiry to various departments of traditional philosophy, showing in each case how traditional philosophy and traditional solutions arise out of ignorance of the principles of Symbolism and out of misuse of language.

The logical structure of propositions and the nature of logical inference are first dealt with. Thence we pass successively to Theory of Knowledge, Principles of Physics, Ethics, and finally to the Mystical (*das Mystische*).

In order to understand Mr Wittgenstein's book, it is necessary to realize what is the problem with which he is concerned. In the part of his theory which deals with Symbolism he is concerned with the conditions which would have to be fulfilled by a logically perfect language. There are various problems as regards language. First, there is the problem what actually occurs in our minds when we use language with the intention of meaning something by it; this problem belongs to psychology. Secondly, there is the problem as to what is the relation subsisting between thoughts, words, or sentences, and that which they refer to or mean; this problem belongs to epistemology. Thirdly, there is the problem of using sentences so as to convey truth rather that falsehood; this belongs to the special sciences dealing with the subject-matter of the sentences in question. Fourthly, there is the question: what relation must one fact (such as a sentence) have to another in order to be *capable* of being a symbol for that other? This last is a logical question, and is the one with which Mr Wittgenstein is concerned. He is concerned with the conditions for *accurate* Symbolism, i.e. for Symbolism in which a sentence 'means' something quite definite. In practice, language is always more or less vague, so that what

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we assert is never quite precise. Thus, logic has two problems to deal with in regard to Symbolism: (1) the conditions for sense rather than nonsense in combinations of words; (2) the conditions for uniqueness of meaning or reference in symbols or combinations of symbols. A logically perfect language has rules of syntax which prevent nonsense, and has single symbols which always have a definite and unique meaning. Mr Wittgenstein is concerned with the conditions for a logically perfect language -- not that any language is logically perfect, or that we believe ourselves capable, here and now, of constructing a logically perfect language, but that the whole function of language is to have meaning, and it only fulfills this function in proportion as it approaches to the ideal language which we postulate.

The essential business of language is to assert or deny facts. Given the syntax of language, the meaning of a sentence is determined as soon as the meaning of the component words is known. In order that a certain sentence should assert a certain fact there must, however the language may be constructed, be something in common between the structure of the sentence and the structure of the fact. This is perhaps the most fundamental thesis of Mr Wittgenstein's theory. That which has to be in common between the sentence and the fact cannot, he contends, be itself in turn *said* in language. It can, in his phraseology, only be *shown*, not said, for whatever we may say will still need to have the same structure.

The first requisite of an ideal language would be that there should be one name for every simple, and never the same name for two different simples. A name is a simple symbol in the sense that it has no parts which are themselves symbols. In a logically perfect language nothing that is not simple will have a simple symbol. The symbol for the whole will be a "complex", containing the symbols for the parts. In speaking of a "complex" we are, as will appear later, sinning against the rules of philosophical grammar, but this is unavoidable at the outset. "Most propositions and questions that have been written about philosophical matters are not false but senseless. We cannot, therefore, answer questions of this kind at all, but only state their senselessness. Most questions and propositions of the philosopohers result from the fact that we do not understand the logic of our language. They are of the same kind as the question whether the Good is more or less identical than the Beautiful" (4.003). What is complex in the world is a fact. Facts which are not compounded of other facts are what Mr Wittgenstein calls *Sachverhalte*, whereas a fact which may consist of two or more facts is a *Tatsache*: thus, for example "Socrates is wise" is a *Sachverhalt*, as well as a *Tatsache*, whereas "Socrates is wise and Plato is his pupil" is a *Tatsache* but not a *Sachverhalt*.

He compares linguistic expression to projection in geometry. A geometrical figure may be projected in many ways: each of these ways corresponds to a different language, but the projective properties of the original figure remain unchanged whichever of these ways may be adopted. These projective properties correspond to that which in his theory the proposition and the fact must have in common, if the proposition is to assert the fact.

In certain elementary ways this is, of course, obvious. It is impossible, for example, to make a statement about two men (assuming for the moment that the men may be treated as simples), without employing two names, and if you are going to assert a relation between the two men it will be necessary that the sentence in which you make the assertion shall establish a relation between the two names. If we say "Plato loves Socrates", the word "loves" which occurs between the word "Plato" and the word "Socrates" establishes a certain relation between these two words, and it is owing to this fact that our sentence is able to assert a relation between the persons named by the words "Plato" and "Socrates". "We must not say, the complex sign '*aRb*' says that '*a* stands in a certain relation *R* to *b*'; but we must say, *that* '*a*' stands in a certain relation to '*b*' says *that aRb*' (3.1432).

Mr Wittgenstein begins his theory of Symbolism with the statement (2.1): "We make to ourselves pictures of facts." A picture, he says, is a model of the reality, and to the objects in the reality correspond the elements of the picture: the picture itself is a fact.

