Organizational memory is a frame of reference in which managers interpret what they will do. Organizational memory is developed through sharing memories of what has worked and what has not worked in the past. Then, business “recipes” are developed to help to interpret future actions. The problem is that new situations might demand totally new “frameworks,” since old recipes may become obsolete. Being aware of this is another “soft” aspect that needs to be considered during the creation and transfer of organizational knowledge (Guzman & Wilson, 2005 p. 70).

A substantial amount of literature in the last few decades has been devoted to the discipline of knowledge and its management. Doubtless various definitions for data, information, and knowledge exist. In short, there is evidence to suggest that a sliding scale exists between what we commonly ascribe as data, information, and knowledge. “Data consists of raw facts … Information is a collection of facts organised in such a way that they have additional value beyond the value of the facts themselves … Knowledge is the body of rules, guidelines, and procedures used to select, organise and manipulate data to make it suitable for a specific task …” (Stair & Reynolds, 1998, p. 5 [italics added]). This is all very well, but presupposes that what is dealt with are the codified stocks of knowledge that exist in our daily lives and more relevantly the workplace or organisational domain.

Organisations to date generally have been successful at creating and maintaining their codified knowledge stocks, but the tacit component is a phenomenon that is only just now starting to receive serious attention. This is not to say that tacit knowledge has not existed for millennia; of course it has. But the serious management or attempt at explicating it and storing it into databases is far more recent. Given that a large proportion of the information made use of is in the form of non-verbal communication, with words in themselves comprising only some 20 percent of our communication (Raghuram, 1996), we begin to understand the issue of tacit knowledge, and in turn the importance of its management. To a large degree what has
prompted this is the global economy, or globalisation as it is more popularly known. Western economies are far less reliant today on income from secondary industry; they simply cannot compete on a manufacturing basis with the labour costs of developing or less developed nations. Primary industry in the west is far less labour intensive than it was 100 years ago. Certainly the tertiary employment sector still needs to be based in the west, but this sector is not quite as knowledge intensive as say the quaternary or quinary sectors. In order to gain competitive advantage in the global economy, developed nations need to turn to maximising their information and knowledge assets. To use an analogy, they need to become the head whilst the less developed nations become the body (Wood, 2003).

The Challenges

In order to achieve greater competitiveness, organizations will need to pay greater attention to managing their soft knowledge such as tacit knowledge, judgement, and intuitive abilities. These parameters could be said to fall under the purview of a recent discipline referred to today as Knowledge management (KM). Broadbent (1998) provides one interpretation of KM, where she considers Knowledge management to be about managing two key assets of the organisation. The first of these relates to maximising the knowledge assets organisations have available to them. The second application relates to making use of the skills employees themselves bring to bear on the company. Indeed at a lower level in the company, the firm may want to improve the performance of its teams, thereby maximising usage of organisational intellectual capital (Curtain, 1998; Jorgensen, 2004; Malik, 2004).

Tacit knowledge management is also important because of the overall economic benefit it brings. Whereas codified knowledge is usually available either freely or through direct payment for patents or intellectual property settlements, tacit knowledge tends to be withheld from direct transfer. The latter knowledge plays a direct role in enabling an organisation to attain a competitive advantage as the knowledge is itself difficult to acquire (Johannessen, Olsen & Olaisen, 1997; Lei, 1997). The ultimate value of any new knowledge, including of course tacit knowledge, is that codification leads to a greater return on investment, increased workplace efficiency, and overall lower organisational costs (Arora, 1996; Nonaka, 1991). For all of these reasons, tacit knowledge often tends to be a resource that employees tend to keep to themselves, for loss of it can represent a loss of power.

One particularly important element of knowledge management is in establishing intra-organisational knowledge flows (Liebowitz, 2005). Both Bloodgood and Salisbury (2001) and Syed-Ikhsan and Rowland (2004) mention the organisational advantages to successful knowledge transfer in firms. One good example of organisational knowledge transfer is knowledge mapping, where the firm seeks to determine bottlenecks or alternatively, particularly rich depots of knowledge. The advantage of conducting such an exercise is that new staff is more easily acclimatised to the culture of the organisation, but more importantly all staff is more easily able to understand what intellectual capital exists in various parts of the company. Management also benefits as it gains a picture of the health of the organisation through studying the interactions of staff and areas where they may be avoiding one another and so not passing on their knowledge. Alternatively particular groupings or cliques of personnel may represent areas where a great deal of tacit knowledge may be being transferred.
There are many techniques to better understanding knowledge flows varying from storytelling (Snowden, 2005, 2002) or narrative knowing and telling (Küpers, 2005). Whatever the case, there is no doubting the role of teams in the modern organisation and their function in tacit knowledge management is critical (Jørgensen, 2004). Groups of people working on a given project tend to collaborate closely together and share their knowledge.