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The fact that things have a certain relation to each other is represented by the fact that in the picture its elements have a certain relation to one another. "In the picture and the pictured there must be something identical in order that the one can be a picture of the other at all. What the picture must have in common with reality in order to be able to represent it after its manner -- rightly or falsely -- is its form of representation" (2.161, 2.17).

We speak of a logical picture of a reality when we wish to imply only so much resemblance as is essential to its being a picture in any sense, that is to say, when we wish to imply no more than identity of logical form. The logical picture of a fact, he says, is a *Gedanke*. A picture can correspond or not correspond with the fact and be accordingly true or false, but in both cases it shares the logical form with the fact. The sense in which he speaks of pictures is illustrated by his statement: "The gramophone record, the musical thought, the score, the waves of sound, all stand to one another in that pictorial internal relation which holds between language and the world. To all of them the logical structure is common. (Like the two youths, their two horses and their lilies in the story. They are all in a certain sense one)" (4.014). The possibility of a proposition representing a fact rests upon the fact that in it objects are represented by signs, but are themselves present in the proposition as in the fact. The proposition and the fact must exhibit the same logical "manifold," and this cannot be itself represented since it has to be in common between the fact and the picture. Mr Wittgenstein maintains that everything properly philosophical belongs to what can only be shown, or to what is in common between a fact and its logical picture. It results from this view that nothing correct can be said in philosophy. Every philosophical proposition is bad grammar, and the best that we can hope to achieve by philosophical discussion is to lead people to see that philosophical discussion is a mistake. "Philosophy is not one of the natural sciences. (The word 'philosophy' must mean something which stands above or below, but not beside the natural sciences.) The object of philosophy is the logical clarification of thoughts. Philosophy is not a theory but an activity. A philosophical work consists essentially of elucidations. The result of philosophy is not a number of 'philosophical propositions,' but to make propositions clear. Philosophy should make clear and delimit sharply the thoughts which otherwise are, as it were, opaque and blurred" (4.111 and 4.112). In accordance with this principle the things that have to be said in leading the reader to understand Mr Wittgenstein's theory are all of them things which that theory itself condemns as meaningless. With this proviso we will endeavour to convey the picture of the world which seems to underlie his system.

The world consists of facts: facts cannot strictly speaking be defined, but we can explain what we mean by saying that facts are what makes propositions true, or false. Facts may contain parts which are facts or may contain no such parts; for example: "Socrates was a wise Athenian," consists of the two facts, "Socrates was wise," and "Socrates was an Athenian." A fact which has no parts that are facts is called by Mr Wittgenstein a *Sachverhalt*. This is the same thing that he calls an atomic fact. An atomic fact, although it contains no parts that are facts, nevertheless does contain parts. If we may regard "Socrates is wise" as an atomic fact we perceive that it contains the constituents "Socrates" and "wise." If an atomic fact is analyzed as fully as possibly (theoretical, not practical possibility is meant) the constituents finally reached may be called "simples" or "objects." It is a logical necessity demanded by theory, like an electron. His ground for maintaining that there must be simples is that every complex presupposes a fact. It is not necessarily assumed that the complexity of facts is finite; even if every fact consisted of an infinite number of atomic facts and if every atomic fact consisted of an infinite number of objects there would still be objects and atomic facts (4.2211). The assertion that there is a certain complex reduces to the assertion that its constituents are related in a certain way, which is the assertion of a *fact:* thus if we give a name to the complex the name only has meaning in virtue of the truth of a certain proposition, namely the proposition asserting the relatedness of the constituents of the complex. Thus the naming

of complexes presupposes propositions, while propositions presupposes the naming of simples. In this way the naming of simples is shown to be what is logically first in logic.

The world is fully described if all atomic facts are known, together with the fact that these are all of them. The world is not described by mearly naming all the objects in it; it is necessary also to know the atomic facts of which these objects are constituents. Given this total of atomic facts, every true proposition, however complex, can theoretically be inferred. A proposition (true or false) asserting an atomic fact is called an atomic proposition. All atomic propositions are logically independent of each other. No atomic proposition implies any other or is inconsistent with any other. Thus the whole business of logical inference is concerned with proposition which are not atomic. Such propositions may be called molecular.

Wittgenstein's theory of molecular propositions turns upon his theory of the construction of truth-functions.

truth-function of a proposition $p$ is a proposition containing $p$ and such that its truth or falsehood depends only upon the truth or falsehood of $p$, and similarly a truth-function of several propositions $p, q, r, \ldots$ is one containing $p, q, r \ldots$ and such that its truth or falsehood depends only upon the truth or falsehood of $p, q, r \ldots$. It might seem at first sight as though there were other functions of propositions besides truth-functions; such, for example, would be "A believes $p$," for in general A will believe some true propositions and some false ones: unless he is an exceptionally gifted individual, we cannot infer that $p$ is true from the fact that he believes it or that $p$ is false from the fact that he does not believe it. Other apparent exceptions would be such as "$p$ is a very complex proposition" or "$p$ is a proposition about Socrates." Mr Wittgenstein maintains, however, for reasons which will appear presently, that such exceptions are only apparent, and that every function of a proposition is really a truth-function. It follows that if we can define truth-functions generally, we can obtain a general definition of all propositions in terms of the original set of atomic propositions. This Wittgenstein proceeds to do.

It has been shown by Dr. Sheffer (*Trans. Am. Math. Soc.*, Vol. XIV, pp. 481-488) that all truth-functions of a given set of propositions can be constructed out of either of the two functions "not-$p$ or not-$q$" or "not-$p$ and not-$q$". Wittgenstein makes use of the latter, assuming a knowledge of Dr. Sheffer's work. The manner in which other truth-functions are constructed out of "not-$p$ and not-$q$" is easy to see. "Not-$p$ and not-$p$" is equivalent to "not-$p$," hence we obtain a definition of negation in terms of our primitive function; hence we can define "$p$ or $q$," since this is the negation of "not-$p$ and not-$q$," *i.e.* of our primitive function. The development of other truth-functions out of "not-$p$" and "$p$ or $q$" is given in detail at the beginning of *Principia Mathematica*. This gives all that is wanted when the propositions which are arguments to our truth-function are given by enumeration. Wittgenstein, however, by a very interesting analysis succeeds in extending the process to general propositions, *i.e.* to cases where the propositions which are arguments to our truth-function are not given by enumeration but are given as all those satisfying some condition. For example, let $fx$ be a propositional function (*i.e.* a function whose values are propositions), such as "$x$ is human" -- then the various values of $fx$ form a set of propositions. We may extend the idea "not-$p$ and not-$q$" so as to apply to simultaneous denial of all the propositions which are values of $fx$. In this way we arrive at the proposition which is ordinarily represented in mathematical logic by the words "$fx$ is false for all values of $x$." The negation of this would be the proposition "There is at least one $x$ for which $fx$ is true" which is represented by "$(x) . fx$." If we had started with not-$fx$ instead of $fx$ we should have arrived at the proposition "$fx$ is true for all values of $x$" which is represented by "$(x) fx$." Wittgenstein's method of dealing with general propositions [*I.e.* "$(x) . fx$" and "$(x) fx$"] differs from previous methods by the fact that the generality comes only in specifying the set of propositions concerned, and when this has been done the building up of truth-functions proceeds exactly as it would in the case of a finite number of enumerated arguments $p, q, r \ldots$.

Mr Wittgenstein's explanation of his symbolism at this point is not quite fully given in the text. The symbol he uses is [, , N()]. The following is the explanation of this symbol:

stands for all atomic propositions.

stands for any set of propositions.

N() stands for the negation of all the propositions making up .

The whole symbol [, , N()] means whatever can be obtained by taking any selection of atomic propositions, negating them all, then taking any selection of the set of propositions now obtained, together with any of the originals — and so on indefinitely. This is, he says, the general truth-function and also the general form of proposition. What is meant is somewhat less complicated than it sounds. The symbol is intended to describe a process by the help of which, given the atomic propositions, all others can be manufactured. The process depends upon:

(a) Sheffer's proof that all truth-functions can be obtained out of simultaneous negation, i.e. out of "not-$p$ and not-$q$";

(b) Mr Wittgenstein's theory of the derivation of general propositions from conjunctions and disjunctions;

(c) The assertion that a proposition can only occur in another proposition as argument to a truth-function. Given these three foundations, it follows that all propositions which are not atomic can be derived from such as are, buy a uniform process, and it is this process which is indicated by Mr Wittgenstein's symbol.

From this uniform method of construction we arrive at an amazing simplification of the theory of inference, as well as a definition of the sort of propositions that belong to logic. The method of generation which has just been described, enables Wittgenstein to say that all propositions can be constructed in the above manner from atomic propositions, and in this way the totality of propositions is defined. (The apparent exceptions which we mentioned above are delt with in a manner which we shall consider later.) Wittgenstein is enabled to assert that propositions are all that follows from the totality of atomic propositions (together with the fact that it is the totality of them); that a proposition is always a truth-function of atomic propositions; and that if $p$ follows from $q$ the meaning of $p$ is contained in the meaning of $q$, from which of course it results that nothing can be deduced from an atomic proposition. All the propositions of logic, he maintains, are tautologies, such, for example, as "$p$ or not $p$."

The fact that nothing can be deduced from an atomic proposition has interesting applications, for example, to causality. There cannot, in Wittgenstein's logic, be any such thing as a causal nexus. "The events of the future," he says, "cannot be inferred from those of the present. Superstition is the belief in the causal nexus." That the sun will rise to-morrow is a hypothesis. We do not in fact know whether it will rise, since there is no compulsion according to which one thing must happen because another happens.