Probably even more than defining the discipline of KM, defining the term “tacit knowledge” can be a vexatious exercise indeed. The need to define is perhaps even more important in research that actually tries to be empirical. Using grounded theory is one way of doing so. Following an examination of 64 recently published documents (Busch, Richards, & Dampney, 2001), we developed a tacit knowledge hermeneutic unit or database in lay terms, examining terms that were most often used to describe tacit knowledge. What is apparent from our grounded theory exercise is that tacit knowledge is typically knowledge (80 instances in the literature), individualistic (50 instances), it is heavily organisationally based (46 instances), it is directly related at least to skill (35) and it is context specific (24). Furthermore it tends to be practically (9) rather than theoretically oriented in nature, also it is acquired in conditions of low environmental support (7) (Sternberg, Wagner, Williams, & Horvath 1995), tying in with its economic importance. One other very important issue, often not realised with tacit knowledge is the need for understanding (9) on the part of the receiver, again making tacit knowledge highly contextual. Our grounded theory analysis of the literature allowed us to establish a definition of tacit knowledge which forms the basis for the phenomenon in this book, namely that of articulate implicit managerial IT workplace knowledge.

One Solution

Through this empirical study, it was intended to define the term tacit knowledge in the context of this study and next was to measure the tacit knowledge in ICT personnel, in a given number of organisations. The study sought to examine the relationships among personnel to see whether there were likely to be factors that would enhance or decrease the likely tacit knowledge flows between them. As a means of increasing rigour associated with this research it was felt (Busch & Richards, 2000) beneficial to adopt a triangulated approach (Jick, 1979) which would incorporate (a) a psychological testing instrument; (b) Social Network Analysis as a tool to track the soft knowledge dissipation cycle, and (c) Formal Concept Analysis as a tool to track the soft knowledge dissipation cycle, and (c) Formal Concept Analysis as a tool to track the soft knowledge dissipation cycle, and Formal Concept Analysis is a mathematical lattice based means of interpreting or visualising data. Social Network Analysis is also graphical and maps the relationships between individuals.

In testing for tacit knowledge itself, approaches are limited. Arguably the greatest amount of empirical tacit knowledge based research has arisen out of the Yale-based psychology group under the directorship of Professor Robert Sternberg. The Sternberg technique has evolved over time and one approach is to incorporate a means of assessment normally using a questionnaire, whereby measurement typically used consists of a set of work-related situations, with anywhere between 5 to 20 response items (Wagner & Sternberg, 1991a; 1991b). Similar to Sternberg’s group, we were also interested in determining whether work-
place proficient personnel were developing or using tacit knowledge in different ways from
novices. To evaluate data, psychological testing usually uses statistics for interpretation.
A Wilcoxon nonparametric statistical test (Siegel, 1956) was performed, which permits a
one-tailed test of statistical significance on data to determine whether in fact statistically,
exterts and novices were answering the scenario questions in different ways. At the same
time, the intention of this research was also to identify other individuals who attained re-