Let us now take up another subject — that of names. In Wittgenstein's theoretical logical language, names are only given to simples. We do not give two names to one thing, or one name to two things. There is no way whatever, according to him, by which we can describe the totality of things that can be names, in other words, the totality of what there is in the world. In order to be able to do this we should have to know of some property which must belong to every thing by a logical necessity. It has been sought to find such a property in self-identity, but the conception of identity is subjected by Wittgenstein to a destructive criticism from which there seems no escape. The definition of identity by means of the identity of indiscernibles is rejected, because the identity of indiscernibles appears to be not a logically necessary principle. According to this principle $x$ is identical with $y$ if every property of $x$ is a property of $y$, but it would, after all be logically possible for two things to have exactly the same properties. If this does not in fact happen that is

an accidental characteristic of the world, not a logically necessary characteristic, and accidental characteristics of the world must, of course, not be admitted into the structure of logic. Mr Wittgenstein accordingly banishes identity and adopts the convention that different letters are to mean different things. In practice, identity is needed as between a name and a description or between two descriptions. It is needed for such propositions as "Socrates is the philosopher who drank the hemlock," or "The even prime is the next number after 1." For such uses of identity it is easy to provide on Wittgenstein's system.

The rejection of identity removes one method of speaking of the totality of things, and it will be found that any other method that may be suggested is equally fallacious: so, at least, Wittgenstein contends and, I think, rightly. This amounts to saying that "object" is a pseudo-concept. To say "$x$ is an object" is to say nothing. It follows from this that we cannot make such statements as "there are more than three objects in the world," or "there are an infinite number of objects in the world." Objects can only be mentioned in connexion with some definite property. We can say "there are more than three objects which are human," or "there are more than three objects which are red," for in these statements the word object can be replaced by a variable in the language of logic, the variable being one which satisfies in the first case the function "$x$ is human"; in the second the function "$x$ is red." But when we attempt to say "there are more than three objects," this substitution of the variable for the word "object" becomes impossible, and the proposition is therefore seen to be meaningless.

We here touch one instance of Wittgenstein's fundamental thesis, that it is impossible to say anything about the world as a whole, and that whatever can be said has to be about bounded portions of the world. This view may have been originally suggested by notation, and if so, that is much in its favor, for a good notation has a subtlety and suggestiveness which at times make it seem almost like a live teacher. Notational irregularities are often the first sign of philosophical errors, and a perfect notation would be a substitute for thought. But although notation may have first suggested to Mr Wittgenstein the limitation of logic to things within the world as opposed to the world as a whole, yet the view, once suggested, is seen to have much else to recommend it. Whether it is ultimately true I do not, for my part, profess to know. In this Introduction I am concerned to expound it, not to pronounce upon it. According to this view we could only say things about the world as a whole if we could get outside the world, if, that is to say, it ceased to be for us the whole world. Our world may be bounded for some superior being who can survey it from above, but for us, however finite it may be, it cannot have a boundary, since it has nothing outside it. Wittgenstein uses, as an analogy, the field of vision. Our field of vision does not, for us, have a visual boundary, just because there is nothing outside it, and in like manner our logical world has no logical boundary because our logic knows of nothing outside it. These considerations lead him to a somewhat curious discussion of Solipsism. Logic, he says, fills the world. The boundaries of the world are also its boundaries. In logic, therefore, we cannot say, there is this and this in the world, but not that, for to say so would apparently presuppose that we exclude certain possibilities, and this cannot be the case, since it would require that logic should go beyond the boundaries of the world as if it could contemplate these boundaries from the other side also. What we cannot think we cannot think, therefore we also cannot say what we cannot think.

This, he says, gives the key to solipsism. What Solipsism intends is quite correct, but this cannot be said, it can only be shown. That the world is *my* world appears in the fact that the boundaries of language (the only language I understand) indicate the boundaries of my world. The metaphysical subject does not belong to the world but is a boundary of the world.

We must take up next the question of molecular propositions which are at first sight not truth-functions, of the propositions that they contain, such, for example, as "A believe *p*."

Wittgenstein introduces this subject in the statement of his position, namely, that all molecular functions are truth-functions. He says (5.54): "In the general propositional form, propositions occur in a proposition only as bases of truth-operations." At first sight, he goes on to explain, it seems as if a propositions could also occur in other ways, e.g. "A believes p." Here it seems superficially as if the proposition p stood in a sort of relation to the object A. "But it is clear that 'A believe that p,' 'A thinks p,' 'A says p' are of the form enumerated arguments p, q, r . . . .'p says p'; and here we have no co-ordination of a fact and an object, but a co-ordination of facts by means of a co-ordination of their objects" (5.542).