results similar to that of experts but were not necessarily recognised by their peers as such.
What made this work quite different from previous such work was the adoption of Formal
Concept Analysis which occurred for a number of key reasons. First, there was a desire to
model the tacit knowledge inventory results (elicited by way of a questionnaire) in a visual
environment, which would permit finer interpretive granularity. Secondly, it was expected
that the sample sizes would be too small to permit effective quantitative interpretation of
the datasets along traditional psychology lines.
Remember that the second and perhaps a very major goal was to examine knowledge
flows amongst individuals. There are many parameters that can affect knowledge flows
in organisations, but at the level of the individual there are limited logistically means with
regard to how measure of flows can take place. Social Network Analysis permits a viable
means of measuring such flows. Pivotal in Social Network Analysis (SNA) has been the
work of Granovetter (1973). It is the ties between individuals that constitute a fundamental
principle in Social Network Analysis. Eventually, through using such tools, we are able to
build up a knowledge map. These knowledge maps may represent staff at the level of the
whole organisation, or at the level of the individual. This research tends to focus more at
the organisational level as a whole.
Given that the research is conducted in organisations, it is useful to use some categorisation
of company type. Just as Sternberg is one of the better known experts in the area of empirical
tacit knowledge research, so too is Mintzberg (1991a-e) well known for his research into
organisations. To ground the work, the research was conducted in three organisations, which
will be referred to as X, Y, and Z. Using Mintzberg’s typology, we could declare Organisation
X to be a very large nationally based diversified company; however, the IT branch within that
firm, which is the section under study, operates as a combination of a machine bureaucracy
and a professional bureaucracy. Although the IT branch acts as a support structure for the
diversified organisation, professionals within the wider company nevertheless conduct a
lot of knowledge work, which is far from standard on a day to day basis. Organisation Y, a
small specialised firm, is either an operating adhocracy or a professional bureaucracy. Such
a classification disparity depends on the type of work being undertaken by the firm. As an
IS/ICT management consultancy, some of their work would be routine, other knowledge
work would be unique. The IT group in organisation Z is in fact similar to the IT group in
organisation X, except on a much smaller scale, such that it too comprises a machine or
professional bureaucracy.
To gather data, a tacit knowledge inventory questionnaire was programmed, which incor-
porated a biographical, social network analysis and tacit knowledge inventory component.
This was the research instrument that permitted the gathering of data. When statistical
testing was applied to the results, the results did not reveal significant differences between
experts and others. The use of Formal Concept Analysis did however allow the identification
of individuals whose answers were consistently like those of experts. It was found
experts did tend to answer the IT tacit knowledge inventory items differently from those of
novices. At the same time, a whole group of expert-novices were identified who were not
officially identified by their peers as being experts but whose results did place them in an expert category.

Perhaps one of the more obvious findings uncovered here is that there are a number of parameters that are going to affect tacit knowledge utilisation and transfer. Starting externally, the classification type of the organisation is going to have some affect. Certain organisations are by their very mission going to be tacit knowledge rich and others far more heavily reliant on a codified knowledge base. Within the organisation itself, the number of employees and number of departments of work teams is going to affect how reliant the company is on codifying their knowledge and trying where possible to codify their tacit knowledge. At the level of the employees themselves, there also are a number of parameters that will affect how well the tacit knowledge is going to flow. Ethnic differences, how well a common language such as English is utilised by the employees, their gender, and their age group—for example along generational lines—will all have a bearing on how well tacit knowledge is made use of and then transferred.

It was found in Organisation X specifically that the soft knowledge of ICT contractors is not being transferred in the Organisation as well as it could have been. In addition to this, certain key personnel were akin to gatekeepers in their ability to either transfer or withhold tacit knowledge. It also was established that there were quite a number of groupings or cliques in this firm, where some of these cliques were comprised of very tacit knowledge rich individuals, where other cliques were quite knowledge poor with regard to limited access to experts. In Organisation Y, the small cottage industry size of the firm meant that higher densities of communication were taking place between the far lower numbers of personnel. Electronic communication which can act as a tacit knowledge barrier was also minimal here, for much face-to-face interaction was taking place instead. The CIO seemed to play a more prominent role in knowledge transferral in Organisation Z. In many ways however the parameters affecting Organisation Z were similar to those of X, except on a smaller scale. Their staff complements were similar in composition and skill levels proportionately speaking. It would be easy to say that Organisation Y provided the best opportunity for tacit knowledge utilisation and transferral; however, by itself this would be simplistic. What is certain is that organisations and their employees need to be more aware of their current knowledge assets and focused on their future opportunities.

Both organisations and individuals are challenged to deal with continuing demands for flexibility. While companies are adapting their managing and organisational structures, demands on employees include continuous self-directed learning, adjusting to new work organisation, and changing job profiles. Employees’ ability to deal with those changes largely determines their future employability (Loogma, Ümarik, & Vilu, 2004 p. 323).

Contributions to Knowledge

This book presents a number of original contributions to research in the tacit knowledge area. First, the research incorporated a triangulated approach to analysing tacit knowledge diffusion within an IT domain. This approach was comprised of firstly a phenomenological
interpretation of tacit knowledge, secondly the inclusion of tacit knowledge testing, and thirdly the adoption of techniques to test for its transfer, none of which in combination have been previously offered. Prior research typically has discussed tacit knowledge, or when actually taken a step further, merely performed tests at the level of the individual. This research, however, actually has examined aspects of diffusion of soft knowledge in IT organisational settings.

Secondly, a very substantial literature review was conducted with a view to incorporating this within a grounded theory analysis of tacit knowledge. The results of this research can be seen in part B of chapter 2. The conduct of grounded theory enabled further research to commence with regard to articulating the phenomenon of tacit knowledge as clearly as possible.