What Mr Wittgenstein says here is said so shortly that its point is not likely to be clear to those who have not in mind the controversies with which he is concerned. The theory which which he is disagreeing will be found in my articles on the nature of truth and falsehood in *Philosophical Essays* and *Proceedings of the Aristotelian Society*, 1906-7. The problem at issue is the problem of the logical form of belief, *i.e.* what is the schema representing what occurs when a man believes. Of course, the problem applies not only to belief, but also to a host of other mental phenomena which may be called propositional attitudes: doubting, considering, desiring, etc. In all these cases it seems natural to express the phenomenon in the form "A doubts p," "A desires p," etc., which makes it appear as though we were dealing with a relation between a person and a proposition. This cannot, of course, be the ultimate analysis, since persons are fictions and so are propositions, except in the sense in which they are facts on their own account. A proposition, considered as a fact on its own account, may be a set of words which a man says over to himself, or a complex image, or train of images passing through his mind, or a set of incipient bodily movements. It may be any one of innumerable different things. The proposition as a fact on its own account, for example the actual set of words the man pronounces to himself, is not relevant to logic. What is relevant to logic is that common element among all these facts, which enables him, as we say, to *mean* the fact which the proposition asserts. To psychology, of course, more is relevant; for a symbol does not mean what it symbolizes in virtue of a logical relation alone, but in virtue also of a psychological relation of intention, or association or what-not. The psychological part of meaning, however, does not concern the logician. What does concern him in this problem of belief is the logical schema. It is clear that, when a person believes a proposition, the person, considered as a metaphysical subject, does not have to be assumed in order to explain what is happening. What has to be explained is the relation between the set of words which is the proposition considered as a fact on its own account, and the "objective" fact which makes the proposition true or false. This reduces ultimately to the question of the meaning of propositions, that is to say, the meaning of propositions is the only non-psychological portion of the problem involved in the analysis of belief. This problem is simply one of a relation of two facts, namely, the relation between the series of words used by the believer and the fact which makes these words true or false. The serious of words is a fact just as much as what makes it true or false is a fact. The relation between these two facts is not unanalyzable, since the meaning of a proposition results from the meaning of its constituent words. The meaning of the series of words which is a proposition is a function of the meaning of the separate words. Accordingly, the proposition as a whole does not really enter into what has to be explained in explaining the meaning of a propositions. It would perhaps help to suggest the point of view which I am trying to indicate, to say that in the cases which have been considering the proposition occurs as a fact, not as a proposition. Such a statement, however, must not be taken too literally. The real point is that in believing, desiring, etc., what is logically fundamental is the relation of a proposition *considered as a fact* to the fact which makes it true or false, and that this relation of two facts is reducible to a relation of their constituents. Thus the proposition does not occur at all in the same sense in which it occurs in a truth-function.

There are some respects, in which, as it seems to me, Mr Wittgenstein's theory stands in need of greater technical development. This applies in particular to his theory of number (6.02 ff.) which, as it stands, is only capable of dealing with finite numbers. No logic can be considered adequate until it has been shown to be capable of dealing with transfinite numbers. I do not think there is anything in Mr Wittgenstein's system to make it impossible for him to fill this lacuna.

More interesting than such questions of comparative detail is Mr Wittgenstein's attitude towards the mystical. His attitude upon this grows naturally out of his doctrine in pure logic, according to which the logical proposition is a picture (true or false) of the fact, and has in common with the fact a certain structure. It is this common structure which makes it capable of being a picture of the fact, but the structure cannot itself be put into words, since it is a structure *of* words, as well as of the fact to which they refer. Everything, therefore, which is involved in the very idea of the expressiveness of language must remain incapable of being expressed in language, and is, therefore, inexpressible in a perfectly precise sense. This inexpressible contains, according to Mr Wittgenstein, the whole of logic and philosophy; he says, would be to confine oneself to propositions of the sciences, stated with all possible clearness and exactness, leaving philosophical assertions to the learner, and proving to him, whenever he made them, that they are meaningless. It is true that the fate of Socrates might befall a man who attempted this method of teaching, but we are not to be deterred by that fear, if it is the only right method. It is not this that causes some hesitation in accepting Mr Wittgenstein's position, in spite of the very powerful arguments which he brings to its support. What causes hesitation is the fact that, after all, Mr Wittgenstein manages to say a good deal about what cannot be said, thus suggesting to the sceptical reader that possibly there may be some loophole through a hierarchy of languages, or by some other exit. The whole subject of ethics, for example, is placed by Mr Wittgenstein in the mystical, inexpressible region. Nevertheless he is capable of conveying his ethical opinions. His defence would be that what he calls the mystical can be shown, although it cannot be said. It may be that this defence is adequate, but, for my part, I confess that it leaves me with a certain sense of intellectual discomfort.

There is one purely logical problem in regard to which these difficulties are peculiarly acute. I mean the problem of generality. In the theory of generality it is necessary to consider all propositions of the form $fx$ where $fx$ is a given propositional functions. This belongs to the part of logic which can be expressed, according to Mr Wittgenstein's system. But the totality of possible values of $x$ which might seem to be involved in the totality of propositions of the form $fx$ is not admitted by Mr Wittgenstein among the things that can be spoken of, for this is no other than the totality of things in the world, and thus involves the attempt to conceive the world as a whole; "the feeling of the world as a bounded whole is the mystical"; hence the totality of the values of $x$ is mystical (6.45). This is expressly argued when Mr Wittgenstein denies that we can make propositions as to how may things there are in the world, as for example, that there are more than three.

These difficulties suggest to my mind some such possibility as this: that every language has, as Mr Wittgenstein says, a structure concerning which *in the language*, nothing can be said, but that there may be another language dealing with the structure of the first language, and having itself a new structure, and that to this hierarchy of languages there may be no limit. Mr Wittgenstein would of course reply that his whole theory is applicable unchanged to the totality of such languages. The only retort would be to deny that there is any such totality. The totalities concerning which Mr Wittgenstein holds that it is impossible to speak logically are nevertheless thought by him to exist, and are the subject-matter of his mysticism. The totality resulting from our hierarchy would be not merely logically inexpressible, but a fiction, a mere delusion, and in this way the supposed sphere of the mystical would be abolished. Such a hypothesis is very difficult, and I can see objections to it which at the moment I do not know how to answer. Yet I do

not see how any easier hypothesis can escape from Mr Wittgenstein's conclusions. Even if this very difficult hypothesis should prove tenable, it would leave untouched a very large part of Mr Wittgenstein's theory, though possibly not the part upon which he himself would wish to lay most stress. As one with a long experience of the difficulties of logic and of the deceptiveness of theories which seem irrefutable, I find myself unable to be sure of the rightness of a theory, mearly on the ground that I cannot see any point on which it is wrong. But to have constructed a theory of logic which is not at any point obviously wrong is to have achieved a work of extraordinary difficulty and importance. This merit, in my opinion, belongs to Mr Wittgenstein's book, and makes it one which no serious philosopher can afford to neglect.

Bertrand Russell

*May 1922*

# APPENDIX 5: THEORY OF ETHICAL ACTION EQUATION:

## Analysing the Theory of Ethical Action Equation $E = A_f C^2$ Using Fuzzy Logic and non-Parametric Mathematics

In this section, I present accounts of the background to the above two nonparametric approaches. Please note that the sources of the contributions below are mainly from online material, Sandberg and Park, 1991, and Wang 1992.

I present what I considered the theoretical links between Radial Basis Functions (Sandberg and Park, 1991) and Fuzzy Logic Systems (Wang 1992).

### Introduction to Radial Basis Functions (RBF)

*"A radial function is a function whose value depends only on the distance from some center point. When using radial basis functions for approximation purposes, the unknown function is expressed as a linear combination of radial functions centered in points scattered throughout the domain of interest." (source: http://www.tdb.uu.se/~bette/FMB/RBF.html, Feb 21, 2003).*

*"An RBF network is simply a linear function approximator using RBFs for its features. Learning is defined by equations,in exactly the same way it is for other linear function approximators. The primary advantage of RBFs over binary features is that they produce approximate functions that vary smoothly and are differentiable. In addition, some learning methods for RBF networks change the centers and widths of the features as well. Such nonlinear methods may be able to fit the target function much more precisely. The downside to RBF networks, and to nonlinear RBF networks especially, is greater computational complexity and, often, more manual tuning before learning is robust and efficient." (source: http://www-anw.cs.umass.edu/~rich/book/8/node7.html, Feb 21, 2003)*

The universal approximator result for radial basis function proved by Sandberg and Park (1991) is:

$$F(X) = \Omega_0 + \sum_{j=1}^{i} \Omega_j \cdot K \left[ x\text{-}z_j /_\sigma \right] / \sum_{j=1}^{i} \cdot K \left[ x\text{-}z_j /_\sigma \right]$$

*Where $x \subset K^r$ ; $\Omega_j \subset K$ ; $z_j \subset K^r$ ; $\sigma \subset K^+$*

## Introduction to Fuzzy Logic Systems

*"Fuzzy logic is a mathematical approach to problem solving. It excels in producing exact results from imprecise data, and is especially useful in computers and electronic applications. Fuzzy logic differs from classical logic in that statements are no longer black or white, true or false, on or off. In traditional logic an object takes on a value of either zero or one; in fuzzy logic, a statement can assume any real value between 0 and 1, representing the degree to which an element belongs to a given set. The human brain can reason with uncertainties, vagueness, and judgments. Computers can only manipulate precise valuations. Fuzzy logic is an attempt to combine the two techniques.*