The third original contribution to research in the tacit knowledge area relates to the creation of an IT specific tacit knowledge inventory. This questionnaire with its IT workplace scenarios represents a research and industry tool that has practical applications in the knowledge management domain. It is anticipated that the inventory will be adopted by some organisations (certain requests have already been made). Similarly, the Social Network Analysis specific component of the questionnaire already has been requested by other organisations.

Fourth, whereas it was noted that the overwhelming majority of tacit knowledge research is descriptive, that small component that actually is empirical typically resides within the domain of psychology. The point being the research presented here is unique insofar as it makes novel use of Formal Concept Analysis as a means of interpreting tacit knowledge related workplace scenarios. Indeed the identification of expert non-experts was only possible through the use of this technique.

And fifth, perhaps the most significant contribution has been that the research has taken place in the “real world” with the involvement of three IT, but nevertheless quite different organisations. All too commonly a great deal of both academic scholarship and research is conducted for the sake of logistical simplicity on captive undergraduate student populations, the results of which then are extrapolated onto the outside world. This empirical study purposely sought to avoid this so that any generalisations that did arise could be better placed with regard to the organisational environments in which they were discovered.

Organisation of the Book

The book is organised into five sections and 15 chapters, followed by appendices. A brief description of each of the chapters follows:

Section 1: Background

Chapter 1: Identifies the existing areas of concern with regard to the domain of tacit knowledge. Difficulties inherent in undertaking tacit knowledge research are explored as well as why researchers and scholars would wish to do so.
Chapter II: Provides a background to this area of research through an examination of knowledge management. Having discussed knowledge management in general, the focus turns to knowledge management with regard to tacit knowledge.

Chapter III: Focuses on tacit knowledge specifically. In coming to an agreement on what constitutes tacit knowledge for this book, ground theory is utilised to arrive at a suitable definition to this form of knowledge.

Section 2: Methodological Foundations

Chapter IV: Describes the issues that currently exist with regard to testing for tacit knowledge. The chapter explains that testing typically takes place at the level of an individual. Although a great deal of literature discussing tacit knowledge exists, testing almost wholly takes place in psychological disciplines; little empirical tacit knowledge research tends to take place outside this discipline.

Chapter V: Discusses the concept of organisations, using Mintzberg’s typology. The organisations under study in this book are then introduced, being named X, Y and Z.

Chapter VI: Introduces the concept of knowledge flows as a means of learning and knowledge transfer.

Chapter VII: Establishes arguably the major means of illustrating knowledge flows is through relationships between individuals. The technique introduced here is Social Network Analysis.

Section 3: Methodology

Chapter VIII: Outlines the methodology used as a technique to eliciting tacit knowledge. The chapter then explores the data analysis necessary for interpretation of results.

Section 4: Results

Chapter IX: Provides the reader with initial results, introducing in detail the test instrument that was used in the research process. Results of a statistical test (Wilcoxon) also are presented.

Chapter X: Presents results through a different technique, namely that of Formal Concept Analysis (FCA). Using this form of investigation we can visually interpret data that would otherwise be lost in numerical obscurity.

Chapter XI: Examines the results from the first of our three organisations, in this case Organisation X.

Chapter XII: Continues the result presentation and discussion with Organisation Y.

Chapter XIII: Concludes the presentation of results with Organisation Z.
Section 5: Discussion, Conclusion, and Recommendations

Chapter XIV: Provides a summary of the work covered in the book.
Chapter XV: This concluding chapter makes brief recommendations for organisations.

Appendices

Appendix A: Prior definitions of tacit knowledge
Appendix B: Tacit knowledge maps created through a qualitative analysis of tacit knowledge definitions
Appendix C: The structure charts for Organisation X
Appendix D: Social Network Analysis sociograms on overhead transparencies, should the reader which to see an overlay of the diagrams from one to the next
Appendix E: Extra Social Network Analysis supporting data
Appendix F: The questionnaire used in the research
Appendix G: Glossary of common terms used in this book

Clarifications for the Reader

There are a few points that need to be clarified for the benefit of the reader.
Firstly, one will note that the authors make use of both the Harvard and endnote referencing styles. The Harvard system is nevertheless the customary approach utilised. When however the number of citations becomes excessive or a particular point is emphasised, end-noting is utilised as an aid to maintaining flow.
Secondly, the reader will note that key words are often italicised.
Thirdly, not all quotes cited throughout the text and citations listed in the bibliography include page numbers, the reasons being that these documents were available electronically in HTML format, in which page numbers do not appear.

References