*Fuzzy logic has certain advantages over traditional logical systems. Fuzzy logic systems are, for the most part, easy to set up and use. The results are accurate, and the technique need not be used alone; it can be employed in conjunction with other analytic methods. It is, however, best applied to relatively complex systems and systems with nonlinearities or uncertainties: traditional methods will probably work just as well when an environment is simple." (Source:* http://www.duke.edu/vertices/update/win94/fuzlogic.html , *Feb 21, 2003)*

## Fuzzy Logic Functional Relationships (Wang's 1992)

**Fuzzy set:** Let $\Omega$ be the universe of discourse (for our purposes $\Omega = K^n$, a set A $\subset \Omega$ is a fuzzy set if its membership function is multivalued (eg. $\Omega_A : \Omega \rightarrow [0,1]$, where $\Omega_A (X)$ is the membership grade of x in A.

**Support:** The support of fuzzy set A is the crisp set of all points $x \subset \Omega$ such that $\Omega_A(X) > 0$

**Centre:** The centre of a fuzzy set A is the point $X \subset \Omega$ where $\Omega_A(X)$ achieves its maximum.

**Singleton:** A fuzzy set with a single point X in $\Omega$ for which $\Omega_A(X) = 1$ is a fuzzy singleton.

**Fuzzifier:** A mapping f from a crisp point $X \subset \Omega$ to a fuzzy set A is called a fuzzifier.

**Defuzzifier:** A mapping g from a fuzzy set A to a crisp point $X \subset \Omega$ is called a defuzzifier.

**Fuzzy Rule Base:** A fuzzy rule base consists of a collection of q fuzzy IF-THEN rules $K^j$, j=1....q of the form: IF $X_1$ is $A1^j$ and .... Xn is $An^j$ THEN y is $B^j$, where $X_k$ is $A_k$ stand for the degree of membership of $X_k$ in $A_k$, then $A_k$ and B are fuzzy sets.

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**Fuzzy Interference Rule:** We may combine IF-THEN rules into mapping from fuzzy sets in $[]_i$ $\Omega_l$ to fuzzy sets in $\forall \subset \Omega$ and then the product rule implication would become $\Omega_{A \cdot B}$: $(x,y) = \Omega_A(X)\,\Omega_B(Y)$

**Fuzzy Logic Approximator:** a mapping from $K^r$ to $K$ consisting of a fuzzifier. Through computation from a fuzzy rule base with a fuzzy inference (Fuzzifier) and defuzzifier can make the Fuzzy Logic Approximator become a fuzzy logic system.

Hence, we may come up for fuzzy logic approximators with Gaussian fuzzifiers where $\Omega\,f(X)$ is given by

$$F(X) = \sum^q_{j=1} Y_j \, []^r_{k=1} \Omega_{jk}\exp\{-[\,x_k\text{-}z_{jk}\,/\sigma^{jk}\,]^2\}$$

If we combine radial basis function with fuzzy logic approximators with Gaussian fuzzifiers, we may come out with the following:

$$F(X) = \sum^q_{j=1} Y_j \, []^r_{k=1}\Omega_{jk}\exp\{-[\,x_k\text{-}z_{jk}\,/\sigma^{jk}\,]^2\} = \Omega_0 + \sum^i_{j=1}\Omega_j \cdot K\,[\,x\text{-}z_j\,/_\sigma\,]\,/\,\sum^i_{j=1}\cdot K\,[\,x\text{-}z_j\,/_\sigma\,]$$
Wang's (1992)        Sandberg and Park (1991)

The above equation may result of a new corollary equation. This corollary equation can be proved by employing Wang's (1992) universal approximation capabilities of fuzzy logic systems with Sandberg and Park's (1991) universal approximator result for radial basis functions.

**Proposition 1:**

We can derive a fuzzy logic approximator of the form

$$F(X) = \Omega_0 + \sum^i_{j=1}\Omega_j \cdot []^r_{k=1}\Psi_a^{\,k}(X_k)$$

By imposing
1)     lj=r
2)     $\Psi$: K to [0,1]

(source: Maxwell, T, Giles, G.L. Lee, Y.C. and Chen, H.H. 1986. Nonlinear dynamics in artificial neural systems. In Denker, J. (ed) Neural Networks for Computing. New York. American Institute of Physics.)

**Proof:**

Enormous impact - function set: Let E be the universe of discourse (for our purposes      $\underline{E} = A^n$, a set A is a subset of a matrix space **Action** and is a fuzzy

set if its membership function is multivalued (eg. $\Omega_A: \Omega \rightarrow [0,1]$, where $\Omega_A(X)$ is the membership grade X of in A). Then a collection of subsets $\{X_i\}$, $_i=1,2...,n$; $X_i \subset A$ is an ε-covering of $\underline{E}$ if the diameter of each $X_i < 2\varepsilon$ and $\underline{E}$ $\subset \cup X_i$ (ie. $\underline{E}$ is covered by $A^n$).

$\underline{E}_\varepsilon = \{e_i,....e_h\}$ is an ε-net for $\underline{E} = \{\theta_j\}$, $j \in J$; if for each $\theta$ in E there is at least one element $e_i$ of $\underline{E}$ such that $\rho(\theta, e_i) \leq \varepsilon$.)

The points $S_i, ..., S_n$ are ε-separate if the pairwise distance $\rho(S_i, S_j) < \varepsilon \forall I \neq j$.

*Mathematical Exploration:*
(adapted from Sandberg & Park's Theorem, 1989 and Wang's Theorem, 1992)

The minimum number n that is sufficient to cover $\underline{E}$ for a given $\varepsilon > 0$ is a function of only its logarithm $H_\varepsilon(\underline{E}) = \log N_\varepsilon$ where $N_\varepsilon(\underline{E}) \equiv \min n$ which is thus called the metric entropy of the set $\underline{E}$.

Thus:

$|\theta(X) - e(X)| = |\Omega_\sigma + \sum_{j=1}^{i}\Omega_j \prod_{n=1}^{i}\Psi(\varpi\,\gamma_{js}) - b_\sigma - \sum_{j=1}^{i}\Omega_j \prod_{n=1}^{i}\Psi(\varpi\,\copyright_{js})|$

$\leq |\Omega_\sigma - b_\sigma + \sum_{j=1}^{i}(\Omega_j - b_j)\prod_{n=1}^{i}\Psi(\varpi\,\copyright_{js})| + |\sum_{j=1}^{i}b_j\{\prod_{n=1}^{i}\Psi(\varpi\,\gamma_{js}) - \prod_{n=1}^{i}\Psi(\varpi\,\copyright_{js})\}|$

Where:

$|\prod_{n=1}^{i}\Psi(\varpi\,\gamma_{js}) - \prod_{n=1}^{i}\Psi(\varpi\,\copyright_{js})| \leq |\{\Psi(\varpi\,\gamma_{js})\} - \{\Psi(\varpi\,\copyright_{js})\}^r|$

$|\prod_{n=1}^{i}\Psi(\varpi\,\gamma_s)| \leq |\Psi(\varpi\,\gamma^\sigma)|^r$ where $\gamma^\sigma$ denotes max $\Psi(\varpi\,\gamma_s)$

$|\prod_{n=1}^{i}\Psi(\varpi\,\copyright_s)| \leq |\Psi'(\varpi\,C^\sigma)|^r$ where $C^\sigma$ denotes max $\Psi(\varpi\,C_s)$

When $\gamma^\sigma$ denotes max $\Psi(\varpi\,\gamma_s)$ which reaches maximum = $\Omega_A$

When $C^\sigma$ denotes max $\Psi(\varpi\,C_s)$ which reaches maximum = $C^2$.

Hence, the final equation turns to:

$|\theta(X) - e(X)| = |\Omega_\sigma + \sum_{j=1}^{i}\Omega_j \prod_{n=1}^{i}\Psi(\varpi\,\gamma_{js}) - b_\sigma - \sum_{j=1}^{i}\Omega_j \prod_{n=1}^{i}\Psi(\varpi\,\copyright_{js})|$

$$\leq \left| \Omega_\sigma - b_\sigma + \sum_{j=1}^{i}(\Omega_j - b_j) \; []^i_{n=1}\Psi(\varpi \; \circledcirc_{js}) \right| + \left| \sum_{j=1}^{i} b_j \left\{ []^i_{n=1}\Psi(\varpi \; \gamma_{js}) - []^i_{n=1}\Psi(\varpi \; \circledcirc_{js}) \right\} \right|$$

$$\left| \theta(X) - e(X) \right| = \left| \Omega_\sigma + \sum_{j=1}^{i}\Omega_j \; []^i_{n=1}\Psi(\varpi \; \gamma_{js}) - b_\sigma - \sum_{j=1}^{i}\Omega_j \; []^i_{n=1}\Psi(\varpi \; \circledcirc_{js}) \right| \text{ equal to } \underline{\mathbf{E}}$$

$$\left| \Omega_\sigma - b_\sigma + \sum_{j=1}^{i}(\Omega_j - b_j) \; []^i_{n=1}\Psi(\varpi \; \circledcirc_{js}) \right| + \left| \sum_{j=1}^{i} b_j \left\{ []^i_{n=1}\Psi(\varpi \; \gamma_{js}) - []^i_{n=1}\Psi(\varpi \; \circledcirc_{jk}) \right\} \right| \text{ equal to } \mathbf{A_\Omega C}^2$$

Resolving both sides of the equation provides the new equation:

$$\mathbf{E} = \mathbf{A_\Omega C}^2$$